

SAFETY DATA SHEET according to Regulation (EC) No. 1907/2006

FORMIC ACID 78% / CAN 23 KG FE/R

Version 4.0

Print Date 21.11.2019

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SECTION 1: Identification of the substance/mixture and of the company/undertaking**1.1. Product identifier**

Trade name : FORMIC ACID 78% / CAN 23 KG FE/R
Substance name : formic acid
Index-No. : 607-001-00-0
CAS-No. : 64-18-6
EC-No. : 200-579-1
EU REACH-Reg. No. : 01-2119491174-37-xxxx

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

Use of the Substance/Mixture : Used as:, Chemical synthesis., Industrial formulation, Feed ingredient, Identified use: See table in front of appendix for a complete overview of identified uses.
Use of the Substance/Mixture :
Uses advised against :
Uses advised against : Do not use in spray cans (aerosols).

1.3. Details of the supplier of the safety data sheet

Company : Brenntag Nordic A/S
Borupvang 5 B
DK 2750 Ballerup
Telephone : +45 43 29 28 00
Telefax : +45 43 29 27 00
E-mail address : SDS.DK@brenntag-nordic.com
Responsible/issuing person : Environment & Quality

1.4. Emergency telephone number

Emergency telephone number : In case of personal injury call:
Denmark: 82 12 12 12 Giftlinien, Bispebjerg Hospital
Finland: Poison Information Centre: (09) 471 977 (direct) or (09) 47 11 (exchange), open 24h/day
Norway: 22 59 13 00 Giftinformasjonen (døgnet)pent
Sweden: +46-8-331231 Giftinformationscentralen (24 hour service)
Outside these countries: Please call your local emergency services

FORMIC ACID 78% / CAN 23 KG FE/R**SECTION 2: Hazards identification****2.1. Classification of the substance or mixture**

Classification according to Regulation (EC) No 1272/2008

REGULATION (EC) No 1272/2008			
Hazard class	Hazard category	Target Organs	Hazard statements
Acute toxicity (Oral)	Category 4	---	H302
Acute toxicity (Inhalation)	Category 4	---	H332
Skin corrosion	Category 1B	---	H314

For the full text of the H-Statements mentioned in this Section, see Section 16.

Most important adverse effects

Human Health	:	Harmful if inhaled., After hours to several days without symptoms may occur severe shortness of breath and pulmonary edema. May cause burns with pain, redness and wounds. Splashes in the eyes may cause painful burns, which may result in permanent damage to the eyes. Harmful if swallowed., Cause serious burns with severe pains, vomiting, pains in the stomach, possibly chock and damaged kidneys. The burn may occur even if only small amounts have been swallowed.
Physical and chemical hazards	:	Vapours may form explosive mixtures with air., To be stored as flammable liquid.
Potential environmental effects	:	The product is not classified as dangerous for the environment.

2.2. Label elements

Labelling according to Regulation (EC) No 1272/2008

Hazard symbols	:	 
Signal word	:	Danger
Hazard statements	:	H302 + H332 Harmful if swallowed or if inhaled H314 Causes severe skin burns and eye damage.
Precautionary statements	:	

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Prevention	:	P261	Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
		P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
Response	:	P301 + P330 + P331	IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
		P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
		P304 + P340 + P310	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/doctor.
		P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
Storage	:	P403 + P233	Store in a well-ventilated place. Keep container tightly closed.

Additional Labelling:

EUH071 Corrosive to the respiratory tract.

Hazardous components which must be listed on the label:

II • formic acid

2.3. Other hazards

For Results of PBT and vPvB assessment see section 12.5.

SECTION 3: Composition/information on ingredients**3.1. Substances**

			Classification (REGULATION (EC) No 1272/2008)	
Hazardous components		Amount [%]	Hazard class / Hazard category	Hazard statements
formic acid				
Index-No.	: 607-001-00-0	>= 70 - <= 78	Flam. Liq.3	H226
CAS-No.	: 64-18-6		Acute Tox.4	H302
EC-No.	: 200-579-1		Acute Tox.3	H331
EU REACH-Reg. No.	: 01-2119491174-37-xxxx		Skin Corr.1A	H314

For the full text of the H-Statements mentioned in this Section, see Section 16.

FORMIC ACID 78% / CAN 23 KG FE/R**SECTION 4: First aid measures****4.1. Description of first aid measures**

General advice	: Take off all contaminated clothing immediately.
If inhaled	: Remove to fresh air. Give oxygen. If unconscious place in recovery position and seek medical advice.
In case of skin contact	: Wash off immediately with plenty of water for at least 15 minutes. Immediate medical treatment is necessary as untreated wounds from corrosion of the skin heal slowly and with difficulty.
In case of eye contact	: Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Remove contact lenses. Consult an eye specialist immediately.
If swallowed	: Clean mouth with water and drink afterwards plenty of water. Never give anything by mouth to an unconscious person. Do NOT induce vomiting. Call a physician immediately.

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

Symptoms	: See Section 11 for more detailed information on health effects and symptoms.
Effects	: See Section 11 for more detailed information on health effects and symptoms.

4.3. Indication of any immediate medical attention and special treatment needed

Treatment	: Do NOT induce vomiting. In case of ingestion, the stomach should be emptied by gastric lavage under qualified medical supervision.
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SECTION 5: Firefighting measures**5.1. Extinguishing media**

Suitable extinguishing media	: Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.
Unsuitable extinguishing media	: High volume water jet

5.2. Special hazards arising from the substance or mixture

Specific hazards during firefighting	: In case of fire hazardous decomposition products may be produced such as: Carbon monoxide, Carbon dioxide (CO ₂), The formation of caustic fumes is possible.
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5.3. Advice for firefighters

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Special protective equipment for firefighters	:	In the event of fire, wear self-contained breathing apparatus. Wear appropriate body protection (full protective suit)
Further advice	:	Cool closed containers exposed to fire with water spray. Collect contaminated fire extinguishing water separately. This must not be discharged into drains.

SECTION 6: Accidental release measures**6.1. Personal precautions, protective equipment and emergency procedures**

Personal precautions	:	Use personal protective equipment. Provide adequate ventilation. Keep away from heat and sources of ignition. Avoid contact with skin and eyes. Do not breathe vapours or spray mist.
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6.2. Environmental precautions

Environmental precautions	:	Do not flush into surface water or sanitary sewer system. Avoid subsoil penetration. If the product contaminates rivers and lakes or drains inform respective authorities. Local authorities should be advised if significant spillages cannot be contained.
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6.3. Methods and materials for containment and cleaning up

Methods and materials for containment and cleaning up	:	Contain spillage, and then collect with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see section 13).
Further information	:	Treat recovered material as described in the section "Disposal considerations".

6.4. Reference to other sections

See Section 1 for emergency contact information.
See Section 8 for information on personal protective equipment.
See Section 13 for waste treatment information.

SECTION 7: Handling and storage**7.1. Precautions for safe handling**

Advice on safe handling	:	Handle in accordance with good industrial hygiene and safety practice. Avoid contact with skin and eyes. Provide for good ventilation. Mechanical ventilation can be needed. Emergency eye wash fountains and emergency showers should be available in the immediate vicinity.
Hygiene measures	:	Smoking, eating and drinking should be prohibited in the application area. Wash hands before breaks and immediately after handling the product.

FORMIC ACID 78% / CAN 23 KG FE/R**7.2. Conditions for safe storage, including any incompatibilities**

Advice on protection against fire and explosion : Take precautionary measures against static discharges.

Further information on storage conditions : Keep tightly closed in a dry and cool place. Keep in a well-ventilated place.

Further information on storage conditions : Storage must follow the regulations for flammable liquids: Class III-2 (DK only).

7.3. Specific end use(s)

Specific use(s) : Identified use: See table in front of appendix for a complete overview of identified uses.

SECTION 8: Exposure controls/personal protection**8.1. Control parameters**

Component:	formic acid	CAS-No. 64-18-6
Derived No Effect Level (DNEL)/Derived Minimal Effect Level (DMEL)		

DNEL		
Workers, Acute - systemic effects, Inhalation	:	19 mg/m ³
DNEL		
Workers, Acute - local effects, Inhalation	:	19 mg/m ³
DNEL		
Workers, Long-term - systemic effects, Inhalation	:	9,5 mg/m ³
DNEL		
Workers, Long-term - local effects, Inhalation	:	9,5 mg/m ³
DNEL		
Consumers, Acute - systemic effects, Inhalation	:	9,5 mg/m ³
DNEL		
Consumers, Acute - local effects, Inhalation	:	9,5 mg/m ³
DNEL		
Consumers, Long-term - systemic effects, Inhalation	:	3 mg/m ³
DNEL		
Consumers, Long-term - local effects, Inhalation	:	3 mg/m ³

Predicted No Effect Concentration (PNEC)

Fresh water	:	2 mg/l
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Marine water	: 0,2 mg/l
Intermittent releases	: 1 mg/l
Fresh water sediment	: 13,4 mg/kg d.w.
Marine sediment	: 1,34 mg/kg d.w.
Soil	: 1,5 mg/kg d.w.
Sewage treatment plant (STP)	: 7,2 mg/l

Other Occupational Exposure Limit Values

Denmark. Danish List of Organic Solvents, Danish Labor Inspectorate, Threshold Limit Values (TLV):
5 ppm

EU. Indicative Exposure Limit Values in Directives 91/322/EEC, 2000/39/EC, 2006/15/EC, 2009/161/EU, Time Weighted Average (TWA):
5 ppm, 9 mg/m³
Indicative

Denmark. Exposure Limit Values, Threshold Limit Values (TLV):
5 ppm, 9 mg/m³

8.2. Exposure controls**Personal protective equipment***Respiratory protection*

Advice : Required, if exposure limit is exceeded (e.g. OEL).
In case of brief exposure or low pollution use breathing filter apparatus.
Recommended Filter type:E
In case of intensive or longer exposure use self-contained breathing apparatus.

Hand protection

Advice : The glove material has to be impermeable and resistant to the product / the substance / the preparation.
Take note of the information given by the producer concerning permeability and break through times, and of special workplace conditions (mechanical strain, duration of contact).
Protective gloves should be replaced at first signs of wear.

Eye protection

Advice : Tightly fitting safety goggles

FORMIC ACID 78% / CAN 23 KG FE/R*Skin and body protection*

Advice : Acid resistant protective clothing.

Environmental exposure controls

General advice : Do not flush into surface water or sanitary sewer system.
Avoid subsoil penetration.
If the product contaminates rivers and lakes or drains inform respective authorities.
Local authorities should be advised if significant spillages cannot be contained.

SECTION 9: Physical and chemical properties**9.1. Information on basic physical and chemical properties**

Form	: liquid
Colour	: colourless to yellow
Odour	: stinging
Odour Threshold	: not determined
pH	: ca. 2,2 (10 g/l ; 20 °C)
Freezing point	: ca. -30 °C (1013 hPa)
Boiling point	: > 100 °C (1013 hPa)
Flash point	: < 100 °C
Evaporation rate	: no data available
Flammability (solid, gas)	: no data available
Upper explosion limit	: 48 %(V)
Lower explosion limit	: 15 %(V)
Vapour pressure	: ca. 24 hPa (20 °C)
Relative vapour density	: no data available
Density	: ca. 1,18 g/cm ³ (20 °C)
Water solubility	: completely soluble
Partition coefficient: n-octanol/water	: log Kow -1,9 (23 °C; pH 5)

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Auto-ignition temperature	: > 500 °C
Thermal decomposition	: Decomposes on heating.
Viscosity, dynamic	: ca. 1,7 mPa.s (20 °C)
Viscosity, kinematic	: ca. 1,4 mm ² /s (20 °C)
Explosivity	: Formation of explosive air/vapour mixtures is possible.
Oxidizing properties	: not oxidising

9.2. Other information

No further information available.

SECTION 10: Stability and reactivity**10.1. Reactivity**

Advice : Stable under recommended storage conditions.

10.2. Chemical stability

Advice : Decomposes on heating.

10.3. Possibility of hazardous reactions

Hazardous reactions : Materials to avoid: Hydrogen peroxide Explosive properties

10.4. Conditions to avoid

Conditions to avoid : Heat, flames and sparks.Exposure to sunlight.
Thermal decomposition : Decomposes on heating.

10.5. Incompatible materials

Materials to avoid : Strong oxidizing agents, Aluminium, alkalis, sulphuric acid, peroxides, e.g. hydrogen peroxide

10.6. Hazardous decomposition products

Hazardous decomposition products : Carbon monoxide

SECTION 11: Toxicological information**11.1. Information on toxicological effects****Data for the product****Acute toxicity**

FORMIC ACID 78% / CAN 23 KG FE/R**Oral**

Cause serious burns with severe pains, vomiting, pains in the stomach, possibly chock and damaged kidneys. The burn may occur even if only small amounts have been swallowed.

Acute toxicity estimate : 935,9 mg/kg) (Calculation method)

Inhalation

Inhalation may cause pain to nose and throat, cough, headache and poorly.
After hours to several days without symptoms may occur severe shortness of breath and pulmonary edema.
Harmful if inhaled.

Acute toxicity estimate : 10,06 mg/l (4 h; vapour) (Calculation method)

Irritation**Skin**

Result : May cause burns with pain, redness and wounds.

Eyes

Result : Splashes in the eyes may cause painful burns, which may result in permanent damage to the eyes.

Component: formic acid CAS-No. 64-18-6

Acute toxicity**Oral**

LD50 : 730 mg/kg (Rat) (OECD Test Guideline 401)

Inhalation

LC50 : 7,85 mg/l (Rat; 4 h) (BASF - Test)

Dermal

Study scientifically not justified.

Irritation**Skin**

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Result	: corrosive effects (Rabbit) (OECD Test Guideline 404)
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Eyes

Result	: corrosive effects (OECD Test Guideline 405)
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Sensitisation

Result	: not sensitizing (Buehler Test; Guinea pig) (OECD Test Guideline 406)
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CMR effects**CMR Properties**

Carcinogenicity	: Animal testing did not show any carcinogenic effects. Information given is based on data obtained from similar substances.
Mutagenicity	: Tests on bacterial or mammalian cell cultures did not show mutagenic effects. Not mutagenic in Ames Test
Teratogenicity	: Did not show teratogenic effects in animal experiments. Information given is based on data obtained from similar substances.
Reproductive toxicity	: Animal testing did not show any effects on fertility. Information given is based on data obtained from similar substances.

Reproductive toxicity

NOAEL Parent	: 676 mg/kg
NOAEL F1	: 676 mg/kg (Rat, male) (Oral) (OECD Test Guideline 416) Fertility and developmental toxicity tests did not reveal any effect on reproduction.

Specific Target Organ Toxicity**Single exposure**

Remark	: The substance or mixture is not classified as specific target organ toxicant, single exposure.
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Repeated exposure

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Remark : The substance or mixture is not classified as specific target organ toxicant, repeated exposure.

Other toxic properties**Aspiration hazard**

Not applicable,

Further information

Other relevant toxicity information : If ingested, severe burns of the mouth and throat, as well as a danger of perforation of the oesophagus and the stomach.

Experience with human exposure : Chronic exposure damages the brain and the central nervous system.,

SECTION 12: Ecological information**12.1. Toxicity**

Component:	formic acid	CAS-No. 64-18-6
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Acute toxicity**Fish**

LC50	: 130 mg/l (Brachydanio rerio; 96 h) (static test; OECD Test Guideline 203) Data based on test results or data from a comparable product.
LC50	: 68 mg/l (Leuciscus idus (Golden orfe); 96 h) (static test; DIN 38412)

Toxicity to daphnia and other aquatic invertebrates

EC50	: 365 mg/l (Daphnia magna; 48 h) (static test; OECD Test Guideline 202) Data based on test results or data from a comparable product.
EC50	: 32,19 mg/l (Daphnia magna; 48 h) (static test)

algae

EC50	: 1,240 mg/l (Scenedesmus capricornutum (fresh water algae); 72 h) (static test; OECD Test Guideline 201) Data based on test results or data from a comparable product.
EC50	: 32,64 mg/l (Scenedesmus subspicatus; 72 h) (static test; End point: Growth rate; DIN 38412)

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Bacteria

EC50	:	46,7 mg/l (Pseudomonas putida; 17 h) (DIN 38412) aerobic
EC10	:	72 mg/l (activated sludge; 13 d) aerobic
EC20	:	> 1000 mg/l (activated sludge; 0,5 h) (ISO 8192) aerobic

Chronic toxicity**Aquatic invertebrates**

NOEC	:	>= 102 mg/l (Daphnia magna (Water flea); 21 d) (semi-static test; OECD Test Guideline 211)
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12.2. Persistence and degradability

Component:	formic acid	CAS-No. 64-18-6
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Persistence and degradability**Persistence**

Result	:	no data available
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Biodegradability

Result	:	100 % (aerobic; activated sludge; Related to: Dissolved organic carbon (DOC); Exposure Time: 9 d)(OECD Test Guideline 301E) Readily biodegradable
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12.3. Bioaccumulative potential

Component:	formic acid	CAS-No. 64-18-6
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Bioaccumulation

Result	:	log Kow -1,9 (23 °C; pH 5) Bioaccumulation is not expected.
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12.4. Mobility in soil

Component:	formic acid	CAS-No. 64-18-6
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Mobility

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Water	:	The substance will not evaporate into the atmosphere from the water surface.
Soil	:	Not expected to adsorb on soil.

12.5. Results of PBT and vPvB assessment**Data for the product****Results of PBT and vPvB assessment**

Result	:	
Result	:	This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

Component:	formic acid	CAS-No. 64-18-6
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Results of PBT and vPvB assessment

Result	:	This substance is not considered to be persistent, bioaccumulating nor toxic (PBT)., This substance is not considered to be very persistent and very bioaccumulating (vPvB).
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12.6. Other adverse effects

Component:	formic acid	CAS-No. 64-18-6
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Biochemical Oxygen Demand (BOD)

Result	:	86 mg/g
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Chemical Oxygen Demand (COD)

Result	:	348 mg/g
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Additional ecological information

Result	:	Harmful effects to aquatic organisms due to pH-shift. Do not flush into surface water or sanitary sewer system.
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SECTION 13: Disposal considerations**13.1. Waste treatment methods**

Product	:	Eliminate waste in conditions authorized by the regulations. Store waste in containers provided for this purpose. Do not dump in drains, water sheets or the ground.
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Contaminated packaging	:	Empty contaminated packagings thoroughly. They can be recycled after thorough and proper cleaning. If recycling is not practicable, dispose of in compliance with local regulations. Do not burn, or use a cutting torch on, the empty drum. Risk of explosion.
European Waste Catalogue Number	:	No waste code according to the European Waste Catalogue can be assigned for this product, as the intended use dictates the assignment. The waste code is established in consultation with the regional waste disposer.
Waste Key Number	:	H 3.13

SECTION 14: Transport information**14.1. UN number**

3412

14.2. UN proper shipping name

ADR	:	FORMIC ACID SOLUTION
RID	:	FORMIC ACID SOLUTION
IMDG	:	FORMIC ACID SOLUTION

14.3. Transport hazard class(es)

ADR-Class	:	8
(Labels; Classification Code; Hazard identification No; Tunnel restriction code)	:	8; C3; 80; (E)
RID-Class	:	8
(Labels; Classification Code; Hazard identification No)	:	8; C3; 80
IMDG-Class	:	8
(Labels; EmS)	:	8; F-A, S-B

14.4. Packaging group

ADR	:	II
RID	:	II
IMDG	:	II

14.5. Environmental hazards

Environmentally hazardous according to ADR	:	no
Environmentally hazardous according to RID	:	no
Marine Pollutant according to IMDG-Code	:	no

14.6. Special precautions for user

Not applicable.

FORMIC ACID 78% / CAN 23 KG FE/R**14.7. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code**

IMDG : Not applicable.

SECTION 15: Regulatory information**15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture****Data for the product**

Other regulations : As a principal rule, persons under 18 years are not allowed to work with this substance.
Do not use in spray cans (aerosols).
Only persons, who are thoroughly instructed in the dangerous properties and the necessary safety precautions of the substance, are allowed to work with it.

Component:	formic acid	CAS-No. 64-18-6
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EU. Regulation EU No. 649/2012 concerning the export and import of dangerous chemicals	: ; Not listed
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EU. REACH, Annex XVII, Marketing and Use Restrictions (Regulation 1907/2006/EC)	: Point Nos.: , 3; Listed
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EU. Regulation No 1451/2007 [Biocides], Annex I, OJ (L 325)	: EC Number: , 200-579-1; Listed
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EU. Regulation No. 1223/2009 on cosmetic products, Annex V: List of Preservatives Allowed in Cosmetic Products	: Maximum concentration in ready for use preparation: 0,5 % acid 14; All cosmetic products; See the text of the regulation for applicable exceptions or provisions.
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EU. Directive 2012/18/EU (SEVESO III) Annex I	: Lower-tier requirements: 50 tonnes; Part 1: Categories of dangerous substances; H2: ACUTE TOXIC (Category 2, all exposure routes; Category 3, inhalation) Upper-tier requirements: 200 tonnes; Part 1: Categories of dangerous substances; H2: ACUTE TOXIC (Category 2, all exposure routes; Category 3, inhalation) Lower-tier requirements: 5.000 tonnes; Part 1: Categories of dangerous substances; P5c: Flammable liquids, Categories 2 or 3 not covered by P5a and P5b, The information given is valid if the product is stored below the boiling point and at a pressure of 1013 hPa.
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Upper-tier requirements: 50.000 tonnes; Part 1: Categories of dangerous substances; P5c: Flammable liquids, Categories 2 or 3 not covered by P5a and P5b, The information given is valid if the product is stored below the boiling point and at a pressure of 1013 hPa.

**Notification status
formic acid:**

Regulatory List	Notification	Notification number
AICS	YES	
DSL	YES	
EINECS	YES	200-579-1
ENCS (JP)	YES	(2)-670
IECSC	YES	
ISHL (JP)	YES	(2)-670
JEX (JP)	YES	(2)-670
KECI (KR)	YES	KE-17233
NZIOC	YES	HSR000979
PICCS (PH)	YES	
TSCA	YES	

15.2. Chemical safety assessment

A Chemical Safety Assessment has been carried out for this substance.

SECTION 16: Other information**Full text of H-Statements referred to under sections 2 and 3.**

H226	Flammable liquid and vapour.
H302	Harmful if swallowed.
H314	Causes severe skin burns and eye damage.
H331	Toxic if inhaled.
H332	Harmful if inhaled.

Abbreviations and Acronyms

BCF	bioconcentration factor
BOD	biochemical oxygen demand
CAS	Chemical Abstracts Service
CLP	Classification, Labelling and Packaging
CMR	carcinogenic, mutagenic or toxic to reproduction
COD	chemical oxygen demand
DNEL	derived no-effect level
EINECS	European Inventory of Existing Commercial Chemical Substances
ELINCS	European List of Notified Chemical Substances
GHS	Globally Harmonized System of Classification and Labelling of Chemicals
LC50	median lethal concentration

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LOAEC	lowest observed adverse effect concentration
LOAEL	lowest observed adverse effect level
LOEL	lowest observed effect level
NLP	no-longer polymer
NOAEC	no observed adverse effect concentration
NOAEL	no observed adverse effect level
NOEC	no observed effect concentration
NOEL	no observed effect level
OECD	Organisation for Economic Cooperation and Development
OEL	occupational exposure limit
PBT	persistent, bioaccumulative and toxic
REACH Auth. No.:	REACH Authorisation Number
REACH AuthAppC. No.	REACH Authorisation Application Consultation Number
PNEC	predicted no-effect concentration
STOT	specific target organ toxicity
SVHC	substance of very high concern

Further information

- Key literature references : Supplier information and data from the "Database of registered substances" of the European Chemicals Agency (ECHA) were used to create this safety data sheet.
- Methods used for product classification : The classification for human health, physical and chemical hazards and environmental hazards were derived from a combination of calculation methods and if available test data.
- Hints for trainings : The workers have to be trained regularly on the safe handling of the products based on the information provided in the Safety Data Sheet and the local conditions of the workplace. National regulations for the training of workers in the handling of hazardous materials must be adhered to.

|| Indicates updated section.

The information provided in this Safety Data Sheet is correct to our knowledge at the date of its revision. The information given only describes the products with regard to safety arrangements and is not to be considered as a warranty or quality specification and does not constitute a legal relationship.

The information contained in this Safety Data Sheet relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

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No.	Short title	Main User Group (SU)	Sector of Use (SU)	Product Category (PC)	Process Category (PROC)	Environmental Release Category (ERC)	Article Category (AC)	Specified
1	Use as an intermediate	3	8, 9	NA	1, 2, 3, 4, 8a, 8b, 15	1, 6a	NA	ES557
2	Distribution of substance	3	8, 9	NA	8a, 8b, 15	1, 2	NA	ES544
3	Formulation & (re)packing of substances and mixtures	3	10	NA	1, 2, 3, 4, 5, 8a, 8b, 9, 14, 15	2	NA	ES547
4	Production of resins	3	12	NA	1, 2, 3, 4, 5, 8a, 8b, 9, 14	6a, 6c	NA	ES578
5	Polymer processing	3	10	NA	1, 2, 3, 4, 5, 6, 8a, 8b, 9, 13, 14	6d	NA	ES580
6	Use in Cleaning Agents	3	NA	NA	1, 2, 3, 4, 7, 8a, 8b, 10, 13, 19	4	NA	ES564
7	Use in Cleaning Agents	22	NA	NA	1, 2, 3, 4, 8a, 8b, 10, 11, 13, 19	8a, 8d	NA	ES567
8	Use in Cleaning Agents	21	NA	35	NA	8a, 8d	NA	ES572
9	Use in laboratories	3	NA	NA	15	4	NA	ES574
10	Use in laboratories	22	NA	NA	15	8a	NA	ES576
11	Use as a process chemical	3	5, 10	NA	1, 2, 3, 4, 5, 6, 7, 8a, 8b, 9, 10, 13, 14, 15, 19	2, 4, 5, 6b	NA	ES588
12	Use as a process chemical	22	NA	NA	1, 2, 3, 4, 5, 8a, 8b, 9, 10, 11, 13, 14, 15, 19	8c, 8d, 8f	NA	ES593
13	Use as a process chemical	21	NA	23, 32, 34	NA	8c, 8d, 8f	NA	ES602
14	Use in animal nutrition	22	NA	NA	5, 10, 11, 13, 19	8a, 8b	NA	ES604
15	Use in biocidal products	22	NA	NA	5, 10, 11, 13, 19	8a, 8b	NA	ES610
16	Uses in coatings	3	NA	NA	1, 2, 3, 4, 5, 7, 8a, 8b, 10, 13, 15	4, 6b	NA	ES561
17	Polymer processing	22	NA	NA	1, 2, 8a, 8b, 14	8a, 8c, 8d, 8f	NA	ES584

FORMIC ACID 78% / CAN 23 KG FE/R**1. Short title of Exposure Scenario 1: Use as an intermediate**

Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Sectors of end-use	SU8: Manufacture of bulk, large scale chemicals (including petroleum products) SU9: Manufacture of fine chemicals
Process categories	PROC1: Use in closed process, no likelihood of exposure PROC2: Use in closed, continuous process with occasional controlled exposure PROC3: Use in closed batch process (synthesis or formulation) PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities PROC15: Use as laboratory reagent
Environmental Release Categories	ERC1: Manufacture of substances ERC6a: Industrial use resulting in manufacture of another substance (use of intermediates)

2.1 Contributing scenario controlling environmental exposure for: ERC1, ERC6a

As no environmental hazard was identified no environmental related exposure assessment and risk characterization was performed

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC15

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).
	Physical Form (at time of use)	liquid
	Vapour pressure	42,7 hPa
Frequency and duration of use	Frequency of use	480 minutes/day
	Frequency of use	5 days/week
Human factors not influenced by risk management	Exposed skin areas	Palm of one hand (240cm ²) (PROC1, PROC3, PROC15)
	Exposed skin areas	Palms of both hands (480 cm ²) (PROC2, PROC4, PROC8b)
	Exposed skin areas	Two hands 960 cm ² (PROC8a)
Other operational conditions affecting workers exposure	Indoor	
Technical conditions and measures to control dispersion from source towards the worker	Provide local exhaust ventilation (LEV). (Efficiency: 90 %)(PROC2, PROC3, PROC4, PROC15)	
	Provide local exhaust ventilation (LEV). (Efficiency: 95 %)(PROC8a)	
	Provide local exhaust ventilation (LEV). (Efficiency: 97 %)(PROC8b)	
Conditions and measures related to personal protection, hygiene and health evaluation	Wear respiratory protection.(PROC8a)	
	Use suitable eye protection and gloves.	

Risk Management Measures are based on qualitative risk characterisation.

3. Exposure estimation and reference to its source**Environment**

No exposure assessment presented for the environment.

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PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC15: Use of ECETOC TRA Version 2 with modifications.

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1	---	Worker - inhalative, long-term - local and systemic.	0,019mg/m ³	0,002
PROC2, PROC15	---	Worker - inhalative, long-term - local and systemic.	1,929mg/m ³	0,203
PROC3	---	Worker - inhalative, long-term - local and systemic.	4,822mg/m ³	0,508
PROC4	---	Worker - inhalative, long-term - local and systemic.	3,858mg/m ³	0,406
PROC8a	---	Worker - inhalative, long-term - local and systemic.	4,823mg/m ³	0,508
PROC8b	---	Worker - inhalative, long-term - local and systemic.	2,894mg/m ³	0,305
PROC1	---	worker dermal, short and long term - systemic	0,343mg/kg bw/day	---
PROC1	---	Worker dermal, short and long term - local	0,100mg/cm ²	---
PROC2, PROC8a	---	worker dermal, short and long term - systemic	0,274mg/kg bw/day	---
PROC2	---	Worker dermal, short and long term - local	0,04mg/cm ²	---
PROC3, PROC15	---	worker dermal, short and long term - systemic	0,069mg/kg bw/day	---
PROC3, PROC15	---	Worker dermal, short and long term - local	0,020mg/cm ²	---
PROC4, PROC8b	---	worker dermal, short and long term - systemic	1,371mg/kg bw/day	---
PROC4, PROC8a, PROC8b	---	Worker dermal, short and long term - local	0,200mg/cm ²	---

The short-term exposure value corresponds to the long-term value multiplied by a factor of 2. Relevant for inhalative exposure estimates. Qualitative assessment of contact with eyes. Qualitative assessment dermal. The use is assessed to be safe.

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

For further information on the assessment method, see: <http://www.ecetoc.org/tra>
Please note that modified version has been used (see exposure estimates).

FORMIC ACID 78% / CAN 23 KG FE/R**1. Short title of Exposure Scenario 2: Distribution of substance**

Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Sectors of end-use	SU8: Manufacture of bulk, large scale chemicals (including petroleum products) SU9: Manufacture of fine chemicals
Process categories	PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities PROC15: Use as laboratory reagent
Environmental Release Categories	ERC1: Manufacture of substances ERC2: Formulation of preparations

2.1 Contributing scenario controlling environmental exposure for: ERC1, ERC2

As no environmental hazard was identified no environmental related exposure assessment and risk characterization was performed

2.2 Contributing scenario controlling worker exposure for: PROC8a, PROC8b, PROC15

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).
	Physical Form (at time of use)	liquid
	Vapour pressure	42,7 hPa
Frequency and duration of use	Frequency of use	480 minutes/day
	Frequency of use	5 days/week
Human factors not influenced by risk management	Exposed skin areas	Two hands 960 cm² (PROC8a)
	Exposed skin areas	Palms of both hands (480 cm2) (PROC8b)
	Exposed skin areas	Palm of one hand (240cm2) (PROC15)
Other operational conditions affecting workers exposure	Indoor	
Technical conditions and measures to control dispersion from source towards the worker	Provide local exhaust ventilation (LEV). (Efficiency: 95 %)(PROC8a)	
	Provide local exhaust ventilation (LEV). (Efficiency: 97 %)(PROC8b)	
	Provide local exhaust ventilation (LEV). (Efficiency: 90 %)(PROC15)	
Conditions and measures related to personal protection, hygiene and health evaluation	Wear respiratory protection.(PROC8a)	
	Use suitable eye protection and gloves.	
Risk Management Measures are based on qualitative risk characterisation.		

3. Exposure estimation and reference to its source**Environment**

No exposure assessment presented for the environment.

Workers

PROC8a, PROC8b, PROC15: Use of ECETOC TRA Version 2 with modifications.

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC8a	---	Worker - inhalative, long-term - local and systemic.	4,823mg/m ³	0,508
PROC8b	---	Worker - inhalative, long-term - local and systemic.	2,894mg/m ³	0,305

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PROC15	---	Worker - inhalative, long-term - local and systemic.	1,929mg/m ³	0,203
PROC8a	---	worker dermal, short and long term - systemic	2,743mg/kg bw/day	---
PROC8a, PROC8b	---	Worker dermal, short and long term - local	0,200mg/cm ²	---
PROC8b	---	worker dermal, short and long term - systemic	1,371mg/kg bw/day	---
PROC15	---	worker dermal, short and long term - systemic	0,069mg/kg bw/day	---
PROC15	---	Worker dermal, short and long term - local	0,020mg/cm ²	---

The short-term exposure value corresponds to the long-term value multiplied by a factor of 2. Relevant for inhalative exposure estimates. Qualitative assessment of contact with eyes. Qualitative assessment dermal. The use is assessed to be safe.

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

For further information on the assessment method, see: <http://www.ecetoc.org/tra>
Please note that modified version has been used (see exposure estimates).

FORMIC ACID 78% / CAN 23 KG FE/R**1. Short title of Exposure Scenario 3: Formulation & (re)packing of substances and mixtures**

Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Sectors of end-use	SU 10: Formulation [mixing] of preparations and/ or re-packaging (excluding alloys)
Process categories	PROC1: Use in closed process, no likelihood of exposure PROC2: Use in closed, continuous process with occasional controlled exposure PROC3: Use in closed batch process (synthesis or formulation) PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact) PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC14: Production of preparations or articles by tableting, compression, extrusion, pelletisation PROC15: Use as laboratory reagent
Environmental Release Categories	ERC2: Formulation of preparations

2.1 Contributing scenario controlling environmental exposure for: ERC2

As no environmental hazard was identified no environmental related exposure assessment and risk characterization was performed

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC8b, PROC15

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).
	Physical Form (at time of use)	liquid
	Vapour pressure	42,7 hPa
Frequency and duration of use	Frequency of use	480 minutes/day
	Frequency of use	5 days/week
Human factors not influenced by risk management	Exposed skin areas	Palm of one hand (240cm ²) (PROC1, PROC3, PROC15)
	Exposed skin areas	Palms of both hands (480 cm ²) (PROC2, PROC4, PROC8b)
Other operational conditions affecting workers exposure	Indoor	
Technical conditions and measures to control dispersion from source towards the worker	Provide local exhaust ventilation (LEV). (Efficiency: 90 %)(PROC2, PROC3, PROC4, PROC15)	
	Provide local exhaust ventilation (LEV). (Efficiency: 97 %)(PROC8b)	
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection and gloves.	

Risk Management Measures are based on qualitative risk characterisation.

2.3 Contributing scenario controlling worker exposure for: PROC5, PROC8a, PROC9, PROC14

Product characteristics	Concentration of the Substance in Mixture/Article	Concentration of substance in product : 0% - 80%
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	Physical Form (at time of use)	liquid
	Vapour pressure	42,7 hPa
Frequency and duration of use	Frequency of use	480 minutes/day
	Frequency of use	5 days/week
Human factors not influenced by risk management	Exposed skin areas	Palms of both hands (480 cm ²) (PROC5, PROC9, PROC14)
	Exposed skin areas	Two hands 960 cm ² (PROC8a)
Other operational conditions affecting workers exposure	Indoor	
Technical conditions and measures to control dispersion from source towards the worker	Provide local exhaust ventilation (LEV). (Efficiency: 90 %)	
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection and gloves.	

Risk Management Measures are based on qualitative risk characterisation.

3. Exposure estimation and reference to its source**Environment**

No exposure assessment presented for the environment.

Workers

PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC14, PROC15: Use of ECETOC TRA Version 2 with modifications.

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1	---	Worker - inhalative, long-term - local and systemic.	0,019mg/m ³	0,002
PROC2, PROC15	---	Worker - inhalative, long-term - local and systemic.	1,9029mg/m ³	0,203
PROC3	---	Worker - inhalative, long-term - local and systemic.	4,822mg/m ³	0,508
PROC4	---	Worker - inhalative, long-term - local and systemic.	3,858mg/m ³	0,406
PROC5, PROC8a, PROC9, PROC14	---	Worker - inhalative, long-term - local and systemic.	7,717mg/m ³	0,812
PROC8b	---	Worker - inhalative, long-term - local and systemic.	2,894mg/m ³	0,305
PROC1	---	worker dermal, short and long term - systemic	0,343mg/kg bw/day	---
PROC1, PROC14	---	Worker dermal, short and long term - local	0,100mg/cm ²	---
PROC2	---	worker dermal, short and long term - systemic	0,274mg/kg bw/day	---
PROC2	---	Worker dermal, short and long term - local	0,04mg/cm ²	---
PROC3, PROC15	---	worker dermal, short and long term - systemic	0,069mg/kg bw/day	---
PROC3,	---	Worker dermal, short and	0,020mg/cm ²	---

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PROC15		long term - local		
PROC4, PROC8b, PROC9	---	worker dermal, short and long term - systemic	1,371mg/kg bw/day	---
PROC4, PROC8a, PROC8b, PROC9	---	Worker dermal, short and long term - local	0,200mg/cm ²	---
PROC5, PROC8a	---	worker dermal, short and long term - systemic	2,743mg/kg bw/day	---
PROC5	---	Worker dermal, short and long term - local	0,400mg/cm ²	---
PROC14	---	worker dermal, short and long term - systemic	0,686mg/kg bw/day	---

The short-term exposure value corresponds to the long-term value multiplied by a factor of 2. Relevant for inhalative exposure estimates. Qualitative assessment of contact with eyes. Qualitative assessment dermal. The use is assessed to be safe.

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

For further information on the assessment method, see: <http://www.ecetoc.org/tra>
Please note that modified version has been used (see exposure estimates).

FORMIC ACID 78% / CAN 23 KG FE/R

1. Short title of Exposure Scenario 4: Production of resins

Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Sectors of end-use	SU12: Manufacture of plastics products, including compounding and conversion
Process categories	PROC1: Use in closed process, no likelihood of exposure PROC2: Use in closed, continuous process with occasional controlled exposure PROC3: Use in closed batch process (synthesis or formulation) PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact) PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC14: Production of preparations or articles by tableting, compression, extrusion, pelletisation
Environmental Release Categories	ERC6a: Industrial use resulting in manufacture of another substance (use of intermediates) ERC6c: Industrial use of monomers for manufacture of thermoplastics

2.1 Contributing scenario controlling environmental exposure for: ERC6a, ERC6c

As no environmental hazard was identified no environmental related exposure assessment and risk characterization was performed

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC14

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).
	Physical Form (at time of use)	liquid
	Vapour pressure	42,7 hPa
Frequency and duration of use	Frequency of use	480 minutes/day
	Frequency of use	5 days/week
Human factors not influenced by risk management	Exposed skin areas	Palm of one hand (240cm2) (PROC1, PROC3)
	Exposed skin areas	Palms of both hands (480 cm2) (PROC2, PROC4, PROC5, PROC8b, PROC9, PROC14)
	Exposed skin areas	Two hands 960 cm² (PROC8a)
Other operational conditions affecting workers exposure	Indoor	
Technical conditions and measures to control dispersion from source towards the worker	Provide local exhaust ventilation (LEV). (Efficiency: 90 %)(PROC2, PROC3, PROC4)	
	Provide local exhaust ventilation (LEV). (Efficiency: 95 %)(PROC5, PROC9, PROC14, PROC8a)	
	Provide local exhaust ventilation (LEV). (Efficiency: 97 %)(PROC8b)	
Conditions and measures related to personal protection, hygiene and health evaluation	Wear respiratory protection.(PROC5, PROC8a, PROC8b, PROC9, PROC14)	
	Use suitable eye protection and gloves.	
Risk Management Measures are based on qualitative risk characterisation.		

3. Exposure estimation and reference to its source

FORMIC ACID 78% / CAN 23 KG FE/R**Environment**

No exposure assessment presented for the environment.

Workers

PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC14: Use of ECETOC TRA Version 2 with modifications.

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1	---	Worker - inhalative, long-term - local and systemic.	0,019mg/m ³	0,002
PROC2	---	Worker - inhalative, long-term - local and systemic.	1,929mg/m ³	0,203
PROC3, PROC5, PROC8a, PROC9, PROC14	---	Worker - inhalative, long-term - local and systemic.	4,822mg/m ³	0,508
PROC4	---	Worker - inhalative, long-term - local and systemic.	3,858mg/m ³	0,406
PROC8b	---	Worker - inhalative, long-term - local and systemic.	2,894mg/m ³	0,305
PROC1	---	worker dermal, short and long term - systemic	0,343mg/kg bw/day	---
PROC1, PROC14	---	Worker dermal, short and long term - local	0,100mg/cm ²	---
PROC2	---	worker dermal, short and long term - systemic	0,274mg/kg bw/day	---
PROC2	---	Worker dermal, short and long term - local	0,04mg/cm ²	---
PROC3	---	worker dermal, short and long term - systemic	0,069mg/kg bw/day	---
PROC3	---	Worker dermal, short and long term - local	0,020mg/cm ²	---
PROC4, PROC8b, PROC9	---	worker dermal, short and long term - systemic	1,371mg/kg bw/day	---
PROC4, PROC8a, PROC8b, PROC9	---	Worker dermal, short and long term - local	0,200mg/cm ²	---
PROC5, PROC8a	---	worker dermal, short and long term - systemic	2,743mg/kg bw/day	---
PROC5	---	Worker dermal, short and long term - local	0,400mg/cm ²	---
PROC14	---	worker dermal, short and long term - systemic	0,686mg/kg bw/day	---

The short-term exposure value corresponds to the long-term value multiplied by a factor of 2. Relevant for inhalative exposure estimates. Qualitative assessment of contact with eyes. Qualitative assessment dermal. The use is assessed to be safe.

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

For further information on the assessment method, see: <http://www.ecetoc.org/tra>

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Please note that modified version has been used (see exposure estimates).

FORMIC ACID 78% / CAN 23 KG FE/R**1. Short title of Exposure Scenario 5: Polymer processing**

Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Sectors of end-use	SU 10: Formulation [mixing] of preparations and/ or re-packaging (excluding alloys)
Process categories	PROC1: Use in closed process, no likelihood of exposure PROC2: Use in closed, continuous process with occasional controlled exposure PROC3: Use in closed batch process (synthesis or formulation) PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact) PROC6: Calendering operations PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC13: Treatment of articles by dipping and pouring PROC14: Production of preparations or articles by tableting, compression, extrusion, pelletisation
Environmental Release Categories	ERC6d: Industrial use of process regulators for polymerisation processes in production of resins, rubbers, polymers

2.1 Contributing scenario controlling environmental exposure for: ERC6d

As no environmental hazard was identified no environmental related exposure assessment and risk characterization was performed

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC8b

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).
	Physical Form (at time of use)	liquid
	Vapour pressure	42,7 hPa
Frequency and duration of use	Frequency of use	480 minutes/day
	Frequency of use	5 days/week
Human factors not influenced by risk management	Exposed skin areas	Palm of one hand (240cm ²) (PROC1, PROC3)
	Exposed skin areas	Palms of both hands (480 cm ²) (PROC2, PROC4, PROC8b)
Other operational conditions affecting workers exposure	Indoor	
Technical conditions and measures to control dispersion from source towards the worker	Provide local exhaust ventilation (LEV). (Efficiency: 90 %)(PROC2, PROC3, PROC4)	
	Provide local exhaust ventilation (LEV). (Efficiency: 97 %)(PROC8b)	
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection and gloves.	

Risk Management Measures are based on qualitative risk characterisation.

2.3 Contributing scenario controlling worker exposure for: PROC5, PROC6, PROC8a, PROC9, PROC13, PROC14

Product characteristics	Concentration of the Substance in	Concentration of substance in product : 0% - 80%
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	Mixture/Article	
	Physical Form (at time of use)	liquid
	Vapour pressure	42,7 hPa
Frequency and duration of use	Frequency of use	480 minutes/day
	Frequency of use	5 days/week
Human factors not influenced by risk management	Exposed skin areas	Two hands 960 cm ² (PROC6, PROC8a)
	Exposed skin areas	Palms of both hands (480 cm ²) (PROC5, PROC9, PROC13, PROC14)
Other operational conditions affecting workers exposure	Indoor	
Technical conditions and measures to control dispersion from source towards the worker	Provide local exhaust ventilation (LEV). (Efficiency: 90 %)	

3. Exposure estimation and reference to its source**Environment**

No exposure assessment presented for the environment.

Workers

PROC1, PROC2, PROC3, PROC4, PROC5, PROC6, PROC8a, PROC8b, PROC9, PROC13, PROC14: Use of ECETOC TRA Version 2 with modifications.

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1	---	Worker - inhalative, long-term - local and systemic.	0,019mg/m ³	0,002
PROC2	---	Worker - inhalative, long-term - local and systemic.	1,929mg/m ³	0,203
PROC3	---	Worker - inhalative, long-term - local and systemic.	4,822mg/m ³	0,508
PROC4	---	Worker - inhalative, long-term - local and systemic.	3,858mg/m ³	0,406
PROC5, PROC6, PROC8a, PROC9, PROC13, PROC14	---	Worker - inhalative, long-term - local and systemic.	7,717mg/m ³	0,812
PROC8b	---	Worker - inhalative, long-term - local and systemic.	2,894mg/m ³	0,305
PROC1	---	worker dermal, short and long term - systemic	0,343mg/kg bw/day	---
PROC1	---	Worker dermal, short and long term - local	0,100mg/m ³	---
PROC2	---	worker dermal, short and long term - systemic	0,274mg/kg bw/day	---
PROC2	---	Worker dermal, short and long term - local	0,04mg/m ³	---
PROC3	---	worker dermal, short and long term - systemic	0,069mg/kg bw/day	---
PROC3	---	Worker dermal, short and long term - local	0,020mg/m ³	---

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PROC4, PROC8b	---	worker dermal, short and long term - systemic	1,371mg/kg bw/day	---
PROC4, PROC8b	---	Worker dermal, short and long term - local	0,200mg/m ³	---
PROC5, PROC8a, PROC13	---	worker dermal, short and long term - systemic	2,194mg/kg bw/day	---
PROC5, PROC6, PROC13	---	Worker dermal, short and long term - local	0,320mg/cm ²	---
PROC6	---	worker dermal, short and long term - systemic	4,389mg/kg bw/day	---
PROC8a, PROC9	---	Worker dermal, short and long term - local	0,160mg/cm ²	---
PROC9	---	worker dermal, short and long term - systemic	1,097mg/kg bw/day	---
PROC14	---	worker dermal, short and long term - systemic	0,549mg/kg bw/day	---
PROC14	---	Worker dermal, short and long term - local	0,080mg/cm ²	---

The short-term exposure value corresponds to the long-term value multiplied by a factor of 2. Relevant for inhalative exposure estimates. Qualitative assessment of contact with eyes. Qualitative assessment dermal. The use is assessed to be safe.

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

For further information on the assessment method, see: <http://www.ecetoc.org/tra>
Please note that modified version has been used (see exposure estimates).

FORMIC ACID 78% / CAN 23 KG FE/R**1. Short title of Exposure Scenario 6: Use in Cleaning Agents**

Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Process categories	PROC1: Use in closed process, no likelihood of exposure PROC2: Use in closed, continuous process with occasional controlled exposure PROC3: Use in closed batch process (synthesis or formulation) PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC7: Industrial spraying PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities PROC10: Roller application or brushing PROC13: Treatment of articles by dipping and pouring PROC19: Hand-mixing with intimate contact and only PPE available
Environmental Release Categories	ERC4: Industrial use of processing aids in processes and products, not becoming part of articles

2.1 Contributing scenario controlling environmental exposure for: ERC4

As no environmental hazard was identified no environmental related exposure assessment and risk characterization was performed

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC8b, PROC8a, PROC10, PROC13

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).
	Physical Form (at time of use)	liquid
	Vapour pressure	42,7 hPa
Frequency and duration of use	Frequency of use	480 minutes/day
	Frequency of use	5 days/week
Human factors not influenced by risk management	Exposed skin areas	Palm of one hand (240cm ²) (PROC1, PROC3)
	Exposed skin areas	Palms of both hands (480 cm ²) (PROC2, PROC4, PROC8b, PROC13)
	Exposed skin areas	Two hands 960 cm ² (PROC8a, PROC10)
Other operational conditions affecting workers exposure	Indoor	
Technical conditions and measures to control dispersion from source towards the worker	Provide local exhaust ventilation (LEV). (Efficiency: 90 %)(PROC2, PROC3, PROC4)	
	Provide local exhaust ventilation (LEV). (Efficiency: 95 %)(PROC8a, PROC10, PROC13)	
	Provide local exhaust ventilation (LEV). (Efficiency: 97 %)(PROC8b)	
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection and gloves.	

Risk Management Measures are based on qualitative risk characterisation.

2.3 Contributing scenario controlling worker exposure for: PROC7

Product characteristics	Concentration of the Substance in Mixture/Article	Concentration of substance in product : 0% - 30%
	Physical Form (at time of use)	liquid

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	Vapour pressure	42,7 hPa
Frequency and duration of use	Frequency of use	480 minutes/day
	Frequency of use	5 days/week
Human factors not influenced by risk management	Exposed skin areas	Hands and forearms. 1500 cm ²
Other operational conditions affecting workers exposure	Indoor	
Technical conditions and measures to control dispersion from source towards the worker	Provide local exhaust ventilation (LEV). (Efficiency: 95 %)	
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection and gloves. Wear respiratory protection.	

Risk Management Measures are based on qualitative risk characterisation.

2.4 Contributing scenario controlling worker exposure for: PROC19

Product characteristics	Concentration of the Substance in Mixture/Article	Concentration of substance in product : 0% - 85%
	Physical Form (at time of use)	liquid
	Vapour pressure	42,7 hPa
Frequency and duration of use	Frequency of use	480 minutes/day
	Frequency of use	5 days/week
Human factors not influenced by risk management	Exposed skin areas	More than hands and forearms. 1980 cm ²
Other operational conditions affecting workers exposure	Indoor	
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection and gloves. Wear respiratory protection. (Efficiency: 90 %)	

Risk Management Measures are based on qualitative risk characterisation.

3. Exposure estimation and reference to its source**Environment**

No exposure assessment presented for the environment.

Workers

PROC1, PROC2, PROC3, PROC4, PROC7, PROC8a, PROC8b, PROC10, PROC13, PROC19: Use of ECETOC TRA Version 2 with modifications.

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1	---	Worker - inhalative, long-term - local and systemic.	0,019mg/m ³	0,002
PROC2	---	Worker - inhalative, long-term - local and systemic.	1,929mg/m ³	0,203
PROC3, PROC8a, PROC10, PROC13	---	Worker - inhalative, long-term - local and systemic.	4,823mg/m ³	0,508
PROC4	---	Worker - inhalative, long-term - local and systemic.	3,858mg/m ³	0,406
PROC7	---	Worker - inhalative, long-	7,234mg/m ³	0,762

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		term - local and systemic.		
PROC8b	---	Worker - inhalative, long-term - local and systemic.	2,894mg/m ³	0,305
PROC1	---	worker dermal, short and long term - systemic	0,343mg/kg bw/day	---
PROC1	---	Worker dermal, short and long term - local	0,100mg/cm ²	---
PROC2	---	worker dermal, short and long term - systemic	0,274mg/kg bw/day	---
PROC2	---	Worker dermal, short and long term - local	0,04mg/cm ²	---
PROC3	---	worker dermal, short and long term - systemic	0,069mg/kg bw/day	---
PROC3	---	Worker dermal, short and long term - local	0,020mg/cm ²	---
PROC4, PROC8b	---	worker dermal, short and long term - systemic	1,371mg/kg bw/day	---
PROC4, PROC8a, PROC8b	---	Worker dermal, short and long term - local	0,200mg/cm ²	---
PROC7	---	worker dermal, short and long term - systemic	2,571mg/kg bw/day	---
PROC7	---	Worker dermal, short and long term - local	0,120mg/cm ²	---
PROC8a, PROC13	---	worker dermal, short and long term - systemic	2,742mg/kg bw/day	---
PROC10	---	worker dermal, short and long term - systemic	5,486mg/kg bw/day	---
PROC10, PROC13	---	Worker dermal, short and long term - local	0,400mg/cm ²	---
PROC19	---	Worker - inhalative, long-term - local and systemic.	8,199mg/m ³	0,863

The short-term exposure value corresponds to the long-term value multiplied by a factor of 2. Relevant for inhalative exposure estimates. Qualitative assessment of contact with eyes. Qualitative assessment dermal. The use is assessed to be safe.

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

For further information on the assessment method, see: <http://www.ecetoc.org/tra>
Please note that modified version has been used (see exposure estimates).

FORMIC ACID 78% / CAN 23 KG FE/R**1. Short title of Exposure Scenario 7: Use in Cleaning Agents**

Main User Groups	SU 22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
Process categories	PROC1: Use in closed process, no likelihood of exposure PROC2: Use in closed, continuous process with occasional controlled exposure PROC3: Use in closed batch process (synthesis or formulation) PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities PROC10: Roller application or brushing PROC11: Non industrial spraying PROC13: Treatment of articles by dipping and pouring PROC19: Hand-mixing with intimate contact and only PPE available
Environmental Release Categories	ERC8a: Wide dispersive indoor use of processing aids in open systems ERC8d: Wide dispersive outdoor use of processing aids in open systems

2.1 Contributing scenario controlling environmental exposure for: ERC8a, ERC8d

As no environmental hazard was identified no environmental related exposure assessment and risk characterization was performed

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).
	Physical Form (at time of use)	liquid
	Vapour pressure	42,7 hPa
Frequency and duration of use	Frequency of use	480 minutes/day
	Frequency of use	5 days/week
Human factors not influenced by risk management	Exposed skin areas	Palm of one hand (240cm ²) (PROC1, PROC3)
	Exposed skin areas	Palms of both hands (480 cm ²) (PROC2, PROC4)
Other operational conditions affecting workers exposure	Indoor	
Technical conditions and measures to control dispersion from source towards the worker	Provide local exhaust ventilation (LEV). (Efficiency: 80 %)(PROC2)	
	Provide adequate ventilation. (Efficiency: 95 %)(PROC3, PROC4)	
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection and gloves.	

Risk Management Measures are based on qualitative risk characterisation.

2.3 Contributing scenario controlling worker exposure for: PROC8a, PROC8b

Product characteristics	Concentration of the Substance in Mixture/Article	Concentration of substance in product : 0% - 80%
	Physical Form (at time of use)	liquid
	Vapour pressure	42,7 hPa
Frequency and duration of use	Frequency of use	480 minutes/day
	Frequency of use	5 days/week
Human factors not influenced by risk management	Exposed skin areas	Palms of both hands (480 cm ²) (PROC8a, PROC8b)

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Other operational conditions affecting workers exposure	Indoor
Technical conditions and measures to control dispersion from source towards the worker	Provide local exhaust ventilation (LEV). (Efficiency: 95 %)(PROC8a) Provide local exhaust ventilation (LEV). (Efficiency: 90 %)(PROC8b)
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection and gloves.
Risk Management Measures are based on qualitative risk characterisation.	

2.4 Contributing scenario controlling worker exposure for: PROC10, PROC13

Product characteristics	Concentration of the Substance in Mixture/Article	Concentration of substance in product : 0% - 50%
	Physical Form (at time of use)	liquid
	Vapour pressure	42,7 hPa
Frequency and duration of use	Frequency of use	480 minutes/day
	Frequency of use	5 days/week
Human factors not influenced by risk management	Exposed skin areas	Two hands 960 cm² (PROC10)
	Exposed skin areas	Palms of both hands (480 cm2) (PROC13)
Other operational conditions affecting workers exposure	Indoor	
Technical conditions and measures to control dispersion from source towards the worker	Provide local exhaust ventilation (LEV). (Efficiency: 95 %)(PROC10, PROC13)	
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection and gloves.	
Risk Management Measures are based on qualitative risk characterisation.		

2.5 Contributing scenario controlling worker exposure for: PROC11

Product characteristics	Concentration of the Substance in Mixture/Article	Concentration of substance in product : 0% - 15%
	Physical Form (at time of use)	liquid
	Vapour pressure	42,7 hPa
Frequency and duration of use	Frequency of use	480 minutes/day
	Frequency of use	5 days/week
Human factors not influenced by risk management	Exposed skin areas	Hands and forearms. 1500 cm²
Other operational conditions affecting workers exposure	Indoor	
Technical conditions and measures to control dispersion from source towards the worker	Provide local exhaust ventilation (LEV). (Efficiency: 95 %)	
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection and gloves.	
Risk Management Measures are based on qualitative risk characterisation.		

2.6 Contributing scenario controlling worker exposure for: PROC19

Product characteristics	Physical Form (at time of use)	liquid
	Vapour pressure	42,7 hPa

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Frequency and duration of use	Frequency of use	< 60 minutes/day
	Frequency of use	5 days/week
Human factors not influenced by risk management	Exposed skin areas	More than hands and forearms. 1980 cm²
Other operational conditions affecting workers exposure	Indoor	
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection and gloves.	
	Wear respiratory protection. (Efficiency: 90 %)	
Risk Management Measures are based on qualitative risk characterisation.		

3. Exposure estimation and reference to its source**Environment**

No exposure assessment presented for the environment.

Workers

PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC10, PROC11, PROC13, PROC19: Use of ECETOC TRA Version 2 with modifications.

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1	---	Worker - inhalative, long-term - local and systemic.	0,019mg/m ³	0,002
PROC2, PROC8a, PROC8b	---	Worker - inhalative, long-term - local and systemic.	7,717mg/m ³	0,812
PROC3	---	Worker - inhalative, long-term - local and systemic.	2,411mg/m ³	0,254
PROC4, PROC10, PROC13	---	Worker - inhalative, long-term - local and systemic.	4,823mg/m ³	0,508
PROC11	---	Worker - inhalative, long-term - local and systemic.	7,234mg/m ³	0,762
PROC19	---	Worker - inhalative, long-term - local and systemic.	3,28mg/m ³	0,345
PROC19	---	Worker - inhalative, short-term - local and systemic	16,398mg/m ³	0,863
PROC1	---	worker dermal, short and long term - systemic	0,343mg/kg bw/day	---
PROC1	---	Worker dermal, short and long term - local	0,100mg/cm ²	---
PROC2	---	worker dermal, short and long term - systemic	0,274mg/kg bw/day	---
PROC2	---	Worker dermal, short and long term - local	0,04mg/cm ²	---
PROC3	---	worker dermal, short and long term - systemic	0,069mg/kg bw/day	---
PROC3	---	Worker dermal, short and long term - local	0,020mg/cm ²	---
PROC4, PROC13	---	worker dermal, short and long term - systemic	1,371mg/kg bw/day	---
PROC4,	---	Worker dermal, short and	0,200mg/cm ²	---

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PROC10, PROC13		long term - local		
PROC8a	---	worker dermal, short and long term - systemic	2,194mg/kg bw/day	---
PROC8a	---	Worker dermal, short and long term - local	0,160mg/cm ²	---
PROC10	---	worker dermal, short and long term - systemic	2,743mg/kg bw/day	---
PROC11	---	worker dermal, short and long term - systemic	3,214mg/kg bw/day	---
PROC11	---	Worker dermal, short and long term - local	0,150mg/cm ²	---

The short-term exposure value corresponds to the long-term value multiplied by a factor of 2. Relevant for inhalative exposure estimates. Qualitative assessment of contact with eyes. Qualitative assessment dermal. The use is assessed to be safe.

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

For further information on the assessment method, see: <http://www.ecetoc.org/tra>
Please note that modified version has been used (see exposure estimates).

FORMIC ACID 78% / CAN 23 KG FE/R**1. Short title of Exposure Scenario 8: Use in Cleaning Agents**

Main User Groups	SU 21: Consumer uses: Private households (= general public = consumers)
Chemical product category	PC35: Washing and cleaning products (including solvent based products)
Environmental Release Categories	ERC8a: Wide dispersive indoor use of processing aids in open systems ERC8d: Wide dispersive outdoor use of processing aids in open systems

2.1 Contributing scenario controlling environmental exposure for: ERC8a, ERC8d

As no environmental hazard was identified no environmental related exposure assessment and risk characterization was performed

2.2 Contributing scenario controlling consumer exposure for: PC35

Product characteristics	Concentration of the Substance in Mixture/Article	Concentration of substance in product: 0% - 7,5%
	Physical Form (at time of use)	liquid
	Vapour pressure	42,7 hPa
Amount used		0,025 kg
Frequency and duration of use	Application duration	120 min
	Frequency of use	104 days/year
Human factors not influenced by risk management	Exposed skin areas	Palms of both hands (480 cm ²)
Other given operational conditions affecting consumers exposure	Indoor use.	
	Room size	58 m ³
	Temperature	23 °C
	Covers use under typical household ventilation.	
Conditions and measures related to protection of consumer (e.g. behavioural advice, personal protection and hygiene)	Application Route	Consumer use
	Consumer Measures	In case of contact with eyes, rinse immediately with plenty of water

3. Exposure estimation and reference to its source**Environment**

No exposure assessment presented for the environment.

Consumers

PC35: ConsExpo 4.1

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PC35	---	Consumer - inhalative, long-term - local and systemic	2,694mg/m ³	0,898
PC35	---	Consumer - inhalative, short-term - local and systemic	1,937mg/m ³	0,215
PC35	---	Consumer - dermal, long-term - systemic	2,080mg/kg bw/day	---
PC35	---	consumer dermal, acute - systemic	7,31mg/kg bw/day	---

Qualitative assessment of contact with eyes. Qualitative assessment dermal. The use is assessed to be safe.

FORMIC ACID 78% / CAN 23 KG FE/R**4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario**

For further information on the assessment method, see:

<http://www.rivm.nl/en/healthandddisease/productsafety/ConsExpo.jsp>

Only properly trained persons shall make use of scaling methods while checking whether the OC and RMM are within the boundaries set by the ES

FORMIC ACID 78% / CAN 23 KG FE/R**1. Short title of Exposure Scenario 9: Use in laboratories**

Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Process categories	PROC15: Use as laboratory reagent
Environmental Release Categories	ERC4: Industrial use of processing aids in processes and products, not becoming part of articles

2.1 Contributing scenario controlling environmental exposure for: ERC4

As no environmental hazard was identified no environmental related exposure assessment and risk characterization was performed

2.2 Contributing scenario controlling worker exposure for: PROC15

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).
	Physical Form (at time of use)	liquid
	Vapour pressure	42,7 hPa
Frequency and duration of use	Frequency of use	480 minutes/day
	Frequency of use	5 days/week
Human factors not influenced by risk management	Exposed skin areas	Palm of one hand (240cm2)
Other operational conditions affecting workers exposure	Indoor	
Technical conditions and measures to control dispersion from source towards the worker	Provide local exhaust ventilation (LEV). (Efficiency: 90 %)	
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection and gloves.	
Risk Management Measures are based on qualitative risk characterisation.		

3. Exposure estimation and reference to its source**Environment**

No exposure assessment presented for the environment.

Workers

PROC15: Use of ECETOC TRA Version 2 with modifications.

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC15	---	Worker - inhalative, long-term - local and systemic.	1,929mg/m ³	0,203
PROC15	---	worker dermal, short and long term - systemic	0,069mg/kg bw/day	---
PROC15	---	Worker dermal, short and long term - local	0,020mg/cm ²	---

The short-term exposure value corresponds to the long-term value multiplied by a factor of 2. Relevant for inhalative exposure estimates. Qualitative assessment of contact with eyes. Qualitative assessment dermal. The use is assessed to be safe.

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

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For further information on the assessment method, see: <http://www.ecetoc.org/tra>
Please note that modified version has been used (see exposure estimates).

FORMIC ACID 78% / CAN 23 KG FE/R**1. Short title of Exposure Scenario 10: Use in laboratories**

Main User Groups	SU 22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
Process categories	PROC15: Use as laboratory reagent
Environmental Release Categories	ERC8a: Wide dispersive indoor use of processing aids in open systems

2.1 Contributing scenario controlling environmental exposure for: ERC8a

As no environmental hazard was identified no environmental related exposure assessment and risk characterization was performed

2.2 Contributing scenario controlling worker exposure for: PROC15

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).
	Physical Form (at time of use)	liquid
	Vapour pressure	42,7 hPa
Frequency and duration of use	Frequency of use	480 minutes/day
	Frequency of use	5 days/week
Human factors not influenced by risk management	Exposed skin areas	One hand, face side only. 240 cm²
Other operational conditions affecting workers exposure	Indoor	
Technical conditions and measures to control dispersion from source towards the worker	Provide local exhaust ventilation (LEV). (Efficiency: 80 %)	
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection and gloves.	
Risk Management Measures are based on qualitative risk characterisation.		

3. Exposure estimation and reference to its source**Environment**

No exposure assessment presented for the environment.

Workers

PROC15: Use of ECETOC TRA Version 2 with modifications.

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC15	---	Worker - inhalative, long-term - local and systemic.	3,858mg/m ³	0,406
PROC15	---	worker dermal, short and long term - systemic	0,069mg/kg bw/day	---
PROC15	---	Worker dermal, short and long term - local	0,020mg/cm ²	---

The short-term exposure value corresponds to the long-term value multiplied by a factor of 2. Relevant for inhalative exposure estimates. Qualitative assessment of contact with eyes. Qualitative assessment dermal. The use is assessed to be safe.

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

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For further information on the assessment method, see: <http://www.ecetoc.org/tra>
Please note that modified version has been used (see exposure estimates).

FORMIC ACID 78% / CAN 23 KG FE/R**1. Short title of Exposure Scenario 11: Use as a process chemical**

Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Sectors of end-use	SU5: Manufacture of textiles, leather, fur SU 10: Formulation [mixing] of preparations and/ or re-packaging (excluding alloys)
Process categories	PROC1: Use in closed process, no likelihood of exposure PROC2: Use in closed, continuous process with occasional controlled exposure PROC3: Use in closed batch process (synthesis or formulation) PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact) PROC6: Calendering operations PROC7: Industrial spraying PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC10: Roller application or brushing PROC13: Treatment of articles by dipping and pouring PROC14: Production of preparations or articles by tableting, compression, extrusion, pelletisation PROC15: Use as laboratory reagent PROC19: Hand-mixing with intimate contact and only PPE available
Environmental Release Categories	ERC2: Formulation of preparations ERC4: Industrial use of processing aids in processes and products, not becoming part of articles ERC5: Industrial use resulting in inclusion into or onto a matrix ERC6b: Industrial use of reactive processing aids

2.1 Contributing scenario controlling environmental exposure for: ERC2, ERC4, ERC5, ERC6b

As no environmental hazard was identified no environmental related exposure assessment and risk characterization was performed

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC5, PROC6, PROC8a, PROC8b, PROC15

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).
	Physical Form (at time of use)	liquid
	Vapour pressure	42,7 hPa
Frequency and duration of use	Frequency of use	480 minutes/day
	Frequency of use	5 days/week
Human factors not influenced by risk management	Exposed skin areas	Palm of one hand (240cm ²) (PROC1, PROC3, PROC15)
	Exposed skin areas	Palms of both hands (480 cm ²) (PROC2, PROC4, PROC5, PROC8b)
	Exposed skin areas	Two hands 960 cm ² (PROC6, PROC8a, PROC10)
Other operational conditions affecting workers exposure	Indoor	
Technical conditions and measures to control dispersion	Provide local exhaust ventilation (LEV). (Efficiency: 90 %)(PROC2, PROC3, PROC4, PROC5, PROC6, PROC8a, PROC15)	

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from source towards the worker	Provide local exhaust ventilation (LEV). (Efficiency: 97 %)(PROC8b)
	Provide local exhaust ventilation (LEV). (Efficiency: 95 %)(PROC10)
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection and gloves.(PROC10)
Risk Management Measures are based on qualitative risk characterisation.(PROC10)	

2.3 Contributing scenario controlling worker exposure for: PROC7

Product characteristics	Concentration of the Substance in Mixture/Article	Concentration of substance in product : 0% - 30%
	Physical Form (at time of use)	liquid
	Vapour pressure	42,7 hPa
Frequency and duration of use	Frequency of use	480 minutes/day
	Frequency of use	5 days/week
Human factors not influenced by risk management	Exposed skin areas	Hands and forearms. 1500 cm ²
Other operational conditions affecting workers exposure	Indoor	
Technical conditions and measures to control dispersion from source towards the worker	Provide local exhaust ventilation (LEV). (Efficiency: 95 %)	
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection and gloves.	
Risk Management Measures are based on qualitative risk characterisation.		

2.4 Contributing scenario controlling worker exposure for: PROC9, PROC13, PROC14

Product characteristics	Concentration of the Substance in Mixture/Article	Concentration of substance in product : 0% - 80%
	Physical Form (at time of use)	liquid
	Vapour pressure	42,7 hPa
Frequency and duration of use	Frequency of use	480 minutes/day
	Frequency of use	5 days/week
Human factors not influenced by risk management	Exposed skin areas	Palms of both hands (480 cm ²)
Other operational conditions affecting workers exposure	Indoor	
Technical conditions and measures to control dispersion from source towards the worker	Provide local exhaust ventilation (LEV). (Efficiency: 90 %)	
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection and gloves.	
Risk Management Measures are based on qualitative risk characterisation.		

2.5 Contributing scenario controlling worker exposure for: PROC19

Product characteristics	Concentration of the Substance in Mixture/Article	Concentration of substance in product : 0% - 2,5%
	Physical Form (at time of use)	liquid
	Vapour pressure	42,7 hPa

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Frequency and duration of use	Frequency of use	480 minutes/day
	Frequency of use	5 days/week
Human factors not influenced by risk management	Exposed skin areas	More than hands and forearms. 1980 cm ²
Other operational conditions affecting workers exposure	Indoor	
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection and gloves.	

Risk Management Measures are based on qualitative risk characterisation.

3. Exposure estimation and reference to its source**Environment**

No exposure assessment presented for the environment.

Workers

PROC1, PROC2, PROC3, PROC4, PROC5, PROC6, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC14, PROC15, PROC19: Use of ECETOC TRA Version 2 with modifications.

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1	---	Worker - inhalative, long-term - local and systemic.	0,019mg/m ³	0,002
PROC2	---	Worker - inhalative, long-term - local and systemic.	1,929mg/m ³	0,203
PROC3, PROC10	---	Worker - inhalative, long-term - local and systemic.	4,822mg/m ³	0,508
PROC4	---	Worker - inhalative, long-term - local and systemic.	3,858mg/m ³	0,406
PROC5, PROC6, PROC8a, PROC9, PROC13, PROC14	---	Worker - inhalative, long-term - local and systemic.	7,717mg/m ³	0,812
PROC7	---	Worker - inhalative, long-term - local and systemic.	7,234mg/m ³	0,762
PROC8b	---	Worker - inhalative, long-term - local and systemic.	2,894mg/m ³	0,305
PROC15	---	Worker - inhalative, long-term - local and systemic.	4,823mg/m ³	0,508
PROC19	---	Worker - inhalative, long-term - local and systemic.	2,411mg/m ³	0,254
PROC1	---	worker dermal, short and long term - systemic	0,343mg/kg bw/day	---
PROC1	---	Worker dermal, short and long term - local	0,100mg/cm ²	---
PROC2	---	worker dermal, short and long term - systemic	0,274mg/kg bw/day	---
PROC2	---	Worker dermal, short and long term - local	0,04mg/cm ²	---
PROC3, PROC15	---	worker dermal, short and long term - systemic	0,069mg/kg bw/day	---
PROC3	---	Worker dermal, short and	0,020mg/cm ²	---

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		long term - local		
PROC4, PROC8b	---	worker dermal, short and long term - systemic	1,371mg/kg bw/day	---
PROC4, PROC8b	---	Worker dermal, short and long term - local	0,200mg/cm ²	---
PROC5, PROC8a, PROC13	---	worker dermal, short and long term - systemic	2,194mg/kg bw/day	---
PROC5, PROC6, PROC13	---	Worker dermal, short and long term - local	0,320mg/cm ²	---
PROC6	---	worker dermal, short and long term - systemic	4,389mg/kg bw/day	---
PROC7	---	worker dermal, short and long term - systemic	2,571mg/kg bw/day	---
PROC7	---	Worker dermal, short and long term - local	0,120mg/cm ²	---
PROC8a, PROC9	---	Worker dermal, short and long term - local	0,160mg/cm ²	---
PROC9	---	worker dermal, short and long term - systemic	1,097mg/kg bw/day	---
PROC10	---	worker dermal, short and long term - systemic	5,486mg/kg bw/day	---
PROC10	---	Worker dermal, short and long term - local	0,400mg/cm ²	---
PROC14	---	worker dermal, short and long term - systemic	0,549mg/kg bw/day	---
PROC14	---	Worker dermal, short and long term - local	0,080mg/cm ²	---

The short-term exposure value corresponds to the long-term value multiplied by a factor of 2. Relevant for inhalative exposure estimates. Qualitative assessment of contact with eyes. The use is assessed to be safe.

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

For further information on the assessment method, see: <http://www.ecetoc.org/tra>
Please note that modified version has been used (see exposure estimates).

FORMIC ACID 78% / CAN 23 KG FE/R**1. Short title of Exposure Scenario 12: Use as a process chemical**

Main User Groups	SU 22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
Process categories	PROC1: Use in closed process, no likelihood of exposure PROC2: Use in closed, continuous process with occasional controlled exposure PROC3: Use in closed batch process (synthesis or formulation) PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact) PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC10: Roller application or brushing PROC11: Non industrial spraying PROC13: Treatment of articles by dipping and pouring PROC14: Production of preparations or articles by tableting, compression, extrusion, pelletisation PROC15: Use as laboratory reagent PROC19: Hand-mixing with intimate contact and only PPE available
Environmental Release Categories	ERC8c: Wide dispersive indoor use resulting in inclusion into or onto a matrix ERC8d: Wide dispersive outdoor use of processing aids in open systems ERC8f: Wide dispersive outdoor use resulting in inclusion into or onto a matrix

2.1 Contributing scenario controlling environmental exposure for: ERC8c, ERC8d, ERC8f

As no environmental hazard was identified no environmental related exposure assessment and risk characterization was performed

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC15

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).
	Physical Form (at time of use)	liquid
	Vapour pressure	42,7 hPa
Frequency and duration of use	Frequency of use	480 minutes/day
	Frequency of use	5 days/week
Human factors not influenced by risk management	Exposed skin areas	Palm of one hand (240cm2) (PROC1, PROC15)
	Exposed skin areas	Palms of both hands (480 cm2) (PROC2)
Other operational conditions affecting workers exposure	Indoor	
Technical conditions and measures to control dispersion from source towards the worker	Provide local exhaust ventilation (LEV). (Efficiency: 80 %)(PROC2)	
	Provide local exhaust ventilation (LEV). (Efficiency: 90 %)(PROC15)	
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection and gloves.	
Risk Management Measures are based on qualitative risk characterisation.		

2.3 Contributing scenario controlling worker exposure for: PROC3, PROC8b, PROC11

Product characteristics	Concentration of the Substance in Mixture/Article	Concentration of substance in product : 0% - 80%
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	Physical Form (at time of use)	liquid
	Vapour pressure	42,7 hPa
Amount used	Not applicable	
Frequency and duration of use	Frequency of use	480 minutes/day
	Frequency of use	5 days/week
Human factors not influenced by risk management	Exposed skin areas	Palms of both hands (480 cm2) (PROC3, PROC8b)
	Exposed skin areas	Hands and forearms. 1500 cm² (PROC11)
Other operational conditions affecting workers exposure	Indoor	
Technical conditions and measures to control dispersion from source towards the worker	Provide local exhaust ventilation (LEV). (Efficiency: 80 %)(PROC3, PROC11)	
	Provide local exhaust ventilation (LEV). (Efficiency: 90 %)(PROC8b)	
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection and gloves.	
Risk Management Measures are based on qualitative risk characterisation.		

2.4 Contributing scenario controlling worker exposure for: PROC4

Product characteristics	Concentration of the Substance in Mixture/Article	Concentration of substance in product : 0% - 40%
	Physical Form (at time of use)	liquid
	Vapour pressure	42,7 hPa
Frequency and duration of use	Frequency of use	480 minutes/day
	Frequency of use	5 days/week
Human factors not influenced by risk management	Exposed skin areas	Palms of both hands (480 cm2)
Other operational conditions affecting workers exposure	Indoor	
Technical conditions and measures to control dispersion from source towards the worker	Provide local exhaust ventilation (LEV). (Efficiency: 80 %)	
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection and gloves.	
Risk Management Measures are based on qualitative risk characterisation.		

2.5 Contributing scenario controlling worker exposure for: PROC5, PROC8a, PROC9, PROC13, PROC14

Product characteristics	Concentration of the Substance in Mixture/Article	Concentration of substance in product : 0% - 20%
	Physical Form (at time of use)	liquid
	Vapour pressure	42,7 hPa
Frequency and duration of use	Frequency of use	480 minutes/day
	Frequency of use	5 days/week
Human factors not influenced by risk management	Exposed skin areas	Two hands 960 cm ² (PROC8a)
	Exposed skin areas	Palms of both hands (480 cm ²) (PROC9, PROC13, PROC14, PROC5)
Other operational conditions affecting workers exposure	Indoor	

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Technical conditions and measures to control dispersion from source towards the worker	Provide local exhaust ventilation (LEV). (Efficiency: 80 %)
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection and gloves.

Risk Management Measures are based on qualitative risk characterisation.

2.6 Contributing scenario controlling worker exposure for: PROC10

Product characteristics	Concentration of the Substance in Mixture/Article	Covers the percentage of the substance in the product up to 25 %.
	Physical Form (at time of use)	liquid
	Vapour pressure	42,7 hPa
Frequency and duration of use	Frequency of use	480 minutes/day
	Frequency of use	5 days/week
Human factors not influenced by risk management	Exposed skin areas	Two hands 960 cm ²
Other operational conditions affecting workers exposure	Indoor	
Technical conditions and measures to control dispersion from source towards the worker	Provide local exhaust ventilation (LEV). (Efficiency: 95 %)	
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection and gloves.	

Risk Management Measures are based on qualitative risk characterisation.

2.7 Contributing scenario controlling worker exposure for: PROC19

Product characteristics	Concentration of the Substance in Mixture/Article	Concentration of substance in product : 0% - 2,5%
	Physical Form (at time of use)	liquid
	Vapour pressure	42,7 hPa
Frequency and duration of use	Frequency of use	480 minutes/day
	Frequency of use	5 days/week
Human factors not influenced by risk management	Exposed skin areas	More than hands and forearms. 1980 cm ²
Other operational conditions affecting workers exposure	Indoor	
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection and gloves.	

Risk Management Measures are based on qualitative risk characterisation.

3. Exposure estimation and reference to its source**Environment**

No exposure assessment presented for the environment.

Workers

PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC10, PROC11, PROC13, PROC14, PROC15, PROC19: Use of ECETOC TRA Version 2 with modifications.

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Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1	---	Worker - inhalative, long-term - local and systemic.	0,019mg/m ³	0,002
PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC11, PROC13, PROC14	---	Worker - inhalative, long-term - local and systemic.	7,717mg/m ³	0,812
PROC10	---	Worker - inhalative, long-term - local and systemic.	2,411mg/m ³	0,254
PROC15	---	Worker - inhalative, long-term - local and systemic.	3,858mg/m ³	0,406
PROC19	---	Worker - inhalative, long-term - local and systemic.	4,823mg/m ³	0,508
PROC1	---	worker dermal, short and long term - systemic	0,343mg/kg bw/day	---
PROC1, PROC10	---	Worker dermal, short and long term - local	0,100mg/cm ²	---
PROC2, PROC9	---	worker dermal, short and long term - systemic	0,274mg/kg bw/day	---
PROC2, PROC8a, PROC9	---	Worker dermal, short and long term - local	0,04mg/cm ²	---
PROC3	---	worker dermal, short and long term - systemic	0,055mg/kg bw/day	---
PROC3	---	Worker dermal, short and long term - local	0,016mg/cm ²	---
PROC4, PROC5, PROC8a, PROC13	---	worker dermal, short and long term - systemic	0,549mg/kg bw/day	---
PROC4, PROC5, PROC13	---	Worker dermal, short and long term - local	0,080mg/cm ²	---
PROC8b	---	worker dermal, short and long term - systemic	1,097mg/kg bw/day	---
PROC8b	---	Worker dermal, short and long term - local	0,160mg/cm ²	---
PROC10	---	worker dermal, short and long term - systemic	1,371mg/kg bw/day	---
PROC11	---	worker dermal, short and long term - systemic	17,143mg/kg bw/day	---
PROC11	---	Worker dermal, short and long term - local	0,800mg/cm ²	---
PROC14	---	worker dermal, short and long term - systemic	0,137mg/kg bw/day	---
PROC14, PROC15	---	Worker dermal, short and long term - local	0,020mg/cm ²	---
PROC15	---	worker dermal, short and long term - systemic	0,069mg/kg bw/day	---
PROC19	---	worker dermal, short and long term - systemic	0,707mg/kg bw/day	---
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PROC19	---	Worker dermal, short and long term - local	0,025mg/cm ²	---
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The short-term exposure value corresponds to the long-term value multiplied by a factor of 2. Relevant for inhalative exposure estimates. Qualitative assessment of contact with eyes. Qualitative assessment dermal. The use is assessed to be safe.

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

For further information on the assessment method, see: <http://www.ecetoc.org/tra>
Please note that modified version has been used (see exposure estimates).

FORMIC ACID 78% / CAN 23 KG FE/R**1. Short title of Exposure Scenario 13: Use as a process chemical**

Main User Groups	SU 21: Consumer uses: Private households (= general public = consumers)
Chemical product category	PC23: Leather tanning, dye, finishing, impregnation and care products PC32: Polymer preparations and compounds PC34: Textile dyes, finishing and impregnating products; including bleaches and other processing aids
Environmental Release Categories	ERC8c: Wide dispersive indoor use resulting in inclusion into or onto a matrix ERC8d: Wide dispersive outdoor use of processing aids in open systems ERC8f: Wide dispersive outdoor use resulting in inclusion into or onto a matrix

2.1 Contributing scenario controlling environmental exposure for: ERC8c, ERC8d, ERC8f

As no environmental hazard was identified no environmental related exposure assessment and risk characterization was performed

2.2 Contributing scenario controlling consumer exposure for: PC23, PC32, PC34

Product characteristics	Concentration of the Substance in Mixture/Article	Concentration of substance in product : 0% - 2%
	Physical Form (at time of use)	liquid
	Vapour pressure	42,7 hPa
Amount used	Amount used per event	0,045 kg (PC23, PC34)
	Relevant for inhalative exposure estimates.(PC23, PC34)	
	Amount used per event	0,025 kg (PC32)
	Relevant for inhalative exposure estimates.(PC32)	
	Amount used per event	0,020 kg (PC32)
	Relevant for dermal exposure estimates.(PC32)	
Frequency and duration of use	Application duration	3 min(PC23, PC34)
	Application duration	20 min(PC32)
	Frequency of use	104 days/year
Human factors not influenced by risk management	Exposed skin areas	Palms of both hands 480 cm ²
Other given operational conditions affecting consumers exposure	Indoor use.(PC23, PC32)	
	Room size	58 m3(PC23, PC32)
	Covers use under typical household ventilation., Covers use at ambient temperatures.(PC23, PC32)	
	Indoor use.(PC34)	
	Room size	58 m3(PC34)
	Ventilation rate per hour	0,5(PC34)
Conditions and measures related to protection of consumer (e.g. behavioural advice, personal protection and hygiene)	Application Route	Consumer use
	Consumer Measures	In case of contact with eyes, rinse immediately with plenty of water

3. Exposure estimation and reference to its source**Environment**

No exposure assessment presented for the environment.

Consumers

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PC23, PC32, PC34: ConsExpo 4.1

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PC23, PC34	---	Consumer - inhalative, long-term - local and systemic	0,004mg/m ³	0,0004
PC23, PC34	---	Consumer - inhalative, short-term - local and systemic	0,09mg/m ³	0,005
PC32	---	Consumer - inhalative, long-term - local and systemic	0,6mg/m ³	0,063
PC32	---	Consumer - inhalative, short-term - local and systemic	3,7mg/m ³	0,195
PC23, PC34	---	Consumer - dermal, long-term - systemic	0,066mg/kg bw/day	---
PC23, PC34	---	consumer dermal, acute - systemic	0,231mg/kg bw/day	---
PC32	---	Consumer - dermal, long-term - systemic	2,080mg/kg bw/day	---
PC32	---	consumer dermal, acute - systemic	7,31mg/kg bw/day	---

Exposure is considered negligible. The use is assessed to be safe.

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

For further information on the assessment method, see:

<http://www.rivm.nl/en/healthanddisease/productsafety/ConsExpo.jsp>

Only properly trained persons shall make use of scaling methods while checking whether the OC and RMM are within the boundaries set by the ES

FORMIC ACID 78% / CAN 23 KG FE/R**1. Short title of Exposure Scenario 14: Use in animal nutrition**

Main User Groups	SU 22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
Process categories	PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact) PROC10: Roller application or brushing PROC11: Non industrial spraying PROC13: Treatment of articles by dipping and pouring PROC19: Hand-mixing with intimate contact and only PPE available
Environmental Release Categories	ERC8a: Wide dispersive indoor use of processing aids in open systems ERC8b: Wide dispersive indoor use of reactive substances in open systems
Activity	This use is exempted from registration according to Art.2 (5)(6) of the REACH regulation (EC) No 1907/2006. Therefore the conditions and measures described in this Exposure Scenario are only intended for a technical function of the substance

2.1 Contributing scenario controlling environmental exposure for: ERC8a, ERC8b

As no environmental hazard was identified no environmental related exposure assessment and risk characterization was performed

2.2 Contributing scenario controlling worker exposure for: PROC5

Product characteristics	Concentration of the Substance in Mixture/Article	Concentration of substance in product : 0% - 20%
	Physical Form (at time of use)	liquid
	Vapour pressure	42,7 hPa
Frequency and duration of use	Frequency of use	480 minutes/day
	Frequency of use	5 days/week
Human factors not influenced by risk management	Exposed skin areas	Palms of both hands (480 cm ²)
Other operational conditions affecting workers exposure	Indoor	
Technical conditions and measures to control dispersion from source towards the worker	Provide local exhaust ventilation (LEV). (Efficiency: 80 %)	
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection and gloves.	

Risk Management Measures are based on qualitative risk characterisation.

2.3 Contributing scenario controlling worker exposure for: PROC10, PROC13

Product characteristics	Concentration of the Substance in Mixture/Article	Concentration of substance in product : 0% - 80%
	Physical Form (at time of use)	liquid
	Vapour pressure	42,7 hPa
Frequency and duration of use	Frequency of use	480 minutes/day
	Frequency of use	5 days/week
Human factors not influenced by risk management	Exposed skin areas	Two hands 960 cm ² (PROC10)
	Exposed skin areas	Palms of both hands (480 cm ²) (PROC13)
Other operational conditions affecting workers exposure	Indoor	
Technical conditions and	Provide local exhaust ventilation (LEV). (Efficiency: 95 %)	

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measures to control dispersion from source towards the worker				
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection and gloves.			
Risk Management Measures are based on qualitative risk characterisation.				
2.4 Contributing scenario controlling worker exposure for: PROC11				
Product characteristics	Concentration of the Substance in Mixture/Article	Concentration of substance in product : 0% - 10%		
	Physical Form (at time of use)	liquid		
	Vapour pressure	42,7 hPa		
Frequency and duration of use	Frequency of use	480 minutes/day		
	Frequency of use	5 days/week		
Human factors not influenced by risk management	Exposed skin areas	Hands and forearms. 1500 cm²		
Other operational conditions affecting workers exposure	Indoor			
Technical conditions and measures to control dispersion from source towards the worker	Provide local exhaust ventilation (LEV). (Efficiency: 95 %)			
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection and gloves.			
Risk Management Measures are based on qualitative risk characterisation.				
2.5 Contributing scenario controlling worker exposure for: PROC19				
Product characteristics	Concentration of the Substance in Mixture/Article	Concentration of substance in product : 0% - 5%		
	Physical Form (at time of use)	liquid		
	Vapour pressure	42,7 hPa		
Frequency and duration of use	Frequency of use	480 minutes/day		
	Frequency of use	5 days/week		
Human factors not influenced by risk management	Exposed skin areas	More than hands and forearms. 1980 cm²		
Other operational conditions affecting workers exposure	Outdoor			
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection and gloves.			
Risk Management Measures are based on qualitative risk characterisation.				
3. Exposure estimation and reference to its source				
Environment				
No exposure assessment presented for the environment.				
Workers				
PROC5, PROC10, PROC11, PROC13, PROC19: Use of ECETOC TRA Version 2 with modifications.				
Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR

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PROC5, PROC10, PROC13	---	Worker - inhalative, long-term - local and systemic.	7,717mg/m ³	0,812
PROC11	---	Worker - inhalative, long-term - local and systemic.	4,8523mg/m ³	0,508
PROC19	---	Worker - inhalative, long-term - local and systemic.	6,752mg/m ³	0,771
PROC10	---	worker dermal, short and long term - systemic	4,389mg/kg bw/day	---
PROC5	---	worker dermal, short and long term - systemic	0,549mg/kg bw/day	---
PROC5	---	Worker dermal, short and long term - local	0,080mg/cm ²	---
PROC10, PROC13	---	Worker dermal, short and long term - local	0,320mg/cm ²	---
PROC11	---	worker dermal, short and long term - systemic	2,143mg/kg bw/day	---
PROC11	---	Worker dermal, short and long term - local	0,100mg/cm ²	---
PROC13	---	worker dermal, short and long term - systemic	2,194mg/kg bw/day	---
PROC19	---	worker dermal, short and long term - systemic	1,1414mg/kg bw/day	---
PROC19	---	Worker dermal, short and long term - local	0,050mg/cm ²	---

The short-term exposure value corresponds to the long-term value multiplied by a factor of 2. Relevant for inhalative exposure estimates. Qualitative assessment of contact with eyes. Qualitative assessment dermal. The use is assessed to be safe.

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

For further information on the assessment method, see: <http://www.ecetoc.org/tra>
Please note that modified version has been used (see exposure estimates).

FORMIC ACID 78% / CAN 23 KG FE/R**1. Short title of Exposure Scenario 15: Use in biocidal products**

Main User Groups	SU 22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
Process categories	PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact) PROC10: Roller application or brushing PROC11: Non industrial spraying PROC13: Treatment of articles by dipping and pouring PROC19: Hand-mixing with intimate contact and only PPE available
Environmental Release Categories	ERC8a: Wide dispersive indoor use of processing aids in open systems ERC8b: Wide dispersive indoor use of reactive substances in open systems

2.1 Contributing scenario controlling environmental exposure for: ERC8a, ERC8b

As no environmental hazard was identified no environmental related exposure assessment and risk characterization was performed

2.2 Contributing scenario controlling worker exposure for: PROC5

Product characteristics	Concentration of the Substance in Mixture/Article	Concentration of substance in product : 0% - 20%
	Physical Form (at time of use)	liquid
	Vapour pressure	42,7 hPa
Frequency and duration of use	Frequency of use	480 minutes/day
	Frequency of use	5 days/week
Human factors not influenced by risk management	Exposed skin areas	Palms of both hands (480 cm2)
Other operational conditions affecting workers exposure	Indoor	
Technical conditions and measures to control dispersion from source towards the worker	Provide local exhaust ventilation (LEV). (Efficiency: 80 %)	
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection and gloves.	
Risk Management Measures are based on qualitative risk characterisation.		

2.3 Contributing scenario controlling worker exposure for: PROC10, PROC13

Product characteristics	Concentration of the Substance in Mixture/Article	Concentration of substance in product : 0% - 80%
	Physical Form (at time of use)	liquid
	Vapour pressure	42,7 hPa
Frequency and duration of use	Frequency of use	480 minutes/day
	Frequency of use	5 days/week
Human factors not influenced by risk management	Exposed skin areas	Two hands 960 cm ² (PROC10)
	Exposed skin areas	Palms of both hands (480 cm ²) (PROC13)
Other operational conditions affecting workers exposure	Indoor	
Technical conditions and measures to control dispersion from source towards the worker	Provide local exhaust ventilation (LEV). (Efficiency: 95 %)	
Conditions and measures related to personal protection, hygiene	Use suitable eye protection and gloves.	

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and health evaluation

Risk Management Measures are based on qualitative risk characterisation.

2.4 Contributing scenario controlling worker exposure for: PROC11

Product characteristics	Concentration of the Substance in Mixture/Article	Concentration of substance in product : 0% - 10%
	Physical Form (at time of use)	liquid
	Vapour pressure	42,7 hPa
Frequency and duration of use	Frequency of use	480 minutes/day
	Frequency of use	5 days/week
Human factors not influenced by risk management	Exposed skin areas	Hands and forearms. 1500 cm ²
Other operational conditions affecting workers exposure	Indoor	
Technical conditions and measures to control dispersion from source towards the worker	Provide local exhaust ventilation (LEV). (Efficiency: 95 %)	
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection and gloves.	

Risk Management Measures are based on qualitative risk characterisation.

2.5 Contributing scenario controlling worker exposure for: PROC19

Product characteristics	Concentration of the Substance in Mixture/Article	Concentration of substance in product : 0% - 5%
	Physical Form (at time of use)	liquid
	Vapour pressure	42,7 hPa
Frequency and duration of use	Frequency of use	480 minutes/day
	Frequency of use	5 days/week
Human factors not influenced by risk management	Exposed skin areas	More than hands and forearms. 1980 cm ²
Other operational conditions affecting workers exposure	Outdoor	
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection and gloves.	

Risk Management Measures are based on qualitative risk characterisation.

3. Exposure estimation and reference to its source**Environment**

No exposure assessment presented for the environment.

Workers

PROC5, PROC10, PROC11, PROC13, PROC19: Use of ECETOC TRA Version 2 with modifications.

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC5, PROC10, PROC13	---	Worker - inhalative, long-term - local and systemic.	7,717mg/m ³	0,812

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PROC11	---	Worker - inhalative, long-term - local and systemic.	4,8523mg/m ³	0,508
PROC19	---	Worker - inhalative, long-term - local and systemic.	6,752mg/m ³	0,771
PROC5	---	worker dermal, short and long term - systemic	0,549mg/kg bw/day	---
PROC5	---	Worker dermal, short and long term - local	0,080mg/cm ²	---
PROC10	---	worker dermal, short and long term - systemic	4,389mg/kg bw/day	---
PROC10, PROC13	---	Worker dermal, short and long term - local	0,320mg/cm ²	---
PROC11	---	worker dermal, short and long term - systemic	2,143mg/kg bw/day	---
PROC11	---	Worker dermal, short and long term - local	0,100mg/cm ²	---
PROC13	---	worker dermal, short and long term - systemic	2,194mg/kg bw/day	---
PROC19	---	worker dermal, short and long term - systemic	1,1414mg/kg bw/day	---
PROC19	---	Worker dermal, short and long term - local	0,050mg/cm ²	---

The short-term exposure value corresponds to the long-term value multiplied by a factor of 2. Relevant for inhalative exposure estimates. Qualitative assessment of contact with eyes. Qualitative assessment dermal. The use is assessed to be safe.

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

For further information on the assessment method, see: <http://www.ecetoc.org/tra>
Please note that modified version has been used (see exposure estimates).

FORMIC ACID 78% / CAN 23 KG FE/R**1. Short title of Exposure Scenario 16: Uses in coatings**

Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Process categories	PROC1: Use in closed process, no likelihood of exposure PROC2: Use in closed, continuous process with occasional controlled exposure PROC3: Use in closed batch process (synthesis or formulation) PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact) PROC7: Industrial spraying PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities PROC10: Roller application or brushing PROC13: Treatment of articles by dipping and pouring PROC15: Use as laboratory reagent
Environmental Release Categories	ERC4: Industrial use of processing aids in processes and products, not becoming part of articles ERC6b: Industrial use of reactive processing aids

2.1 Contributing scenario controlling environmental exposure for: ERC4, ERC6b

As no environmental hazard was identified no environmental related exposure assessment and risk characterization was performed

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC10, PROC13, PROC15

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).
	Physical Form (at time of use)	liquid
	Vapour pressure	42,7 hPa
Frequency and duration of use	Frequency of use	480 minutes/day
	Frequency of use	5 days/week
Human factors not influenced by risk management	Exposed skin areas	Palm of one hand (240cm ²) (PROC1, PROC3)
	Exposed skin areas	Palms of both hands (480 cm ²) (PROC2, PROC4, PROC5, PROC8b, PROC13)
	Exposed skin areas	Two hands 960 cm ² (PROC8a, PROC10)
Other operational conditions affecting workers exposure	Indoor	
Technical conditions and measures to control dispersion from source towards the worker	Provide local exhaust ventilation (LEV). (Efficiency: 90 %)(PROC2, PROC3, PROC4, PROC15)	
	Provide local exhaust ventilation (LEV). (Efficiency: 95 %)(PROC5, PROC8a, PROC10, PROC13)	
	Provide local exhaust ventilation (LEV). (Efficiency: 97 %)(PROC8b)	
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection and gloves.	

Risk Management Measures are based on qualitative risk characterisation.

2.3 Contributing scenario controlling worker exposure for: PROC7

Product characteristics	Concentration of the Substance in Mixture/Article	Concentration of substance in product : 0% - 30%
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FORMIC ACID 78% / CAN 23 KG FE/R

	Physical Form (at time of use)	liquid
	Vapour pressure	42,7 hPa
Frequency and duration of use	Frequency of use	480 minutes/day
	Frequency of use	5 days/week
Human factors not influenced by risk management	Exposed skin areas	Hands and forearms. 1500 cm²
Other operational conditions affecting workers exposure	Indoor	
Technical conditions and measures to control dispersion from source towards the worker	Provide local exhaust ventilation (LEV). (Efficiency: 95 %)	
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection and gloves.	
Risk Management Measures are based on qualitative risk characterisation.		

3. Exposure estimation and reference to its source**Environment**

No exposure assessment presented for the environment.

Workers

PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC10, PROC13, PROC15: Use of ECETOC TRA Version 2 with modifications.

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1	---	Worker - inhalative, long-term - local and systemic.	0,019mg/m ³	0,002
PROC2, PROC15	---	Worker - inhalative, long-term - local and systemic.	1,929mg/m ³	0,203
PROC3, PROC5, PROC8a, PROC10, PROC13	---	Worker - inhalative, long-term - local and systemic.	4,823mg/m ³	0,508
PROC4	---	Worker - inhalative, long-term - local and systemic.	3,858mg/m ³	0,406
PROC7	---	Worker - inhalative, long-term - local and systemic.	7,234mg/m ³	0,762
PROC8b	---	Worker - inhalative, long-term - local and systemic.	2,894mg/m ³	0,305
PROC1	---	worker dermal, short and long term - systemic	0,343mg/kg bw/day	---
PROC1	---	Worker dermal, short and long term - local	0,100mg/cm ²	---
PROC2	---	worker dermal, short and long term - systemic	0,274mg/kg bw/day	---
PROC2	---	Worker dermal, short and long term - local	0,04mg/cm ²	---
PROC3, PROC15	---	worker dermal, short and long term - systemic	0,069mg/kg bw/day	---
PROC3, PROC15	---	Worker dermal, short and long term - local	0,020mg/cm ²	---

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PROC4, PROC8b	---	worker dermal, short and long term - systemic	1,371mg/kg bw/day	---
PROC4	---	Worker dermal, short and long term - local	0,200mg/cm ²	---
PROC5, PROC8a, PROC13	---	worker dermal, short and long term - systemic	2,743mg/kg bw/day	---
PROC5, PROC10, PROC13	---	Worker dermal, short and long term - local	0,400mg/cm ²	---
PROC7	---	worker dermal, short and long term - systemic	2,571mg/kg bw/day	---
PROC7	---	Worker dermal, short and long term - local	0,120mg/cm ²	---
PROC8a, PROC8b	---	Worker dermal, short and long term - local	0,200mg/cm ²	---
PROC10	---	worker dermal, short and long term - systemic	5,486mg/kg bw/day	---

The short-term exposure value corresponds to the long-term value multiplied by a factor of 2. Relevant for inhalative exposure estimates. Qualitative assessment of contact with eyes. Qualitative assessment dermal. The use is assessed to be safe.

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

For further information on the assessment method, see: <http://www.ecetoc.org/tra>
Please note that modified version has been used (see exposure estimates).

FORMIC ACID 78% / CAN 23 KG FE/R**1. Short title of Exposure Scenario 17: Polymer processing**

Main User Groups	SU 22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
Process categories	PROC1: Use in closed process, no likelihood of exposure PROC2: Use in closed, continuous process with occasional controlled exposure PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities PROC14: Production of preparations or articles by tableting, compression, extrusion, pelletisation
Environmental Release Categories	ERC8a: Wide dispersive indoor use of processing aids in open systems ERC8c: Wide dispersive indoor use resulting in inclusion into or onto a matrix ERC8d: Wide dispersive outdoor use of processing aids in open systems ERC8f: Wide dispersive outdoor use resulting in inclusion into or onto a matrix

2.1 Contributing scenario controlling environmental exposure for: ERC8a, ERC8c, ERC8d, ERC8f

As no environmental hazard was identified no environmental related exposure assessment and risk characterization was performed

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).
	Physical Form (at time of use)	liquid
	Vapour pressure	42,7 hPa
Frequency and duration of use	Frequency of use	480 minutes/day
	Frequency of use	5 days/week
Human factors not influenced by risk management	Exposed skin areas	Palm of one hand (240cm ²) (PROC1)
	Exposed skin areas	Palms of both hands (480 cm ²) (PROC2)
Other operational conditions affecting workers exposure	Indoor	
Technical conditions and measures to control dispersion from source towards the worker	Provide local exhaust ventilation (LEV). (Efficiency: 80 %)(PROC2)	
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection and gloves.	

Risk Management Measures are based on qualitative risk characterisation.

2.3 Contributing scenario controlling worker exposure for: PROC8a, PROC14

Product characteristics	Concentration of the Substance in Mixture/Article	Concentration of substance in product : 0% - 20%
	Physical Form (at time of use)	liquid
	Vapour pressure	42,7 hPa
Frequency and duration of use	Frequency of use	480 minutes/day
	Frequency of use	5 days/week
Human factors not influenced by risk management	Exposed skin areas	Two hands 960 cm ² (PROC8a)
	Exposed skin areas	Palms of both hands (480 cm ²) (PROC14)
Other operational conditions affecting workers exposure	Indoor	

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Technical conditions and measures to control dispersion from source towards the worker	Provide local exhaust ventilation (LEV). (Efficiency: 80 %)(PROC8a, PROC14)
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection and gloves.

Risk Management Measures are based on qualitative risk characterisation.

2.4 Contributing scenario controlling worker exposure for: PROC8b

Product characteristics	Concentration of the Substance in Mixture/Article	Concentration of substance in product : 0% - 80%
	Physical Form (at time of use)	liquid
	Vapour pressure	42,7 hPa
Frequency and duration of use	Frequency of use	480 minutes/day
	Frequency of use	5 days/week
Human factors not influenced by risk management	Exposed skin areas	Palms of both hands (480 cm ²)
Other operational conditions affecting workers exposure	Indoor	
Technical conditions and measures to control dispersion from source towards the worker	Provide local exhaust ventilation (LEV). (Efficiency: 90 %)	
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection and gloves.	

Risk Management Measures are based on qualitative risk characterisation.

3. Exposure estimation and reference to its source**Environment**

No exposure assessment presented for the environment.

Workers

PROC1, PROC2, PROC8a, PROC8b, PROC14: Use of ECETOC TRA Version 2 with modifications.

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1	---	Worker - inhalative, long-term - local and systemic.	0,019mg/m ³	0,002
PROC2, PROC8a, PROC14	---	Worker - inhalative, long-term - local and systemic.	7,717mg/m ³	0,812
PROC8b	---	Worker - inhalative, long-term - local	7,717mg/m ³	0,305
PROC1	---	worker dermal, short and long term - systemic	0,343mg/kg bw/day	---
PROC1	---	Worker dermal, short and long term - local	0,100mg/cm ²	---
PROC2	---	worker dermal, short and long term - systemic	0,274mg/kg bw/day	---
PROC2, PROC8a	---	Worker dermal, short and long term - local	0,040mg/cm ²	---
PROC8a	---	worker dermal, short and	0,549mg/kg bw/day	---

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		long term - systemic		
PROC8b	---	worker dermal, short and long term - systemic	1,097mg/kg bw/day	---
PROC8b	---	Worker dermal, short and long term - local	0,160mg/cm ²	---
PROC14	---	worker dermal, short and long term - systemic	0,137mg/kg bw/day	---
PROC14	---	Worker dermal, short and long term - local	0,020mg/cm ²	---

The short-term exposure value corresponds to the long-term value multiplied by a factor of 2. Relevant for inhalative exposure estimates. Qualitative assessment of contact with eyes. Qualitative assessment dermal. The use is assessed to be safe.

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

For further information on the assessment method, see: <http://www.ecetoc.org/tra>
Please note that modified version has been used (see exposure estimates).