We create chemistry

Safety data sheet

BASF Safety data sheet according to Regulation (EC) No. 1907/2006 as amended from time to time.
Date / Revised: 16.06.2020 Version: 15.0
Date previous version: 29.12.2016 Previous version: 14.0
Product: **Formic acid 99-100%**

(ID no. 30036676/SDS_GEN_GB/EN)
Date of print 28.09.2022

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Formic acid 99-100%

Chemical name: formic acid...%
CAS Number: 64-18-6

REACH registration number: 01-2119491174-37-0000, 01-2119491174-37-0013

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

Relevant identified uses: Chemical used in synthesis and/or formulation of industrial products

For the detailed identified uses of the product see appendix of the safety data sheet.

1.3. Details of the supplier of the safety data sheet

Company:
BASF SE
67056 Ludwigshafen
GERMANY

Contact address:
BASF plc
4th and 5th Floors, 2 Stockport Exchange
Railway Road, Stockport, SK1 3GG
UNITED KINGDOM

Telephone: +44 161 475 3000
E-mail address: product-safety-uk-and-ireland@basf.com

1.4. Emergency telephone number

International emergency number:
Telephone: +49 180 2273-112

SECTION 2: Hazards Identification

2.1. Classification of the substance or mixture

According to Regulation (EC) No 1272/2008 [CLP]

Flam. Liq. 3	H226 Flammable liquid and vapour.
Acute Tox. 3 (Inhalation - vapour)	H331 Toxic if inhaled.
Acute Tox. 4 (oral)	H302 Harmful if swallowed.
Skin Corr./Irrit. 1A	H314 Causes severe skin burns and eye damage.
Eye Dam./Irrit. 1	H318 Causes serious eye damage.

Specific Concentration Limits According to Regulation (EC) No 1272/2008 [CLP]

Skin Corr./Irrit. 1A: >= 90 %
Skin Corr./Irrit. 1B: 10 - < 90 %
Eye Dam./Irrit. 2: 2 - < 10 %
Skin Corr./Irrit. 2: 2 - < 10 %

For the classifications not written out in full in this section the full text can be found in section 16.

2.2. Label elements

According to Regulation (EC) No 1272/2008 [CLP]

Pictogram:

Signal Word:
Danger

Hazard Statement:

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

Precautionary Statements (Prevention):

P271	Use only outdoors or in a well-ventilated area.
P280	Wear protective gloves, protective clothing and eye protection or face protection.
P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P260	Do not breathe mist or vapour.
P243	Take action to prevent static discharges.
P241	Use explosion-proof electrical, ventilating and lighting equipment.
P264	Wash contaminated body parts thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P242	Use only non-sparking tools.
P240	Ground and bond container and receiving equipment.

Precautionary Statements (Response):

P310	Immediately call a POISON CENTER or physician.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P304 + P340	IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P303 + P361 + P352	IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Wash with plenty of soap and water.
P301 + P330 + P331	IF SWALLOWED: rinse mouth. Do NOT induce vomiting.
P370 + P378	In case of fire: Use alcohol-resistant foam, carbon dioxide, dry powder or water spray for extinction.

Precautionary Statements (Storage):

P403 + P235	Store in a well-ventilated place. Keep cool.
P233	Keep container tightly closed.
P405	Store locked up.

Precautionary Statements (Disposal):

P501	Dispose of contents and container to hazardous or special waste collection point.

Labeling of special preparations (GHS):
EUH071: Corrosive to the respiratory tract.

According to Regulation (EC) No 1272/2008 [CLP]

Hazard determining component(s) for labelling: formic acid … %

2.3. Other hazards

According to Regulation (EC) No 1272/2008 [CLP]

If applicable information is provided in this section on other hazards which do not result in classification but which may contribute to the overall hazards of the substance or mixture.

SECTION 3: Composition/Information on Ingredients

3.1. Substances

Chemical nature

formic acid … %

CAS Number: 64-18-6
EC-Number: 200-579-1
INDEX-Number: 607-001-00-0

Hazardous ingredients (GHS)
according to Regulation (EC) No. 1272/2008

formic acid … %

Content (W/W): >= 99 % - <= 100 %	Flam. Liq. 3
CAS Number: 64-18-6	Acute Tox. 3 (Inhalation - vapour)
EC-Number: 200-579-1	Acute Tox. 4 (oral)
INDEX-Number: 607-001-00-0	Skin Corr./Irrit. 1A
	Eye Dam./Irrit. 1
	H226, H331, H302, H314
	EUH071
	Specific concentration limit:
	Skin Corr./Irrit. 1A: >= 90 %
	Skin Corr./Irrit. 1B: 10 - < 90 %
	Eye Dam./Irrit. 2: 2 - < 10 %
	Skin Corr./Irrit. 2: 2 - < 10 %

For the classifications not written out in full in this section, including the hazard classes and the hazard statements, the full text is listed in section 16.

3.2. Mixtures

Not applicable

SECTION 4: First-Aid Measures

4.1. Description of first aid measures

First aid personnel should pay attention to their own safety. If the patient is likely to become unconscious, place and transport in stable sideways position (recovery position). Immediately remove contaminated clothing.

If inhaled:
Keep patient calm, remove to fresh air, seek medical attention. Immediately administer a corticosteroid from a controlled/metered dose inhaler.

On skin contact:
Immediately wash thoroughly with plenty of water, apply sterile dressings, consult a skin specialist.

On contact with eyes:
Immediately wash affected eyes for at least 15 minutes under running water with eyelids held open, consult an eye specialist.

On ingestion:
Do not induce vomiting. Immediately rinse mouth and then drink 200-300 ml of water, seek medical attention.

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

Symptoms: Information, i.e. additional information on symptoms and effects may be included in the GHS labeling phrases available in Section 2 and in the Toxicological assessments available in Section 11.

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

Treatment: Treat according to symptoms (decontamination, vital functions), no known specific antidote.

SECTION 5: Fire-Fighting Measures

5.1. Extinguishing media

Suitable extinguishing media:
water spray, dry powder, alcohol-resistant foam, carbon dioxide

5.2. Special hazards arising from the substance or mixture

carbon monoxide
The substances/groups of substances mentioned can be released in case of fire.

5.3. Advice for fire-fighters

Special protective equipment:
Wear self-contained breathing apparatus and chemical-protective clothing.

Further information:
Collect contaminated extinguishing water separately, do not allow to reach sewage or effluent systems.

SECTION 6: Accidental Release Measures

6.1. Personal precautions, protective equipment and emergency procedures

Breathing protection required. Avoid contact with the skin, eyes and clothing.

6.2. Environmental precautions
Do not empty into drains.

6.3. Methods and material for containment and cleaning up
For large amounts: Pump off product.
For residues: Pick up with suitable absorbent material (e.g. acid binder).

6.4. Reference to other sections
Information regarding exposure controls/personal protection and disposal considerations can be found in section 8 and 13.

SECTION 7: Handling and Storage

7.1. Precautions for safe handling
Ensure thorough ventilation of stores and work areas. Sealed containers should be protected against heat as this results in pressure build-up.

Protection against fire and explosion:
Sources of ignition should be kept well clear.

7.2. Conditions for safe storage, including any incompatibilities
Segregate from alkalies and alkalizing substances.

Suitable materials for containers: Stainless steel 1.4571, Stainless steel 1.4404, High density polyethylene (HDPE), Low density polyethylene (LDPE), glass, HDPE fluorinated

Storage stability:
Storage temperature: < 30 °C
Storage duration: <= 24 Months
From the data on storage duration in this safety data sheet no agreed statement regarding the warrantee of application properties can be deduced.

7.3. Specific end use(s)
See exposure scenario(s) in the attachment to this safety data sheet.

SECTION 8: Exposure Controls/Personal Protection

8.1. Control parameters

Components with occupational exposure limits

64-18-6: formic acid … %
TWA value 9.6 mg/m3 ; 5 ppm (WEL/EH 40 (UK))

TWA value 9 mg/m3 ; 5 ppm (OEL (EU))
indicative

PNEC
freshwater: 2 mg/l

marine water: 0.2 mg/l

intermittent release: 1 mg/l

sediment (freshwater): 13.4 mg/kg

sediment (marine water): 1.34 mg/kg

soil: 1.5 mg/kg

STP: 7.2 mg/l

DNEL
worker:
Long-term exposure - systemic and local effects, Inhalation: 9.5 mg/m3

consumer:
Long-term exposure - systemic and local effects, Inhalation: 3 mg/m3

8.2. Exposure controls

Personal protective equipment

Respiratory protection:
Suitable respiratory protection for lower concentrations or short-term effect: Gas filter for acid inorganic gases/vapours such as SO2, HCl (e.g. EN 14387 Type E). Gas filter for gases/vapours of inorganic compounds (e.g. EN 14387 Type B) Combination filter for gases/vapours of organic, inorganic, acid inorganic and alkaline compounds (e.g. EN 14387 Type ABEK). Suitable respiratory protection for higher concentrations or long-term effect: Self-contained breathing apparatus.

Consider the risk management measures as outlined in the exposure scenario.

Hand protection:
Chemical resistant protective gloves (EN 374)
Suitable materials also with prolonged, direct contact (Recommended: Protective index 6, corresponding > 480 minutes of permeation time according to EN 374):
chloroprene rubber (CR) - 0.5 mm coating thickness
butyl rubber (butyl) - 0.7 mm coating thickness
fluoroelastomer (FKM) - 0.7 mm coating thickness
Polyethylene-Laminate (PE laminate) - ca. 0.1 mm coating thickness
Suitable materials for short-term contact (recommended: At least protective index 2, corresponding > 30 minutes of permeation time according to EN 374)
polyvinylchloride (PVC) - 0.7 mm coating thickness

natural rubber/natural latex (NR) - 0.5 mm coating thickness
Supplementary note: The specifications are based on tests, literature data and information of glove manufacturers or are derived from similar substances by analogy. Due to many conditions (e.g. temperature) it must be considered, that the practical usage of a chemical-protective glove in practice may be much shorter than the permeation time determined through testing. Manufacturer's directions for use should be observed because of great diversity of types.

Eye protection:
Tightly fitting safety goggles (cage goggles) (e.g. EN 166) and face shield.

Body protection:
Body protection must be chosen depending on activity and possible exposure, e.g. apron, protecting boots, chemical-protection suit (according to EN 14605 in case of splashes or EN ISO 13982 in case of dust).

Body protection must be chosen depending on activity and possible exposure, e.g. apron, protecting boots, chemical-protection suit (according to EN 14605 in case of splashes or EN ISO 13982 in case of dust).

General safety and hygiene measures
Avoid contact with the skin, eyes and clothing. Avoid inhalation of vapour. Avoid contact with skin and eyes. Gloves must be inspected regularly and prior to each use. Replace if necessary (e.g. pinhole leaks). Take off immediately all contaminated clothing. Wash contaminated clothing before reuse. Hands and/or face should be washed before breaks and at the end of the shift. When using, do not eat, drink or smoke.

SECTION 9: Physical and Chemical Properties

9.1. Information on basic physical and chemical properties

Form:	liquid	
Colour:	colourless to yellow	
Odour:	pungent odour	
Odour threshold:	not determined	
pH value:	2.2 (10 g/l, 20 °C)	
Melting point:	8 °C (1,013.25 hPa)	(OECD Guideline 102)
Boiling point:	100.23 °C	(OECD Guideline 103)
Flash point:	49.5 °C	(DIN EN ISO 13736)
Evaporation rate:	Value can be approximated from Henry's Law Constant or vapor pressure.	
Flammability:	Flammable liquid and vapour.	(derived from flash point)

Lower explosion limit:		
	For liquids not relevant for classification and labelling., The lower explosion point may be 5 - 15 °C below the flash point.	
Upper explosion limit:		
	For liquids not relevant for classification and labelling.	
Ignition temperature:	528 °C	(DIN EN 14522)
Vapour pressure:	42.71 mbar (20 °C)	(OECD Guideline 104)
	54.96 mbar (25 °C)	(OECD Guideline 104)
	170.7 mbar (50 °C)	(OECD Guideline 104)
Density:	1.2196 g/cm3 (20 °C)	(ISO 2811-3)
	1.1691 g/cm3 (55 °C)	(ISO 2811-3)
	1.2200 g/cm3 (15 °C)	
	1.1800 g/cm3 (50 °C)	
Relative density:	1.2195 (20 °C)	(OECD Guideline 109)
Solubility in water:	miscible (20 °C, 1,013.25 hPa)	(internal method)
Solubility (qualitative) solvent(s):	N, N-dimethylformamide, 1,4-dioxane, dichloromethane miscible in all proportions	
Partitioning coefficient n-octanol/water (log Kow):	-2.1 (23 °C; pH value: 7.0)	(Directive 92/69/EEC, A.8)
	-1.9 (23 °C; pH value: 5.0)	(Directive 92/69/EEC, A.8)
	-2.3 (23 °C; pH value: 9.0)	(Directive 92/69/EEC, A.8)
Self ignition:	Based on its structural properties the product is not classified as self-igniting.	Test type: Spontaneous self-ignition at room-temperature.
Thermal decomposition:	350 °C, 0.15 kJ/g, (DSC (DIN 51007)) Thermal decomposition above the indicated temperature is possible. It is not a self-decompositionable substance.	
Viscosity, dynamic:	1.72 mPa.s (20 °C)	(calculated (from kinematic viscosity))
	1.17 mPa.s (40 °C)	(calculated (from kinematic viscosity))
	0.92 mPa.s (55 °C)	(calculated (from kinematic viscosity))
Viscosity, kinematic:	1.41 mm2/s (20 °C)	(DIN 51562)

	0.98 mm2/s (40 °C)	(DIN 51562)
	0.78 mm2/s (55 °C)	(DIN 51562)

9.2. Other information

Self heating ability:	not applicable, the product is a liquid	
SADT:	Study scientifically not justified.	
Miscibility with water:	miscible in all proportions	
pKA:	3.70 (20 °C)	(OECD Guideline 112)
Adsorption/water - soil:	KOC: < 17.8; log KOC: 1.25	(OECD Guideline 121)
Surface tension:	71.5 mN/m (20 °C; 1 g/l)	(OECD-Guideline 115)
Grain size distribution:	The substance / product is marketed or used in a non solid or granular form.	
Molar mass:	46.03 g/mol	

SECTION 10: Stability and Reactivity

10.1. Reactivity

Corrosion to metals:	No corrosive effect on metal.	
	No corrosive effect on metal.	
Formation of flammable gases:	Remarks:	Forms no flammable gases in the presence of water.

10.2. Chemical stability
Slow decomposition possible.

10.3. Possibility of hazardous reactions
Exothermic reaction. Reacts with alkalies. Reacts with amines. The formation of gaseous decomposition products builds up pressure in tightly closed containers.

10.4. Conditions to avoid
Temperature: > 30 °C

10.5. Incompatible materials

Substances to avoid:
bases, non-coated metals, base metals

10.6. Hazardous decomposition products

Hazardous decomposition products:
carbon monoxide

SECTION 11: Toxicological Information

11.1. Information on toxicological effects

Acute toxicity

Assessment of acute toxicity:
Of moderate toxicity after single ingestion. Of pronounced toxicity after short-term inhalation.

Experimental/calculated data:
LD50 rat (oral): 730 mg/kg (OECD Guideline 401)

LC50 rat (by inhalation): 7.85 mg/l 4 h (BASF-Test)
The vapour was tested.

(dermal):No data available. Study scientifically not justified.

Irritation

Assessment of irritating effects:
Highly corrosive! Damages skin and eyes.

Experimental/calculated data:
Skin corrosion/irritation rabbit: Corrosive. (OECD Guideline 404)
Literature data.

Serious eye damage/irritation: Study scientifically not justified. As the product corrodes the skin, it can be expected to have a similar effect on the eyes also.

Respiratory/Skin sensitization

Assessment of sensitization:
Skin sensitizing effects were not observed in animal studies.

Experimental/calculated data:
Buehler test guinea pig: Non-sensitizing. (OECD Guideline 406)

Germ cell mutagenicity

Assessment of mutagenicity:
No mutagenic effect was found in various tests with bacteria and mammalian cell culture. The substance was not mutagenic in an insect test.

Carcinogenicity

Assessment of carcinogenicity:
In long-term studies in rats and mice in which the substance was given by feed, a carcinogenic effect was not observed. The product has not been tested. The statement has been derived from substances/products of a similar structure or composition.

Reproductive toxicity

Assessment of reproduction toxicity:
The results of animal studies gave no indication of a fertility impairing effect. The product has not been tested. The statement has been derived from substances/products of a similar structure or composition.

Developmental toxicity

Assessment of teratogenicity:
No indications of a developmental toxic / teratogenic effect were seen in animal studies. The product has not been tested. The statement has been derived from substances/products of a similar structure or composition.

Specific target organ toxicity (single exposure)

Assessment of STOT single:
Corrosive to the respiratory tract.

Repeated dose toxicity and Specific target organ toxicity (repeated exposure)

Assessment of repeated dose toxicity:
No substance-specific organtoxicity was observed after repeated administration to animals. The product has not been tested. The statement has been derived from substances/products of a similar structure or composition.

Aspiration hazard

No aspiration hazard expected.

SECTION 12: Ecological Information

12.1. Toxicity

Assessment of aquatic toxicity:
There is a high probability that the product is not acutely harmful to aquatic organisms. The inhibition of the degradation activity of activated sludge is not anticipated when introduced to biological treatment plants in appropriate low concentrations.
The product gives rise to pH shifts.

Toxicity to fish:
LC50 (96 h) 130 mg/l, Brachydanio rerio (OECD 203; ISO 7346; 92/69/EEC, C.1, static)
The product has not been tested. The statement has been derived from substances/products of a similar structure or composition.

Aquatic invertebrates:
EC50 (48 h) 365 mg/l, Daphnia magna (OECD Guideline 202, part 1, static)
The product has not been tested. The statement has been derived from substances/products of a similar structure or composition. The statement of the toxic effect relates to the analytically determined concentration.

Aquatic plants:
EC50 (72 h) 1,240 mg/l (growth rate), Selenastrum capricornutum (OECD Guideline 201, static)
The product has not been tested. The statement has been derived from substances/products of a similar structure or composition.

EC50 (72 h) 32.64 mg/l (growth rate), Scenedesmus subspicatus (DIN 38412 Part 9, static)
The details of the toxic effect relate to the nominal concentration. The product will cause changes in the pH value of the test system. The result refers to an unneutralized sample.

Microorganisms/Effect on activated sludge:
EC10 (13 d) 72 mg/l, activated sludge, domestic, non-adapted (other, aerobic)

Chronic toxicity to fish:
Study scientifically not justified.

Chronic toxicity to aquatic invertebrates:
No observed effect concentration (21 d) >= 100 mg/l, Daphnia magna (OECD Guideline 211, semistatic)
The statement of the toxic effect relates to the analytically determined concentration. The product will cause changes in the pH value of the test system. The result refers to a neutralized sample. No effects at the highest test concentration.

Assessment of terrestrial toxicity:
No data available.
Study scientifically not justified.

Soil living organisms:
Literature data.

Terrestrial plants:
Literature data.

Other terrestrial non-mammals:
LD50 (18 h) >= 111 mg/kg, Agelaius phoeniceus
Literature data.

12.2. Persistence and degradability

Assessment biodegradation and elimination (H2O):

Readily biodegradable (according to OECD criteria).

Elimination information:
100 % DOC reduction (9 d) (OECD 301E/92/69/EEC, C.4-B) (aerobic, municipal sewage treatment plant effluent)

Assessment of stability in water:
According to structural properties, hydrolysis is not expected/probable.
Information on Stability in Water (Hydrolysis):
$t_{1/2}$ > 5 d (50 °C, pH value 4), (Directive 92/69/EEC, C.7, pH 4)

$t_{1/2}$ > 5 d (50 °C, pH value 7), (Directive 92/69/EEC, C.7, pH 7)

$t_{1/2}$ > 5 d (50 °C, pH value 9), (Directive 92/69/EEC, C.7, pH 9)

12.3. Bioaccumulative potential

Assessment bioaccumulation potential:
Significant accumulation in organisms is not to be expected.

Bioaccumulation potential:
Significant accumulation in organisms is not to be expected.

12.4. Mobility in soil

Assessment transport between environmental compartments:
Volatility: The substance will not evaporate into the atmosphere from the water surface.
Adsorption in soil: Adsorption to solid soil phase is not expected.

12.5. Results of PBT and vPvB assessment

According to Annex XIII of Regulation (EC) No.1907/2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH): The product does not fulfill the criteria for PBT (Persistent/bioaccumulative/toxic) and vPvB (very persistent/very bioaccumulative). Self classification

12.6. Other adverse effects

The substance is not listed in Regulation (EC) 1005/2009 on substances that deplete the ozone layer.

12.7. Additional information

Sum parameter

Chemical oxygen demand (COD): 348 mg/g

Biochemical oxygen demand (BOD) Incubation period 5 d: 86 mg/g

SECTION 13: Disposal Considerations

13.1. Waste treatment methods

A waste code in accordance with the European waste catalog (EWC) cannot be specified, due to dependence on the usage.
The waste code in accordance with the European waste catalog (EWC) must be specified in cooperation with disposal agency/manufacturer/authorities.

Incinerate in suitable incineration plant, observing local authority regulations.

The UK Environmental Protection (Duty of Care) Regulations (EP) and amendments should be noted (United Kingdom).
This product and any uncleaned containers must be disposed of as hazardous waste in accordance with the 2005 Hazardous Waste Regulations and amendments (United Kingdom)

Contaminated packaging:
Contaminated packaging should be emptied as far as possible; then it can be passed on for recycling after being thoroughly cleaned.

SECTION 14: Transport Information

Land transport

ADR

UN number	UN1779
UN proper shipping name:	FORMIC ACID
Transport hazard class(es):	8, 3
Packing group:	II
Environmental hazards:	no
Special precautions for user:	Tunnel code: D/E

RID

UN number	UN1779
UN proper shipping name:	FORMIC ACID
Transport hazard class(es):	8, 3
Packing group:	II
Environmental hazards:	no
Special precautions for user:	None known

Inland waterway transport

ADN

UN number	UN1779
UN proper shipping name:	FORMIC ACID
Transport hazard class(es):	8, 3
Packing group:	II
Environmental hazards:	no
Special precautions for user:	None known

Transport in inland waterway vessel

UN number	UN1779
UN proper shipping name:	FORMIC ACID
Transport hazard class(es):	8, 3, N3
Packing group:	II
Environmental hazards:	yes
Type of inland waterway vessel:	N
Cargo tank design:	2
Cargo tank type:	3

Sea transport

IMDG

UN number:	UN 1779
UN proper shipping name:	FORMIC ACID
Transport hazard class(es):	8, 3
Packing group:	II
Environmental hazards:	no Marine pollutant: NO
Special precautions for user:	None known

Air transport

IATA/ICAO

UN number:	UN 1779
UN proper shipping name:	FORMIC ACID
Transport hazard class(es):	8, 3
Packing group:	II
Environmental hazards:	No Mark as dangerous for the environment is needed
Special precautions for user:	None known

14.1. UN number
See corresponding entries for “UN number” for the respective regulations in the tables above.

14.2. UN proper shipping name
See corresponding entries for “UN proper shipping name” for the respective regulations in the tables above.

14.3. Transport hazard class(es)
See corresponding entries for “Transport hazard class(es)” for the respective regulations in the tables above.

14.4. Packing group
See corresponding entries for “Packing group” for the respective regulations in the tables above.

14.5. Environmental hazards
See corresponding entries for “Environmental hazards” for the respective regulations in the tables above.

14.6. Special precautions for user
See corresponding entries for “Special precautions for user” for the respective regulations in the tables above.

14.7. Transport in bulk according to Annex II of MARPOL and the IBC Code

Regulation:	IBC
Shipment approved:	1
Pollution name:	Formic acid (over 85%)
Pollution category:	Y
Ship Type:	3

Further information
This product is subject to the most recent edition of "The Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations" and their amendments (United Kingdom).

SECTION 15: Regulatory Information

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

Directive 2012/18/EU - Control of Major Accident Hazards involving dangerous substances (EU):
List entry in regulation: H2
List entry in regulation: P5c

If other regulatory information applies that is not already provided elsewhere in this safety data sheet, then it is described in this subsection.

The data should be considered when making any assessment under the Control of Substances Hazardous to Health Regulations (COSHH), and related guidance, for example, 'COSHH Essentials' (United Kingdom).
This product may be subject to the Control of Major Accident Hazards Regulations (COMAH), and amendments if specific threshold tonnages are exceeded (United Kingdom).

15.2. Chemical Safety Assessment

Chemical Safety Assessment performed

SECTION 16: Other Information

Assessment of the hazard classes according to UN GHS criteria (most recent version)

Skin Corr./Irrit. 1A
Flam. Liq. 3
Eye Dam./Irrit. 1
Acute Tox. 4 (oral)
Acute Tox. 3 (Inhalation - vapour)

Full text of the classifications, including the hazard classes and the hazard statements, if mentioned in section 2 or 3:

Flam. Liq.	Flammable liquids
Acute Tox.	Acute toxicity
Skin Corr./Irrit.	Skin corrosion/irritation
Eye Dam./Irrit.	Serious eye damage/eye irritation
H226	Flammable liquid and vapour.
H331	Toxic if inhaled.
H302	Harmful if swallowed.
H314	Causes severe skin burns and eye damage.
EUH071	Corrosive to the respiratory tract.

Abbreviations
ADR = The European Agreement concerning the International Carriage of Dangerous Goods by Road. ADN = The European Agreement concerning the International Carriage of Dangerous Goods by Inland waterways. ATE = Acute Toxicity Estimates. CAO = Cargo Aircraft Only. CAS = Chemical Abstract Service. CLP = Classification, Labelling and Packaging of substances and mixtures. DIN = German national organization for standardization. DNEL = Derived No Effect Level. EC50 = Effective concentration median for 50% of the population. EC = European Community. EN = European Standards. IARC = International Agency for Research on Cancer. IATA = International Air Transport Association. IBC-Code = Intermediate Bulk Container code. IMDG = International Maritime Dangerous Goods Code. ISO = International Organization for Standardization. STEL = Short-Term Exposure Limit. LC50 = Lethal concentration median for 50% of the population. LD50 = Lethal dose median for 50% of the population. TLV = Threshold Limit Value. MARPOL = The International Convention for the Prevention of Pollution from Ships. NEN = Dutch Norm. NOEC = No Observed Effect Concentration. OEL = Occupational Exposure Limit. OECD = Organization for Economic Cooperation and Development. PBT = Persistent, Bioaccumulative and Toxic. PNEC = Predicted No Effect Level. PPM = Parts per million. RID = The European Agreement concerning the International Carriage of Dangerous Goods by Rail. TWA = Time

Weight Average. UN-number = UN number at transport. vPvB = very Persistent and very Bioaccumulative.

The data contained in this safety data sheet are based on our current knowledge and experience and describe the product only with regard to safety requirements. This safety data sheet is neither a Certificate of Analysis (CoA) nor technical data sheet and shall not be mistaken for a specification agreement. Identified uses in this safety data sheet do neither represent an agreement on the corresponding contractual quality of the substance/mixture nor a contractually designated use. It is the responsibility of the recipient of the product to ensure any proprietary rights and existing laws and legislation are observed.

Vertical lines in the left hand margin indicate an amendment from the previous version.

Annex: Exposure Scenarios

Index

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1. Short title of exposure scenario

Charging and discharging of substances and mixtures, Formulation
SU3; SU10; ERC2; PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9

Control of exposure and risk management measures

Contributing exposure scenario	
Use descriptors covered	ERC2: Formulation of preparations As no environmental hazard was identified no

	environmental-related exposure assessment and risk characterization was performed.
Operational conditions	

Contributing exposure scenario	
Use descriptors covered	PROC1: Use in closed process, no likelihood of exposure. Use domain: industrial
Operational conditions	
Concentration of the substance	formic acid … % Content: >= 0 % - <= 100 %
Physical state	liquid
Vapour pressure of the substance during use	4271 Pa
Process temperature	20 °C
Duration and Frequency of activity	480 min 5 days per week
Indoor/Outdoor	Outdoor
Risk Management Measures	
Avoid frequent and direct contact with substance. Ensure minimization of manual phases Provide specific employee training to prevent/minimize exposures. Regular inspection and maintenance of equipment and machines. Supervision in place to check that the RMMs in place are being used correctly and OCs followed.	
In case of potential exposure:, Wear suitable personal protective equipment.	
Use suitable eye protection. Wear suitable face shield	
Avoid skin contact. Wash off any skin contamination immediately. Provide specific employee training to prevent/minimize exposures. Provide employee skin care programs.	
Wear chemically resistant gloves in combination with specific activity training Wear suitable coveralls to prevent exposure to the skin. Wear suitable face shield	
Exposure estimate and reference to its source	
Assessment method	EASY TRA v4.1, ECETOC TRA v3.0, Worker

	Worker - inhalation, long-term - local
Exposure estimate	0.0134 mg/m³
Risk Characterization Ratio (RCR)	0.001413
Assessment method	Qualitative assessment
	Worker - dermal
Guidance to Downstream Users	
For scaling see: http://www.ecetoc.org/tra	

Contributing exposure scenario	
Use descriptors covered	PROC2: Use in closed, continuous process with occasional controlled exposure. Use domain: industrial
Operational conditions	
Concentration of the substance	formic acid … % Content: >= 0 % - <= 100 %
Physical state	liquid
Vapour pressure of the substance during use	4271 Pa
Process temperature	20 °C
Duration and Frequency of activity	480 min 5 days per week
Indoor/Outdoor	Indoor
Risk Management Measures	
Provide a good standard of general or controlled ventilation (5 to 10 air changes per hour)	Effectiveness: 70 %
Avoid frequent and direct contact with substance. Ensure minimization of manual phases Provide specific employee training to prevent/minimize exposures. Regular inspection and maintenance of equipment and machines. Supervision in place to check that the RMMs in place are being used correctly and OCs followed.	
In case of potential exposure:, Wear suitable personal protective equipment.	
Use suitable eye protection. Wear suitable face shield	
Avoid skin contact. Wash off any skin contamination immediately. Provide specific employee training to prevent/minimize exposures. Provide employee skin care programs.	

Wear chemically resistant gloves in combination with specific activity training Wear suitable coveralls to prevent exposure to the skin. Wear suitable face shield	
Exposure estimate and reference to its source	
Assessment method	EASY TRA v4.1, ECETOC TRA v3.0, Worker
	Worker - inhalation, long-term - local
Exposure estimate	2.8766 mg/m³
Risk Characterization Ratio (RCR)	0.302799
Assessment method	Qualitative assessment
	Worker - dermal
Guidance to Downstream Users	
For scaling see: http://www.ecetoc.org/tra	

Contributing exposure scenario	
Use descriptors covered	PROC3: Use in closed batch process (synthesis or formulation). Use domain: industrial
Operational conditions	
Concentration of the substance	formic acid … % Content: >= 0 % - <= 100 %
Physical state	liquid
Vapour pressure of the substance during use	4271 Pa
Process temperature	20 °C
Duration and Frequency of activity	480 min 5 days per week
Indoor/Outdoor	Indoor
Risk Management Measures	
Local exhaust ventilation	Effectiveness: 90 %
Avoid frequent and direct contact with substance. Ensure minimization of manual phases Provide specific employee training to prevent/minimize exposures. Regular inspection and maintenance of equipment and machines. Supervision in place to check that the RMMs in place are being used correctly and OCs followed.	
In case of potential exposure:, Wear suitable personal protective equipment.	
Use suitable eye protection. Wear suitable face shield	

Avoid skin contact. Wash off any skin contamination immediately. Provide specific employee training to prevent/minimize exposures. Provide employee skin care programs.	
Wear chemically resistant gloves in combination with specific activity training Wear suitable coveralls to prevent exposure to the skin. Wear suitable face shield	
Exposure estimate and reference to its source	
Assessment method	EASY TRA v4.1, ECETOC TRA v3.0, Worker
	Worker - inhalation, long-term - local
Exposure estimate	1.9177 mg/m³
Risk Characterization Ratio (RCR)	0.201866
Assessment method	Qualitative assessment
	Worker - dermal
Guidance to Downstream Users	
For scaling see: http://www.ecetoc.org/tra	

Contributing exposure scenario	
Use descriptors covered	PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises. Use domain: industrial
Operational conditions	
Concentration of the substance	formic acid … % Content: >= 0 % - <= 100 %
Physical state	liquid
Vapour pressure of the substance during use	4271 Pa
Process temperature	20 °C
Duration and Frequency of activity	480 min 5 days per week
Indoor/Outdoor	Indoor
Risk Management Measures	
Local exhaust ventilation	Effectiveness: 90 %
Avoid frequent and direct contact with substance. Ensure minimization of manual phases Provide specific employee training to prevent/minimize exposures. Regular inspection and maintenance of equipment and machines. Supervision in place to check that the RMMs in place are being used correctly and OCs followed.	

In case of potential exposure:, Wear suitable personal protective equipment.	
Use suitable eye protection. Wear suitable face shield	
Avoid skin contact. Wash off any skin contamination immediately. Provide specific employee training to prevent/minimize exposures. Provide employee skin care programs.	
Wear chemically resistant gloves in combination with specific activity training Wear suitable coveralls to prevent exposure to the skin. Wear suitable face shield	
Exposure estimate and reference to its source	
Assessment method	EASY TRA v4.1, ECETOC TRA v3.0, Worker
	Worker - inhalation, long-term - local
Exposure estimate	3.8354 mg/m³
Risk Characterization Ratio (RCR)	0.403732
Assessment method	Qualitative assessment
	Worker - dermal
Guidance to Downstream Users	
For scaling see: http://www.ecetoc.org/tra	

Contributing exposure scenario	
Use descriptors covered	PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact). Use domain: industrial
Operational conditions	
Concentration of the substance	formic acid … % Content: >= 0 % - <= 100 %
Physical state	liquid
Vapour pressure of the substance during use	4271 Pa
Process temperature	20 °C
Duration and Frequency of activity	480 min 5 days per week
Indoor/Outdoor	Indoor
Risk Management Measures	
Local exhaust ventilation	Effectiveness: 90 %
Provide a good standard of general ventilation (not less than 3 - 5 air changes per hour)	Effectiveness: 30 %
Avoid frequent and direct contact with	

substance. Ensure minimization of manual phases Provide specific employee training to prevent/minimize exposures. Regular inspection and maintenance of equipment and machines. Supervision in place to check that the RMMs in place are being used correctly and OCs followed.	
In case of potential exposure:, Wear suitable personal protective equipment.	
Use suitable eye protection. Wear suitable face shield	
Avoid skin contact. Wash off any skin contamination immediately. Provide specific employee training to prevent/minimize exposures. Provide employee skin care programs.	
Wear chemically resistant gloves in combination with specific activity training Wear suitable coveralls to prevent exposure to the skin. Wear suitable face shield	
Exposure estimate and reference to its source	
Assessment method	EASY TRA v4.1, ECETOC TRA v3.0, Worker
	Worker - inhalation, long-term - local
Exposure estimate	6.712 mg/m³
Risk Characterization Ratio (RCR)	0.70653
Assessment method	Qualitative assessment
	Worker - dermal
Guidance to Downstream Users	
For scaling see: http://www.ecetoc.org/tra	

Contributing exposure scenario	
Use descriptors covered	PROC8a: Transfer of substance or preparation (charging/discharging) from/to ves-sels/large containers at non-dedicated facilities Use domain: industrial
Operational conditions	
Concentration of the substance	formic acid … % Content: >= 0 % - <= 100 %
Physical state	liquid
Vapour pressure of the substance during use	4271 Pa
Process temperature	20 °C

Duration and Frequency of activity	480 min 5 days per week
Indoor/Outdoor	Indoor
Risk Management Measures	
Local exhaust ventilation	Effectiveness: 90 %
Provide a good standard of general ventilation (not less than 3 - 5 air changes per hour)	Effectiveness: 30 %
Avoid frequent and direct contact with substance. Ensure minimization of manual phases Provide specific employee training to prevent/minimize exposures. Regular inspection and maintenance of equipment and machines. Supervision in place to check that the RMMs in place are being used correctly and OCs followed.	
In case of potential exposure:, Wear suitable personal protective equipment.	
Use suitable eye protection. Wear suitable face shield	
Avoid skin contact. Wash off any skin contamination immediately. Provide specific employee training to prevent/minimize exposures. Provide employee skin care programs.	
Wear chemically resistant gloves in combination with specific activity training Wear suitable coveralls to prevent exposure to the skin. Wear suitable face shield	
Exposure estimate and reference to its source	
Assessment method	EASY TRA v4.1, ECETOC TRA v3.0, Worker
	Worker - inhalation, long-term - local
Exposure estimate	6.712 mg/m³
Risk Characterization Ratio (RCR)	0.70653
Assessment method	Qualitative assessment
	Worker - dermal
Guidance to Downstream Users	
For scaling see: http://www.ecetoc.org/tra	

Contributing exposure scenario	
Use descriptors covered	PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities Use domain: industrial

Operational conditions	
Concentration of the substance	formic acid … % Content: >= 0 % - <= 100 %
Physical state	liquid
Vapour pressure of the substance during use	4271 Pa
Process temperature	20 °C
Duration and Frequency of activity	480 min 5 days per week
Indoor/Outdoor	Indoor
Risk Management Measures	
Local exhaust ventilation	Effectiveness: 95 %
Avoid frequent and direct contact with substance. Ensure minimization of manual phases Provide specific employee training to prevent/minimize exposures. Regular inspection and maintenance of equipment and machines. Supervision in place to check that the RMMs in place are being used correctly and OCs followed.	
In case of potential exposure:, Wear suitable personal protective equipment.	
Use suitable eye protection. Wear suitable face shield	
Avoid skin contact. Wash off any skin contamination immediately. Provide specific employee training to prevent/minimize exposures. Provide employee skin care programs.	
Wear chemically resistant gloves in combination with specific activity training Wear suitable coveralls to prevent exposure to the skin. Wear suitable face shield	
Exposure estimate and reference to its source	
Assessment method	EASY TRA v4.1, ECETOC TRA v3.0, Worker
	Worker - inhalation, long-term - local
Exposure estimate	2.3972 mg/m³
Risk Characterization Ratio (RCR)	0.252332
Assessment method	Qualitative assessment
	Worker - dermal
Guidance to Downstream Users	
For scaling see: http://www.ecetoc.org/tra	

Contributing exposure scenario	
Use descriptors covered	PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing). Use domain: industrial
Operational conditions	
Concentration of the substance	formic acid … % Content: >= 0 % - <= 100 %
Physical state	liquid
Vapour pressure of the substance during use	4271 Pa
Process temperature	20 °C
Duration and Frequency of activity	480 min 5 days per week
Indoor/Outdoor	Indoor
Risk Management Measures	
Local exhaust ventilation	Effectiveness: 90 %
Provide a good standard of general ventilation (not less than 3 - 5 air changes per hour)	Effectiveness: 30 %
Avoid frequent and direct contact with substance. Ensure minimization of manual phases Provide specific employee training to prevent/minimize exposures. Regular inspection and maintenance of equipment and machines. Supervision in place to check that the RMMs in place are being used correctly and OCs followed.	
In case of potential exposure:, Wear suitable personal protective equipment.	
Use suitable eye protection. Wear suitable face shield	
Avoid skin contact. Wash off any skin contamination immediately. Provide specific employee training to prevent/minimize exposures. Provide employee skin care programs.	
Wear chemically resistant gloves in combination with specific activity training Wear suitable coveralls to prevent exposure to the skin. Wear suitable face shield	
Exposure estimate and reference to its source	
Assessment method	EASY TRA v4.1, ECETOC TRA v3.0, Worker

	Worker - inhalation, long-term - local
Exposure estimate	6.712 mg/m³
Risk Characterization Ratio (RCR)	0.70653
Assessment method	Qualitative assessment
	Worker - dermal
Guidance to Downstream Users	
For scaling see: http://www.ecetoc.org/tra	

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2. Short title of exposure scenario

Use in laboratories
SU3; ERC4; PROC15

Control of exposure and risk management measures

Contributing exposure scenario	
Use descriptors covered	ERC4: Industrial use of processing aids in processes and products, not becoming part of articles As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.
Operational conditions	

Contributing exposure scenario	
Use descriptors covered	PROC15: Use a laboratory reagent. Use domain: industrial
Operational conditions	
Concentration of the substance	formic acid … % Content: >= 0 % - <= 100 %
Physical state	liquid
Vapour pressure of the substance during use	4271 Pa
Process temperature	20 °C
Duration and Frequency of activity	480 min 5 days per week
Indoor/Outdoor	Indoor
Risk Management Measures	
Local exhaust ventilation	Effectiveness: 90 %
Avoid frequent and direct contact with substance. Ensure minimization of manual phases Provide specific employee training to prevent/minimize exposures. Regular inspection and maintenance of equipment and	

machines. Supervision in place to check that the RMMs in place are being used correctly and OCs followed.	
In case of potential exposure:, Wear suitable personal protective equipment.	
Use suitable eye protection. Wear suitable face shield	
Avoid skin contact. Wash off any skin contamination immediately. Provide specific employee training to prevent/minimize exposures. Provide employee skin care programs.	
Wear chemically resistant gloves in combination with specific activity training Wear suitable coveralls to prevent exposure to the skin. Wear suitable face shield	
Exposure estimate and reference to its source	
Assessment method	EASY TRA v4.1, ECETOC TRA v3.0, Worker
	Worker - inhalation, long-term - local
Exposure estimate	1.9177 mg/m³
Risk Characterization Ratio (RCR)	0.201866
Assessment method	Qualitative assessment
	Worker - dermal
Guidance to Downstream Users	
For scaling see: http://www.ecetoc.org/tra	

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3. Short title of exposure scenario

Use in laboratories
SU22; ERC8a; PROC15

Control of exposure and risk management measures

Contributing exposure scenario	
Use descriptors covered	ERC8a: Wide dispersive indoor use of processing aids in open systems As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.
Operational conditions	

Contributing exposure scenario	
Use descriptors covered	PROC15: Use a laboratory reagent. Use domain: professional

Operational conditions	
Concentration of the substance	formic acid … % Content: >= 0 % - <= 100 %
Physical state	liquid
Vapour pressure of the substance during use	4271 Pa
Process temperature	20 °C
Duration and Frequency of activity	480 min 5 days per week
Indoor/Outdoor	Indoor
Risk Management Measures	
Local exhaust ventilation	Effectiveness: 80 %
Avoid frequent and direct contact with substance. Ensure minimization of manual phases Provide specific employee training to prevent/minimize exposures. Regular inspection and maintenance of equipment and machines. Supervision in place to check that the RMMs in place are being used correctly and OCs followed.	
In case of potential exposure:, Wear suitable personal protective equipment.	
Use suitable eye protection. Wear suitable face shield	
Avoid skin contact. Wash off any skin contamination immediately. Provide specific employee training to prevent/minimize exposures. Provide employee skin care programs.	
Wear chemically resistant gloves in combination with specific activity training Wear suitable coveralls to prevent exposure to the skin. Wear suitable face shield	
Exposure estimate and reference to its source	
Assessment method	EASY TRA v4.1, ECETOC TRA v3.0, Worker
	Worker - inhalation, long-term - local
Exposure estimate	3.8354 mg/m³
Risk Characterization Ratio (RCR)	0.403732
Assessment method	Qualitative assessment
	Worker - dermal
Guidance to Downstream Users	
For scaling see: http://www.ecetoc.org/tra	

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4. Short title of exposure scenario

Use as an intermediate
SU3; ERC6a; PROC1, PROC2, PROC3, PROC4

Control of exposure and risk management measures

Contributing exposure scenario	
Use descriptors covered	ERC6a: Industrial use resulting in manufacture of another substance (use of intermediates) As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.
Operational conditions	

Contributing exposure scenario	
Use descriptors covered	PROC1: Use in closed process, no likelihood of exposure. Use domain: industrial
Operational conditions	
Concentration of the substance	formic acid … % Content: >= 0 % - <= 100 %
Physical state	liquid
Vapour pressure of the substance during use	4271 Pa
Process temperature	20 °C
Duration and Frequency of activity	480 min 5 days per week
Indoor/Outdoor	Outdoor
Risk Management Measures	
Avoid frequent and direct contact with substance. Ensure minimization of manual phases Provide specific employee training to prevent/minimize exposures. Regular inspection and maintenance of equipment and machines. Supervision in place to check that the RMMs in place are being used correctly and OCs followed.	
In case of potential exposure:, Wear suitable personal protective equipment.	
Use suitable eye protection. Wear	

suitable face shield	
Avoid skin contact. Wash off any skin contamination immediately. Provide specific employee training to prevent/minimize exposures. Provide employee skin care programs.	
Wear chemically resistant gloves in combination with specific activity training Wear suitable coveralls to prevent exposure to the skin. Wear suitable face shield	
Exposure estimate and reference to its source	
Assessment method	EASY TRA v4.1, ECETOC TRA v3.0, Worker
	Worker - inhalation, long-term - local
Exposure estimate	0.0134 mg/m³
Risk Characterization Ratio (RCR)	0.001413
Assessment method	Qualitative assessment
	Worker - dermal
Guidance to Downstream Users	
For scaling see: http://www.ecetoc.org/tra	

Contributing exposure scenario	
Use descriptors covered	PROC2: Use in closed, continuous process with occasional controlled exposure. Use domain: industrial
Operational conditions	
Concentration of the substance	formic acid … % Content: >= 0 % - <= 100 %
Physical state	liquid
Vapour pressure of the substance during use	4271 Pa
Process temperature	20 °C
Duration and Frequency of activity	480 min 5 days per week
Indoor/Outdoor	Indoor
Risk Management Measures	
Provide a good standard of general or controlled ventilation (5 to 10 air changes per hour)	Effectiveness: 70 %
Avoid frequent and direct contact with substance. Ensure minimization of manual phases Provide specific employee training to prevent/minimize exposures. Regular inspection and maintenance of equipment and machines. Supervision in place to	

check that the RMMs in place are being used correctly and OCs followed.	
In case of potential exposure:, Wear suitable personal protective equipment.	
Use suitable eye protection. Wear suitable face shield	
Avoid skin contact. Wash off any skin contamination immediately. Provide specific employee training to prevent/minimize exposures. Provide employee skin care programs.	
Wear chemically resistant gloves in combination with specific activity training Wear suitable coveralls to prevent exposure to the skin. Wear suitable face shield	
Exposure estimate and reference to its source	
Assessment method	EASY TRA v4.1, ECETOC TRA v3.0, Worker
	Worker - inhalation, long-term - local
Exposure estimate	2.8766 mg/m³
Risk Characterization Ratio (RCR)	0.302799
Assessment method	Qualitative assessment
	Worker - dermal
Guidance to Downstream Users	
For scaling see: http://www.ecetoc.org/tra	

Contributing exposure scenario	
Use descriptors covered	PROC3: Use in closed batch process (synthesis or formulation). Use domain: industrial
Operational conditions	
Concentration of the substance	formic acid … % Content: >= 0 % - <= 100 %
Physical state	liquid
Vapour pressure of the substance during use	4271 Pa
Process temperature	20 °C
Duration and Frequency of activity	480 min 5 days per week
Indoor/Outdoor	Indoor
Risk Management Measures	
Local exhaust ventilation	Effectiveness: 90 %
Avoid frequent and direct contact with substance. Ensure minimization of	

manual phases Provide specific employee training to prevent/minimize exposures. Regular inspection and maintenance of equipment and machines. Supervision in place to check that the RMMs in place are being used correctly and OCs followed.	
In case of potential exposure:, Wear suitable personal protective equipment.	
Use suitable eye protection. Wear suitable face shield	
Avoid skin contact. Wash off any skin contamination immediately. Provide specific employee training to prevent/minimize exposures. Provide employee skin care programs.	
Wear chemically resistant gloves in combination with specific activity training Wear suitable coveralls to prevent exposure to the skin. Wear suitable face shield	
Exposure estimate and reference to its source	
Assessment method	EASY TRA v4.1, ECETOC TRA v3.0, Worker
	Worker - inhalation, long-term - local
Exposure estimate	1.9177 mg/m³
Risk Characterization Ratio (RCR)	0.201866
Assessment method	Qualitative assessment
	Worker - dermal
Guidance to Downstream Users	
For scaling see: http://www.ecetoc.org/tra	

Contributing exposure scenario	
Use descriptors covered	PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises. Use domain: industrial
Operational conditions	
Concentration of the substance	formic acid … % Content: >= 0 % - <= 100 %
Physical state	liquid
Vapour pressure of the substance during use	4271 Pa
Process temperature	20 °C
Duration and Frequency of activity	480 min 5 days per week

Indoor/Outdoor	Indoor
Risk Management Measures	
Local exhaust ventilation	Effectiveness: 90 %
Avoid frequent and direct contact with substance. Ensure minimization of manual phases Provide specific employee training to prevent/minimize exposures. Regular inspection and maintenance of equipment and machines. Supervision in place to check that the RMMs in place are being used correctly and OCs followed.	
In case of potential exposure:, Wear suitable personal protective equipment.	
Use suitable eye protection. Wear suitable face shield	
Avoid skin contact. Wash off any skin contamination immediately. Provide specific employee training to prevent/minimize exposures. Provide employee skin care programs.	
Wear chemically resistant gloves in combination with specific activity training Wear suitable coveralls to prevent exposure to the skin. Wear suitable face shield	
Exposure estimate and reference to its source	
Assessment method	EASY TRA v4.1, ECETOC TRA v3.0, Worker
	Worker - inhalation, long-term - local
Exposure estimate	3.8354 mg/m³
Risk Characterization Ratio (RCR)	0.403732
Assessment method	Qualitative assessment
	Worker - dermal
Guidance to Downstream Users	
For scaling see: http://www.ecetoc.org/tra	

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5. Short title of exposure scenario

Use in leather tanning, finishing, impregnation
SU3; ERC4, ERC5, ERC6b; PROC6, PROC7, PROC10, PROC13, PROC14

Control of exposure and risk management measures

Contributing exposure scenario	
Use descriptors covered	ERC4: Industrial use of processing aids in processes and products, not becoming part of articles

	As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.
Operational conditions	

Contributing exposure scenario	
Use descriptors covered	ERC5: Industrial use resulting in inclusion into or onto a matrix As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.
Operational conditions	

Contributing exposure scenario	
Use descriptors covered	ERC6b: Industrial use of reactive processing aids As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.
Operational conditions	

Contributing exposure scenario	
Use descriptors covered	PROC6: Calendering operations Use domain: industrial
Operational conditions	
Concentration of the substance	formic acid … % Content: >= 0 % - <= 5 %
Physical state	liquid
Vapour pressure of the substance during use	4271 Pa
Process temperature	20 °C
Duration and Frequency of activity	480 min 5 days per week
Indoor/Outdoor	Indoor
Risk Management Measures	
Provide a good standard of general ventilation (not less than 3 - 5 air changes per hour)	Effectiveness: 30 %
Use suitable eye protection.	
Provide employee skin care programs.	
Use suitable chemically resistant gloves.	
Exposure estimate and reference to its source	

Assessment method	EASY TRA v4.1, ECETOC TRA v3.0, worker, modified version, The concentration of the substance has been considered using a linear approach.
	Worker - inhalation, long-term - local
Exposure estimate	3.356 mg/m³
Risk Characterization Ratio (RCR)	0.353265
Assessment method	Qualitative assessment
	Worker - dermal
Guidance to Downstream Users	
For scaling see: http://www.ecetoc.org/tra Please note that a modified version has been used (see exposure estimates)	

Contributing exposure scenario	
Use descriptors covered	PROC7: Industrial spraying Use domain: industrial
Operational conditions	
Concentration of the substance	formic acid … % Content: >= 0 % - <= 5 %
Physical state	liquid
Vapour pressure of the substance during use	4271 Pa
Process temperature	20 °C
Duration and Frequency of activity	480 min 5 days per week
Indoor/Outdoor	Indoor
Risk Management Measures	
Provide a good standard of general or controlled ventilation (5 to 10 air changes per hour)	Effectiveness: 70 %
Use suitable eye protection.	
Provide employee skin care programs.	
Use suitable chemically resistant gloves.	
Exposure estimate and reference to its source	
Assessment method	EASY TRA v4.1, ECETOC TRA v3.0, worker, modified version, The concentration of the substance has been considered using a linear approach.
	Worker - inhalation, long-term - local
Exposure estimate	7.1915 mg/m³
Risk Characterization Ratio (RCR)	0.756997
Assessment method	Qualitative assessment
	Worker - dermal
Guidance to Downstream Users	
For scaling see: http://www.ecetoc.org/tra Please note that a modified version has been used (see	

exposure estimates)

Contributing exposure scenario	
Use descriptors covered	PROC10: Roller application or brushing Use domain: industrial
Operational conditions	
Concentration of the substance	formic acid … % Content: >= 0 % - <= 5 %
Physical state	liquid
Vapour pressure of the substance during use	4271 Pa
Process temperature	20 °C
Duration and Frequency of activity	480 min 5 days per week
Indoor/Outdoor	Indoor
Risk Management Measures	
Provide a good standard of general ventilation (not less than 3 - 5 air changes per hour)	Effectiveness: 30 %
Use suitable eye protection.	
Provide employee skin care programs.	
Use suitable chemically resistant gloves.	
Exposure estimate and reference to its source	
Assessment method	EASY TRA v4.1, ECETOC TRA v3.0, worker, modified version, The concentration of the substance has been considered using a linear approach.
	Worker - inhalation, long-term - local
Exposure estimate	3.356 mg/m³
Risk Characterization Ratio (RCR)	0.353265
Assessment method	Qualitative assessment
	Worker - dermal
Guidance to Downstream Users	
For scaling see: http://www.ecetoc.org/tra Please note that a modified version has been used (see exposure estimates)	

Contributing exposure scenario	
Use descriptors covered	PROC13: Treatment of articles by dipping and pouring. Use domain: industrial
Operational conditions	
Concentration of the substance	formic acid … % Content: >= 0 % - <= 5 %
Physical state	liquid

Vapour pressure of the substance during use	4271 Pa
Process temperature	20 °C
Duration and Frequency of activity	480 min 5 days per week
Indoor/Outdoor	Indoor
Risk Management Measures	
Provide a good standard of general ventilation (not less than 3 - 5 air changes per hour)	Effectiveness: 30 %
Use suitable eye protection.	
Provide employee skin care programs.	
Use suitable chemically resistant gloves.	
Exposure estimate and reference to its source	
Assessment method	EASY TRA v4.1, ECETOC TRA v3.0, worker, modified version, The concentration of the substance has been considered using a linear approach.
	Worker - inhalation, long-term - local
Exposure estimate	3.356 mg/m³
Risk Characterization Ratio (RCR)	0.353265
Assessment method	Qualitative assessment
	Worker - dermal
Guidance to Downstream Users	
For scaling see: http://www.ecetoc.org/tra Please note that a modified version has been used (see exposure estimates)	

Contributing exposure scenario	
Use descriptors covered	PROC14: Production of preparations or articles by tabletting, compression, extrusion, pelettisation. Use domain: industrial
Operational conditions	
Concentration of the substance	formic acid … % Content: >= 0 % - <= 5 %
Physical state	liquid
Vapour pressure of the substance during use	4271 Pa
Process temperature	20 °C
Duration and Frequency of activity	480 min 5 days per week
Indoor/Outdoor	Indoor
Risk Management Measures	
Provide a good standard of general ventilation (not less than 3 - 5 air	Effectiveness: 30 %

changes per hour)	
Use suitable eye protection.	
Provide employee skin care programs.	
Use suitable chemically resistant gloves.	
Exposure estimate and reference to its source	
Assessment method	EASY TRA v4.1, ECETOC TRA v3.0, worker, modified version, The concentration of the substance has been considered using a linear approach.
	Worker - inhalation, long-term - local
Exposure estimate	3.356 mg/m³
Risk Characterization Ratio (RCR)	0.353265
Assessment method	Qualitative assessment
	Worker - dermal
Guidance to Downstream Users	
For scaling see: http://www.ecetoc.org/tra Please note that a modified version has been used (see exposure estimates)	

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6. Short title of exposure scenario

Use in leather tanning, finishing, impregnation
SU22; ERC8c, ERC8d, ERC8f; PROC10, PROC11, PROC13, PROC19

Control of exposure and risk management measures

Contributing exposure scenario	
Use descriptors covered	ERC8c: Wide dispersive indoor use resulting in inclusion into or onto a matrix As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.
Operational conditions	

Contributing exposure scenario	
Use descriptors covered	ERC8d: Wide dispersive outdoor use of processing aids in open systems As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.
Operational conditions	

Contributing exposure scenario	
Use descriptors covered	ERC8f: Wide dispersive outdoor use resulting in inclusion into or onto a matrix As no environmental hazard was identified no

	environmental-related exposure assessment and risk characterization was performed.
Operational conditions	

Contributing exposure scenario	
Use descriptors covered	PROC10: Roller application or brushing Use domain: professional
Operational conditions	
Concentration of the substance	formic acid … % Content: >= 0 % - <= 5 %
Physical state	liquid
Vapour pressure of the substance during use	4271 Pa
Process temperature	20 °C
Duration and Frequency of activity	480 min 5 days per week
Indoor/Outdoor	Indoor
Risk Management Measures	
Provide a good standard of general ventilation (not less than 3 - 5 air changes per hour)	Effectiveness: 30 %
Use suitable eye protection.	
Provide employee skin care programs.	
Use suitable chemically resistant gloves.	
Exposure estimate and reference to its source	
Assessment method	EASY TRA v4.1, ECETOC TRA v3.0, worker, modified version, The concentration of the substance has been considered using a linear approach.
	Worker - inhalation, long-term - local
Exposure estimate	6.712 mg/m³
Risk Characterization Ratio (RCR)	0.70653
Assessment method	Qualitative assessment
	Worker - dermal
Guidance to Downstream Users	
For scaling see: http://www.ecetoc.org/tra Please note that a modified version has been used (see exposure estimates)	

Contributing exposure scenario	
Use descriptors covered	PROC11: Non industrial spraying Use domain: professional
Operational conditions	
Concentration of the substance	formic acid … %

	Content: >= 0 % - <= 5 %
Physical state	liquid
Vapour pressure of the substance during use	4271 Pa
Process temperature	20 °C
Duration and Frequency of activity	480 min 5 days per week
Indoor/Outdoor	Indoor
Risk Management Measures	
Local exhaust ventilation	Effectiveness: 80 %
Provide a good standard of general ventilation (not less than 3 - 5 air changes per hour)	Effectiveness: 30 %
In case no suitable local exhaust ventilation is present:, Wear a suitable respiratory protection with adequate effectiveness .	
Use suitable eye protection.	
Provide employee skin care programs.	
Use suitable chemically resistant gloves.	
Exposure estimate and reference to its source	
Assessment method	EASY TRA v4.1, ECETOC TRA v3.0, worker, modified version, The concentration of the substance has been considered using a linear approach.
	Worker - inhalation, long-term - local
Exposure estimate	6.712 mg/m³
Risk Characterization Ratio (RCR)	0.70653
Assessment method	Qualitative assessment
	Worker - dermal
Guidance to Downstream Users	
For scaling see: http://www.ecetoc.org/tra Please note that a modified version has been used (see exposure estimates)	

Contributing exposure scenario	
Use descriptors covered	PROC13: Treatment of articles by dipping and pouring. Use domain: professional
Operational conditions	
Concentration of the substance	formic acid … % Content: >= 0 % - <= 5 %
Physical state	liquid
Vapour pressure of the substance during use	4271 Pa
Process temperature	20 °C

Duration and Frequency of activity	480 min 5 days per week
Indoor/Outdoor	Indoor
Risk Management Measures	
Provide a good standard of general ventilation (not less than 3 - 5 air changes per hour)	Effectiveness: 30 %
Use suitable eye protection.	
Provide employee skin care programs.	
Use suitable chemically resistant gloves.	
Exposure estimate and reference to its source	
Assessment method	EASY TRA v4.1, ECETOC TRA v3.0, worker, modified version, The concentration of the substance has been considered using a linear approach.
	Worker - inhalation, long-term - local
Exposure estimate	6.712 mg/m³
Risk Characterization Ratio (RCR)	0.70653
Assessment method	Qualitative assessment
	Worker - dermal
Guidance to Downstream Users	
For scaling see: http://www.ecetoc.org/tra Please note that a modified version has been used (see exposure estimates)	

Contributing exposure scenario	
Use descriptors covered	PROC19: Hand-mixing with intimate contact and only PPE available. Use domain: professional
Operational conditions	
Concentration of the substance	formic acid … % Content: >= 0 % - <= 5 %
Physical state	liquid
Vapour pressure of the substance during use	4271 Pa
Process temperature	20 °C
Duration and Frequency of activity	480 min 5 days per week
Indoor/Outdoor	Indoor
Risk Management Measures	
Provide a good standard of general ventilation (not less than 3 - 5 air changes per hour)	Effectiveness: 30 %
Use suitable eye protection.	
Provide employee skin care	

programs.	
Use suitable chemically resistant gloves.	
Exposure estimate and reference to its source	
Assessment method	EASY TRA v4.1, ECETOC TRA v3.0, worker, modified version, The concentration of the substance has been considered using a linear approach.
	Worker - inhalation, long-term - local
Exposure estimate	6.712 mg/m³
Risk Characterization Ratio (RCR)	0.70653
Assessment method	Qualitative assessment
	Worker - dermal
Guidance to Downstream Users	
For scaling see: http://www.ecetoc.org/tra Please note that a modified version has been used (see exposure estimates)	

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7. Short title of exposure scenario

Use in Cleaning Agents
SU3; ERC4; PROC7, PROC10, PROC13

Control of exposure and risk management measures

Contributing exposure scenario	
Use descriptors covered	ERC4: Industrial use of processing aids in processes and products, not becoming part of articles As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.
Operational conditions	

Contributing exposure scenario	
Use descriptors covered	PROC7: Industrial spraying Use domain: industrial
Operational conditions	
Concentration of the substance	formic acid … % Content: >= 0 % - <= 5 %
Physical state	liquid
Vapour pressure of the substance during use	4271 Pa
Process temperature	20 °C
Duration and Frequency of activity	480 min 5 days per week
Indoor/Outdoor	Indoor

Risk Management Measures	
Provide a good standard of general or controlled ventilation (5 to 10 air changes per hour)	Effectiveness: 70 %
Use suitable eye protection.	
Provide employee skin care programs.	
Use suitable chemically resistant gloves.	
Exposure estimate and reference to its source	
Assessment method	EASY TRA v4.1, ECETOC TRA v3.0, worker, modified version, The concentration of the substance has been considered using a linear approach.
	Worker - inhalation, long-term - local
Exposure estimate	7.1915 mg/m³
Risk Characterization Ratio (RCR)	0.756997
Assessment method	Qualitative assessment
	Worker - dermal
Guidance to Downstream Users	
For scaling see: http://www.ecetoc.org/tra Please note that a modified version has been used (see exposure estimates)	

Contributing exposure scenario	
Use descriptors covered	PROC10: Roller application or brushing Use domain: industrial
Operational conditions	
Concentration of the substance	formic acid … % Content: >= 0 % - <= 5 %
Physical state	liquid
Vapour pressure of the substance during use	4271 Pa
Process temperature	20 °C
Duration and Frequency of activity	480 min 5 days per week
Indoor/Outdoor	Indoor
Risk Management Measures	
Provide a good standard of general ventilation (not less than 3 - 5 air changes per hour)	Effectiveness: 30 %
Use suitable eye protection.	
Provide employee skin care programs.	
Use suitable chemically resistant gloves.	
Exposure estimate and reference to its source	

Assessment method	EASY TRA v4.1, ECETOC TRA v3.0, worker, modified version, The concentration of the substance has been considered using a linear approach.
	Worker - inhalation, long-term - local
Exposure estimate	3.356 mg/m³
Risk Characterization Ratio (RCR)	0.353265
Assessment method	Qualitative assessment
	Worker - dermal
Guidance to Downstream Users	
For scaling see: http://www.ecetoc.org/tra Please note that a modified version has been used (see exposure estimates)	

Contributing exposure scenario	
Use descriptors covered	PROC13: Treatment of articles by dipping and pouring. Use domain: industrial
Operational conditions	
Concentration of the substance	formic acid … % Content: >= 0 % - <= 5 %
Physical state	liquid
Vapour pressure of the substance during use	4271 Pa
Process temperature	20 °C
Duration and Frequency of activity	480 min 5 days per week
Indoor/Outdoor	Indoor
Risk Management Measures	
Provide a good standard of general ventilation (not less than 3 - 5 air changes per hour)	Effectiveness: 30 %
Use suitable eye protection.	
Provide employee skin care programs.	
Use suitable chemically resistant gloves.	
Exposure estimate and reference to its source	
Assessment method	EASY TRA v4.1, ECETOC TRA v3.0, worker, modified version, The concentration of the substance has been considered using a linear approach.
	Worker - inhalation, long-term - local
Exposure estimate	3.356 mg/m³
Risk Characterization Ratio (RCR)	0.353265
Assessment method	Qualitative assessment
	Worker - dermal
Guidance to Downstream Users	
For scaling see: http://www.ecetoc.org/tra Please note that a modified version has been used (see	

exposure estimates)

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8. Short title of exposure scenario

Use in Cleaning Agents
SU22; ERC8a; PROC8a, PROC8b, PROC10, PROC11, PROC13, PROC19

Control of exposure and risk management measures

Contributing exposure scenario	
Use descriptors covered	ERC8a: Wide dispersive indoor use of processing aids in open systems As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.
Operational conditions	

Contributing exposure scenario	
Use descriptors covered	PROC8a: Transfer of substance or preparation (charging/discharging) from/to ves-sels/large containers at non-dedicated facilities Use domain: professional
Operational conditions	
Concentration of the substance	formic acid … % Content: >= 0 % - <= 5 %
Physical state	liquid
Vapour pressure of the substance during use	4271 Pa
Process temperature	20 °C
Duration and Frequency of activity	480 min 5 days per week
Indoor/Outdoor	Indoor
Risk Management Measures	
Provide a good standard of general ventilation (not less than 3 - 5 air changes per hour)	Effectiveness: 30 %
Use suitable eye protection.	
Provide employee skin care programs.	
Use suitable chemically resistant gloves.	
Exposure estimate and reference to its source	
Assessment method	EASY TRA v4.1, ECETOC TRA v3.0, worker, modified version, The concentration of the substance has been

	considered using a linear approach.
	Worker - inhalation, long-term - local
Exposure estimate	6.712 mg/m³
Risk Characterization Ratio (RCR)	0.70653
Assessment method	Qualitative assessment
	Worker - dermal
Guidance to Downstream Users	
For scaling see: http://www.ecetoc.org/tra Please note that a modified version has been used (see exposure estimates)	

Contributing exposure scenario	
Use descriptors covered	PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities Use domain: professional
Operational conditions	
Concentration of the substance	formic acid … % Content: >= 0 % - <= 5 %
Physical state	liquid
Vapour pressure of the substance during use	4271 Pa
Process temperature	20 °C
Duration and Frequency of activity	480 min 5 days per week
Indoor/Outdoor	Indoor
Risk Management Measures	
Provide a good standard of general ventilation (not less than 3 - 5 air changes per hour)	Effectiveness: 30 %
Use suitable eye protection.	
Provide employee skin care programs.	
Use suitable chemically resistant gloves.	
Exposure estimate and reference to its source	
Assessment method	EASY TRA v4.1, ECETOC TRA v3.0, worker, modified version, The concentration of the substance has been considered using a linear approach.
	Worker - inhalation, long-term - local
Exposure estimate	3.356 mg/m³
Risk Characterization Ratio (RCR)	0.353265
Assessment method	Qualitative assessment
	Worker - dermal
Guidance to Downstream Users	
For scaling see: http://www.ecetoc.org/tra Please note that a modified version has been used (see	

exposure estimates)

Contributing exposure scenario	
Use descriptors covered	PROC10: Roller application or brushing Use domain: professional
Operational conditions	
Concentration of the substance	formic acid … % Content: >= 0 % - <= 5 %
Physical state	liquid
Vapour pressure of the substance during use	4271 Pa
Process temperature	20 °C
Duration and Frequency of activity	480 min 5 days per week
Indoor/Outdoor	Indoor
Risk Management Measures	
Provide a good standard of general ventilation (not less than 3 - 5 air changes per hour)	Effectiveness: 30 %
Use suitable eye protection.	
Provide employee skin care programs.	
Use suitable chemically resistant gloves.	
Exposure estimate and reference to its source	
Assessment method	EASY TRA v4.1, ECETOC TRA v3.0, worker, modified version, The concentration of the substance has been considered using a linear approach.
	Worker - inhalation, long-term - local
Exposure estimate	6.712 mg/m³
Risk Characterization Ratio (RCR)	0.70653
Assessment method	Qualitative assessment
	Worker - dermal
Guidance to Downstream Users	
For scaling see: http://www.ecetoc.org/tra Please note that a modified version has been used (see exposure estimates)	

Contributing exposure scenario	
Use descriptors covered	PROC11: Non industrial spraying Use domain: professional
Operational conditions	
Concentration of the substance	formic acid … % Content: >= 0 % - <= 5 %
Physical state	liquid

Vapour pressure of the substance during use	4271 Pa
Process temperature	20 °C
Duration and Frequency of activity	480 min 5 days per week
Indoor/Outdoor	Indoor
Risk Management Measures	
Local exhaust ventilation	Effectiveness: 80 %
Provide a good standard of general ventilation (not less than 3 - 5 air changes per hour)	Effectiveness: 30 %
In case no suitable local exhaust ventilation is present:, Wear a suitable respiratory protection with adequate effectiveness .	
Use suitable eye protection.	
Provide employee skin care programs.	
Use suitable chemically resistant gloves.	
Exposure estimate and reference to its source	
Assessment method	EASY TRA v4.1, ECETOC TRA v3.0, worker, modified version, The concentration of the substance has been considered using a linear approach.
	Worker - inhalation, long-term - local
Exposure estimate	6.712 mg/m³
Risk Characterization Ratio (RCR)	0.70653
Assessment method	Qualitative assessment
	Worker - dermal
Guidance to Downstream Users	
For scaling see: http://www.ecetoc.org/tra Please note that a modified version has been used (see exposure estimates)	

Contributing exposure scenario	
Use descriptors covered	PROC13: Treatment of articles by dipping and pouring. Use domain: professional
Operational conditions	
Concentration of the substance	formic acid … % Content: >= 0 % - <= 5 %
Physical state	liquid
Vapour pressure of the substance during use	4271 Pa
Process temperature	20 °C
Duration and Frequency of activity	480 min 5 days per week

Indoor/Outdoor	Indoor
Risk Management Measures	
Provide a good standard of general ventilation (not less than 3 - 5 air changes per hour)	Effectiveness: 30 %
Use suitable eye protection.	
Provide employee skin care programs.	
Use suitable chemically resistant gloves.	
Exposure estimate and reference to its source	
Assessment method	EASY TRA v4.1, ECETOC TRA v3.0, worker, modified version, The concentration of the substance has been considered using a linear approach.
	Worker - inhalation, long-term - local
Exposure estimate	6.712 mg/m³
Risk Characterization Ratio (RCR)	0.70653
Assessment method	Qualitative assessment
	Worker - dermal
Guidance to Downstream Users	
For scaling see: http://www.ecetoc.org/tra Please note that a modified version has been used (see exposure estimates)	

Contributing exposure scenario	
Use descriptors covered	PROC19: Hand-mixing with intimate contact and only PPE available. Use domain: professional
Operational conditions	
Concentration of the substance	formic acid … % Content: >= 0 % - <= 5 %
Physical state	liquid
Vapour pressure of the substance during use	4271 Pa
Process temperature	20 °C
Duration and Frequency of activity	480 min 5 days per week
Indoor/Outdoor	Indoor
Risk Management Measures	
Provide a good standard of general ventilation (not less than 3 - 5 air changes per hour)	Effectiveness: 30 %
Use suitable eye protection.	
Provide employee skin care programs.	
Use suitable chemically resistant gloves.	

Exposure estimate and reference to its source	
Assessment method	EASY TRA v4.1, ECETOC TRA v3.0, worker, modified version, The concentration of the substance has been considered using a linear approach.
	Worker - inhalation, long-term - local
Exposure estimate	6.712 mg/m³
Risk Characterization Ratio (RCR)	0.70653
Assessment method	Qualitative assessment
	Worker - dermal
Guidance to Downstream Users	
For scaling see: http://www.ecetoc.org/tra Please note that a modified version has been used (see exposure estimates)	

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9. Short title of exposure scenario

Use in Cleaning Agents
SU21; ERC8d; PC35

Control of exposure and risk management measures

Contributing exposure scenario	
Use descriptors covered	ERC8d: Wide dispersive outdoor use of processing aids in open systems As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.
Operational conditions	

Contributing exposure scenario	
Use descriptors covered	PC35: Washing and Cleaning Products (including solvent based products).
Operational conditions	
Concentration of the substance	formic acid … % Content: >= 0 % - <= 5 %
Vapour pressure of the substance during use	4271 Pa
Process temperature	20 °C
Duration and Frequency of activity	Exposure duration: 60 min Relevant for inhalative exposure estimates
Duration and Frequency of activity	365 uses per year
Room size	15 m3
Ventilation rate per hour	2.5
body weight	65 kg

Spray duration	24.6 sec
Risk Management Measures	
Consumer Measures	Ensure spraying away from persons.
Exposure estimate and reference to its source	
Assessment method	EASY TRA v4.1, ConsExpo v4.1, Inhalation model: Exposure to spray/dust
	Consumer - inhalation, long-term - systemic
Exposure estimate	0.0052 mg/m³
Risk Characterization Ratio (RCR)	0.001719
	The exposure calculation is based on the mean concentration on the day of exposure.
Guidance to Downstream Users	
For scaling see: http://www.rivm.nl/en/healthanddisease/productsafety/ConsExpo.jsp	

Contributing exposure scenario	
Use descriptors covered	PC35: Washing and Cleaning Products (including solvent based products).
Operational conditions	
Concentration of the substance	formic acid … % Content: >= 0 % - <= 5 %
Vapour pressure of the substance during use	4271 Pa
Process temperature	20 °C
Duration and Frequency of activity	Exposure duration: 60 min Relevant for inhalative exposure estimates
Duration and Frequency of activity	Application duration: 10 min Relevant for inhalative exposure estimates
Duration and Frequency of activity	365 uses per year
Room size	15 m3
Ventilation rate per hour	2.5
Temperature (Application)	25 °C
body weight	65 kg
Release area	17100 cm²
	Release area is constant
Release duration	10 min
	Relevant for inhalative exposure estimates
Exposure estimate and reference to its source	
Assessment method	EASY TRA v4.1, ConsExpo v4.1, Inhalation model: exposure to vapour - evaporation
	Consumer - inhalation, long-term - systemic
Exposure estimate	0.8261 mg/m³
Risk Characterization Ratio (RCR)	0.275362

	The exposure calculation is based on the mean concentration on the day of exposure.
Guidance to Downstream Users	
For scaling see: http://www.rivm.nl/en/healthanddisease/productsafety/ConsExpo.jsp	

Contributing exposure scenario	
Use descriptors covered	PC35: Washing and Cleaning Products (including solvent based products)., Bathroom cleaning (spray)
Operational conditions	
Concentration of the substance	formic acid … % Content: >= 0 % - <= 5 %
Vapour pressure of the substance during use	4271 Pa
Process temperature	20 °C
Duration and Frequency of activity	Exposure duration: 25 min Relevant for inhalative exposure estimates
Duration and Frequency of activity	52 uses per year
Room size	10 m3
Ventilation rate per hour	2
body weight	65 kg
Spray duration	90 sec
Risk Management Measures	
Consumer Measures	Ensure spraying away from persons.
Exposure estimate and reference to its source	
Assessment method	EASY TRA v4.1, ConsExpo v4.1, Inhalation model: Exposure to spray/dust
	Consumer - inhalation, long-term - systemic
Exposure estimate	0.0668 mg/m³
Risk Characterization Ratio (RCR)	0.022273
	The exposure calculation is based on the mean concentration on the day of exposure.
Guidance to Downstream Users	
For scaling see: http://www.rivm.nl/en/healthanddisease/productsafety/ConsExpo.jsp	

Contributing exposure scenario	
Use descriptors covered	PC35: Washing and Cleaning Products (including solvent based products)., Bathroom cleaning (spray)
Operational conditions	
Concentration of the substance	formic acid … % Content: >= 0 % - <= 5 %
Vapour pressure of the substance	4271 Pa

during use	
Process temperature	20 °C
Duration and Frequency of activity	Exposure duration: 25 min Relevant for inhalative exposure estimates
Duration and Frequency of activity	Application duration: 20 min Relevant for inhalative exposure estimates
Duration and Frequency of activity	52 uses per year
Room size	10 m3
Ventilation rate per hour	2
Temperature (Application)	25 °C
body weight	65 kg
Release area	64000 cm²
	Release area is constant
Release duration	20 min
	Relevant for inhalative exposure estimates
Exposure estimate and reference to its source	
Assessment method	EASY TRA v4.1, ConsExpo v4.1, Inhalation model: exposure to vapour - evaporation
	Consumer - inhalation, long-term - systemic
Exposure estimate	1.7657 mg/m³
Risk Characterization Ratio (RCR)	0.588562
	The exposure calculation is based on the mean concentration on the day of exposure.
Guidance to Downstream Users	
For scaling see: http://www.rivm.nl/en/healthanddisease/productsafety/ConsExpo.jsp	

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10. Short title of exposure scenario

Industrial use of process regulators for polymersation processes in production of resins, rubbers, polymers
SU3; ERC6c; PROC1, PROC2, PROC3, PROC4, PROC5, PROC14

Control of exposure and risk management measures

Contributing exposure scenario	
Use descriptors covered	ERC6c: Industrial use of monomers for manufacture of thermoplastics As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.
Operational conditions	

Contributing exposure scenario

Use descriptors covered	PROC1: Use in closed process, no likelihood of exposure. Use domain: industrial
Operational conditions	
Concentration of the substance	formic acid … % Content: >= 0 % - <= 2 %
Physical state	liquid
Vapour pressure of the substance during use	4271 Pa
Process temperature	20 °C
Duration and Frequency of activity	480 min 5 days per week
Indoor/Outdoor	Indoor
Risk Management Measures	
Use suitable eye protection.	
Provide employee skin care programs.	
Use suitable chemically resistant gloves.	
Exposure estimate and reference to its source	
Assessment method	EASY TRA v4.1, ECETOC TRA v3.0, worker, modified version, The concentration of the substance has been considered using a linear approach.
	Worker - inhalation, long-term - local
Exposure estimate	0.0004 mg/m³
Risk Characterization Ratio (RCR)	0.00004
Assessment method	Qualitative assessment
	Worker - dermal
Guidance to Downstream Users	
For scaling see: http://www.ecetoc.org/tra Please note that a modified version has been used (see exposure estimates)	

Contributing exposure scenario	
Use descriptors covered	PROC2: Use in closed, continuous process with occasional controlled exposure. Use domain: industrial
Operational conditions	
Concentration of the substance	formic acid … % Content: >= 0 % - <= 2 %
Physical state	liquid
Vapour pressure of the substance during use	4271 Pa
Process temperature	20 °C
Duration and Frequency of activity	480 min 5 days per week

Indoor/Outdoor	Indoor
Risk Management Measures	
Use suitable eye protection.	
Provide employee skin care programs.	
Use suitable chemically resistant gloves.	
Exposure estimate and reference to its source	
Assessment method	EASY TRA v4.1, ECETOC TRA v3.0, worker, modified version, The concentration of the substance has been considered using a linear approach.
	Worker - inhalation, long-term - local
Exposure estimate	0.1918 mg/m³
Risk Characterization Ratio (RCR)	0.020187
Assessment method	Qualitative assessment
	Worker - dermal
Guidance to Downstream Users	
For scaling see: http://www.ecetoc.org/tra Please note that a modified version has been used (see exposure estimates)	

Contributing exposure scenario	
Use descriptors covered	PROC3: Use in closed batch process (synthesis or formulation). Use domain: industrial
Operational conditions	
Concentration of the substance	formic acid … % Content: >= 0 % - <= 2 %
Physical state	liquid
Vapour pressure of the substance during use	4271 Pa
Process temperature	20 °C
Duration and Frequency of activity	480 min 5 days per week
Indoor/Outdoor	Indoor
Risk Management Measures	
Use suitable eye protection.	
Provide employee skin care programs.	
Use suitable chemically resistant gloves.	
Exposure estimate and reference to its source	
Assessment method	EASY TRA v4.1, ECETOC TRA v3.0, worker, modified version, The concentration of the substance has been considered using a linear approach.

	Worker - inhalation, long-term - local
Exposure estimate	0.3835 mg/m³
Risk Characterization Ratio (RCR)	0.040373
Assessment method	Qualitative assessment
	Worker - dermal
Guidance to Downstream Users	
For scaling see: http://www.ecetoc.org/tra Please note that a modified version has been used (see exposure estimates)	

Contributing exposure scenario	
Use descriptors covered	PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises. Use domain: industrial
Operational conditions	
Concentration of the substance	formic acid … % Content: >= 0 % - <= 2 %
Physical state	liquid
Vapour pressure of the substance during use	4271 Pa
Process temperature	20 °C
Duration and Frequency of activity	480 min 5 days per week
Indoor/Outdoor	Indoor
Risk Management Measures	
Use suitable eye protection.	
Provide employee skin care programs.	
Use suitable chemically resistant gloves.	
Exposure estimate and reference to its source	
Assessment method	EASY TRA v4.1, ECETOC TRA v3.0, worker, modified version, The concentration of the substance has been considered using a linear approach.
	Worker - inhalation, long-term - local
Exposure estimate	0.7671 mg/m³
Risk Characterization Ratio (RCR)	0.080746
Assessment method	Qualitative assessment
	Worker - dermal
Guidance to Downstream Users	
For scaling see: http://www.ecetoc.org/tra Please note that a modified version has been used (see exposure estimates)	

Contributing exposure scenario	
Use descriptors covered	PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or

	significant contact). Use domain: industrial
Operational conditions	
Concentration of the substance	formic acid … % Content: >= 0 % - <= 2 %
Physical state	liquid
Vapour pressure of the substance during use	4271 Pa
Process temperature	20 °C
Duration and Frequency of activity	480 min 5 days per week
Indoor/Outdoor	Indoor
Risk Management Measures	
Use suitable eye protection.	
Provide employee skin care programs.	
Use suitable chemically resistant gloves.	
Exposure estimate and reference to its source	
Assessment method	EASY TRA v4.1, ECETOC TRA v3.0, worker, modified version, The concentration of the substance has been considered using a linear approach.
	Worker - inhalation, long-term - local
Exposure estimate	1.9177 mg/m³
Risk Characterization Ratio (RCR)	0.201866
Assessment method	Qualitative assessment
	Worker - dermal
Guidance to Downstream Users	
For scaling see: http://www.ecetoc.org/tra Please note that a modified version has been used (see exposure estimates)	

Contributing exposure scenario	
Use descriptors covered	PROC14: Production of preparations or articles by tabletting, compression, extrusion, pelettisation. Use domain: industrial
Operational conditions	
Concentration of the substance	formic acid … % Content: >= 0 % - <= 2 %
Physical state	liquid
Vapour pressure of the substance during use	4271 Pa
Process temperature	20 °C
Duration and Frequency of activity	480 min 5 days per week

Indoor/Outdoor	Indoor
Risk Management Measures	
Use suitable eye protection.	
Provide employee skin care programs.	
Use suitable chemically resistant gloves.	
Exposure estimate and reference to its source	
Assessment method	EASY TRA v4.1, ECETOC TRA v3.0, worker, modified version, The concentration of the substance has been considered using a linear approach.
	Worker - inhalation, long-term - local
Exposure estimate	1.9177 mg/m³
Risk Characterization Ratio (RCR)	0.201866
Assessment method	Qualitative assessment
	Worker - dermal
Guidance to Downstream Users	
For scaling see: http://www.ecetoc.org/tra Please note that a modified version has been used (see exposure estimates)	

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11. Short title of exposure scenario

Use in Oilfield drilling and production operations
SU3; ERC4; PROC1, PROC2, PROC3, PROC4

Control of exposure and risk management measures

Contributing exposure scenario	
Use descriptors covered	ERC4: Industrial use of processing aids in processes and products, not becoming part of articles As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.
Operational conditions	

Contributing exposure scenario	
Use descriptors covered	PROC1: Use in closed process, no likelihood of exposure. Use domain: industrial
Operational conditions	
Concentration of the substance	formic acid … % Content: >= 0 % - <= 20 %
Physical state	liquid
Vapour pressure of the substance during use	4271 Pa

Process temperature	20 °C
Duration and Frequency of activity	480 min 5 days per week
Indoor/Outdoor	Outdoor
Risk Management Measures	
Avoid frequent and direct contact with substance. Ensure minimization of manual phases Provide specific employee training to prevent/minimize exposures. Regular inspection and maintenance of equipment and machines. Supervision in place to check that the RMMs in place are being used correctly and OCs followed.	
In case of potential exposure:, Wear suitable personal protective equipment.	
Use suitable eye protection. Wear suitable face shield	
Avoid skin contact. Wash off any skin contamination immediately. Provide specific employee training to prevent/minimize exposures. Provide employee skin care programs.	
Wear chemically resistant gloves in combination with specific activity training Wear suitable coveralls to prevent exposure to the skin. Wear suitable face shield	
Exposure estimate and reference to its source	
Assessment method	EASY TRA v4.1, ECETOC TRA v3.0, worker, modified version, The concentration of the substance has been considered using a linear approach.
	Worker - inhalation, long-term - local
Exposure estimate	0.0027 mg/m³
Risk Characterization Ratio (RCR)	0.000283
Assessment method	Qualitative assessment
	Worker - dermal
Guidance to Downstream Users	
For scaling see: http://www.ecetoc.org/tra Please note that a modified version has been used (see exposure estimates)	

Contributing exposure scenario	
Use descriptors covered	PROC2: Use in closed, continuous process with occasional controlled exposure. Use domain: industrial

Operational conditions	
Concentration of the substance	formic acid … % Content: >= 0 % - <= 20 %
Physical state	liquid
Vapour pressure of the substance during use	4271 Pa
Process temperature	20 °C
Duration and Frequency of activity	480 min 5 days per week
Indoor/Outdoor	Indoor
Risk Management Measures	
Avoid frequent and direct contact with substance. Ensure minimization of manual phases Provide specific employee training to prevent/minimize exposures. Regular inspection and maintenance of equipment and machines. Supervision in place to check that the RMMs in place are being used correctly and OCs followed.	
In case of potential exposure:, Wear suitable personal protective equipment.	
Use suitable eye protection. Wear suitable face shield	
Avoid skin contact. Wash off any skin contamination immediately. Provide specific employee training to prevent/minimize exposures. Provide employee skin care programs.	
Wear chemically resistant gloves in combination with specific activity training Wear suitable coveralls to prevent exposure to the skin. Wear suitable face shield	
Exposure estimate and reference to its source	
Assessment method	EASY TRA v4.1, ECETOC TRA v3.0, worker, modified version, The concentration of the substance has been considered using a linear approach.
	Worker - inhalation, long-term - local
Exposure estimate	1.9177 mg/m³
Risk Characterization Ratio (RCR)	0.201866
Assessment method	Qualitative assessment
	Worker - dermal
Guidance to Downstream Users	
For scaling see: http://www.ecetoc.org/tra Please note that a modified version has been used (see	

exposure estimates)

Contributing exposure scenario	
Use descriptors covered	PROC3: Use in closed batch process (synthesis or formulation). Use domain: industrial
Operational conditions	
Concentration of the substance	formic acid … % Content: >= 0 % - <= 20 %
Physical state	liquid
Vapour pressure of the substance during use	4271 Pa
Process temperature	20 °C
Duration and Frequency of activity	480 min 5 days per week
Indoor/Outdoor	Indoor
Risk Management Measures	
Avoid frequent and direct contact with substance. Ensure minimization of manual phases Provide specific employee training to prevent/minimize exposures. Regular inspection and maintenance of equipment and machines. Supervision in place to check that the RMMs in place are being used correctly and OCs followed.	
In case of potential exposure:, Wear suitable personal protective equipment.	
Use suitable eye protection. Wear suitable face shield	
Avoid skin contact. Wash off any skin contamination immediately. Provide specific employee training to prevent/minimize exposures. Provide employee skin care programs.	
Wear chemically resistant gloves in combination with specific activity training Wear suitable coveralls to prevent exposure to the skin. Wear suitable face shield	
Exposure estimate and reference to its source	
Assessment method	EASY TRA v4.1, ECETOC TRA v3.0, worker, modified version, The concentration of the substance has been considered using a linear approach.

	Worker - inhalation, long-term - local
Exposure estimate	3.8354 mg/m³
Risk Characterization Ratio (RCR)	0.403732
Assessment method	Qualitative assessment
	Worker - dermal
Guidance to Downstream Users	
For scaling see: http://www.ecetoc.org/tra Please note that a modified version has been used (see exposure estimates)	

Contributing exposure scenario	
Use descriptors covered	PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises. Use domain: industrial
Operational conditions	
Concentration of the substance	formic acid … % Content: >= 0 % - <= 20 %
Physical state	liquid
Vapour pressure of the substance during use	4271 Pa
Process temperature	20 °C
Duration and Frequency of activity	480 min 5 days per week
Indoor/Outdoor	Indoor
Risk Management Measures	
Provide a good standard of general ventilation (not less than 3 - 5 air changes per hour)	Effectiveness: 30 %
Avoid frequent and direct contact with substance. Ensure minimization of manual phases Provide specific employee training to prevent/minimize exposures. Regular inspection and maintenance of equipment and machines. Supervision in place to check that the RMMs in place are being used correctly and OCs followed.	
In case of potential exposure:, Wear suitable personal protective equipment.	
Use suitable eye protection. Wear suitable face shield	
Avoid skin contact. Wash off any skin contamination immediately. Provide specific employee training to prevent/minimize exposures. Provide	

employee skin care programs.	
Wear chemically resistant gloves in combination with specific activity training Wear suitable coveralls to prevent exposure to the skin. Wear suitable face shield	
Exposure estimate and reference to its source	
Assessment method	EASY TRA v4.1, ECETOC TRA v3.0, worker, modified version, The concentration of the substance has been considered using a linear approach.
	Worker - inhalation, long-term - local
Exposure estimate	5.3696 mg/m³
Risk Characterization Ratio (RCR)	0.565224
Assessment method	Qualitative assessment
	Worker - dermal
Guidance to Downstream Users	
For scaling see: http://www.ecetoc.org/tra Please note that a modified version has been used (see exposure estimates)	

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