

1. IDENTIFICATION

Trade Name	PANA
Substance Name	N-Phenyl-1-naphthylamine
EINECS Number	201-983-0
Reach Registration Number	01-211-9488704-27-0003
CAS Number	90-30-2
Main Use	Industrial use, Professional use, Consumer use
Specific Use	See exposure scenarios in Annex
Manufacturer	Nation Ford Chemical Company 2300 Banks St Fort Mill, SC 29715 United States of America
Email	info@nationfordchem.com
Telephone	1-803-548-3210
Only Representative	Chemservice GmbH Herrnsheimer Hauptstr. 1b 67550 Worms, Germany
Email	germany@chemservice-group.com
Phone	+49-6241-95480-0
Fax	+49 (0)6241-95480-25
Emergency Telephone Number	1-800-424-9300 (CHEMTREC)

2. HAZARDS IDENTIFICATION

Hazard Classification

Classification in accordance with Regulation (EC) No 1272/2008 and 29 CFR 1910.1200

Acute Toxicity	Category 4	H302
Skin Irritant	Category 1B	H317
Specific Target Organ Toxicity – Repeat Exposure	Category 2	H373
Aquatic Acute Toxicity	Category 1	H400
Aquatic Chronic Toxicity	Category 1	H410

Label Elements



Hazard Pictograms
Signal Word

Warning

Hazard Statements

H302	Harmful if swallowed
H317	May cause an allergic skin reaction
H373	May cause damage to blood system through prolonged or repeated exposure
H400	Very toxic to aquatic life
H410	Very toxic to aquatic life with long lasting effects.

Precautionary Statements

P260	Do not breath dust
P264	Wash skin thoroughly after handling
P273	Avoid release to the environment.
P302 + P352	IF ON SKIN: Wash with plenty of soap and water
P313 + P333	If skin irritation or rash occurs: Get medical attention.
P314	Get medical advice if you feel unwell.
P391	Collect Spillage.
P501	Dispose of contents in accordance with local regulations.

Other Hazards

Results of PBT and vPvB assessment

PBT	Not applicable
vPvB	Not applicable

Endocrine Disrupting Properties No

3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance Name	N-Phenyl-1-naphthylamine
CAS Number	90-30-2
EINECS Number	201-983-0
Reach Registration Number	01-211-9488704-27-0003
Purity	99.6+%
Synonyms	PANA PhenylNaphthylamine

4. FIRST AID MEASURES

General information	Symptoms of poisoning may only appear several hours later. When symptoms persist or in all cases of doubt seek medical advice. Remove from exposure, lie down. Never give anything by mouth to an unconscious person.
Inhalation	After inhalation of vapors during processing, remove the patient to fresh air at once.
Skin contact	Take off all contaminated clothing immediately. If symptoms persist, call a physician. Wash off immediately with soap and plenty of water.
Eye contact	In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
Ingestion	Should the product be swallowed seek medical advice.
Note to physician	Symptomatic treatment and if possible, contact poison specialist.

5. FIRE FIGHTING MEASURES

Suitable extinguishing media	Carbon Dioxide (CO2), Foam, Dry Chemical
Special hazards arising from the substance	Do not allow run-off from firefighting to enter drains or water courses.
Advice for firefighters	Must wear self-contained breathing apparatus.
Additional Information	Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations. Collect contaminated fire extinguishing water separately. This must not be discharged into drains.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment, and emergency procedures	Use personal protective equipment.
Environmental precautions	Prevent entry into drains, waters or soil. Prevent further leakage or spillage if safe to do so.
Methods and materials for containment and cleaning	Take up avoiding formulation of dust. Fill into labelled, sealable containers.
Reference to other sections	See Section 7 for information on safe handling. See Section 8 for information on personal protection equipment. See Section 13 for disposal information.

7. HANDLING AND STORAGE

Precautions for Safe Handling	Provide adequate ventilation and, if necessary, exhaust ventilation during handling or transferring of the product. Avoid contact with skin and eyes. Dispose of rinse water in accordance with local and national regulations. Persons with a history of skin sensitization problems or asthma, allergies, chronic or recurrent respiratory disease should not be employed in any process in which this mixture is being used.
Conditions for Safe Storage Requirements to be met by Storerooms and receptacles	Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage. No special storage conditions required.
Information about storage in one common storage facility	Keep away from foodstuffs, drinks and tobacco. No decomposition if stored and applied as directed.
German Storage Class	13 (Non-flammable solids that cannot be assigned to any of the aforementioned LGK)

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control Parameters	
DNEL Values	
Dermal (Long Term Exposure)	0.050 mg/kg bw/day
Inhalation (Long Term Exposure)	0.18 mg/m ³
PNEC Values	
PNEC _{aqua} (freshwater)	0.0002 mg/L; Assessment factor 100
PNEC _{aqua} (marine water)	0.00002 mg/L; Assessment factor 1000
PNEC _{aqua} (intermittent releases)	0.002 mg/L; Assessment factor 100
PNEC _{STP}	100 mg/L
Exposure Controls	
Personal protective equipment general protective and hygienic measures	Keep away from foodstuffs, beverages and feed. Immediately remove all soiled and contaminated clothing. Wash hands before breaks and at the end of work. Avoid contact with the eyes and skin.
Ventilation	Normal criterion for workplace air changes. A system of local and/or general exhaust is recommended to keep employee exposures as low as possible. Local exhaust ventilation is generally preferred because it can control the emissions of the

contaminant at its source, preventing dispersion of it into the general work area.

Respiratory Protection

NIOSH/MSHA approved respirator.

Dust - It is recommended to wear respiratory protection such as particle filter P2 or P3.

Vapor – It is recommended to wear respiratory protection such as a full masks with ABEK filter.

Hand Protection

Protective gloves. The glove material has to be impermeable and resistant to the substance.

Fabric	Thickness	Breakthrough Time
Natural Latex	1.4 mm	≤ 480 min
Polychloroprene	0.65 mm	≤ 480 min
Nitrile	0.1 mm	≤ 480 min

Eye and Face Protection

In cases where there is likelihood of eye contact, wear chemical goggles.

Skin and Body Protection

Protective work clothing

Environmental Exposure

Do not release into the environment. Dispose of as hazardous waste in accordance with local directives on waste.

9. PHYSICAL AND CHEMICAL PROPERTIES

Color Yellow to tan crystalline flakes or pellets

Form Solid

Odor Pungent odor

Odor threshold No data available

pH Not applicable

Melting/Freezing point 62°C (143.6°F)

Boiling point 363°C (685.4°F) (estimated)

Flash point 202°C (396°F)

Evaporation rate Not applicable

Flammability (solid, gas) Product is classified

Upper explosion limit Not applicable

Lower explosion limit Not applicable

Vapor pressure 0.0011 pa @ 25°C

Density 1.16 g/cm³

Water solubility at 20°C 3 mg/L

Segregation coefficient (n-octanol/water) at 25°C 4.47 log POW (estimated)

Ignition temperature	No data available
Decomposition temperature	No data available
Self-igniting	No data available
Danger of explosion	As with most organic compounds, fine dust dispersed in air in the presence of an ignition source is a potential dust explosion hazard.
Dynamic viscosity	Not applicable
Kinematic viscosity	Not applicable

10. STABILITY AND REACTIVITY

Reactivity	Product is not reactive under normal conditions of storage and use.
Chemical stability	Product is stable under normal conditions of storage and use.
Possibility of hazardous reactions	Can react with acids.
Conditions to avoid	Extremes of temperature and direct sunlight.
Incompatible materials	Keep away from reducing agents, oxidizing agents, acids and bases.
Hazardous decomposition products	Thermal decomposition does not occur until flash point is reached. No hazardous decomposition products when stored and handled correctly. Formation of carbon monoxide, carbon dioxide, nitrogen oxides and other toxic gases in the event of a fire or during thermal decomposition.

11. TOXICOLOGICAL INFORMATION

Skin Contact	Irritating to skin.
Long-Term Exposure	No long-term effects have been identified.
Acute Oral Toxicity	LD ₅₀ : 1625 mg/kg bw (rat)
Acute Dermal Toxicity	LD ₅₀ : >5000 mg/kg bw (rabbit)
Acute Inhalation Toxicity	No study performed as exposure is highly unlikely due to low vapor pressure.
Acute Intraperitoneal Toxicity	LD ₅₀ : 219 mg/kg bw (mouse)
Systemic Oral Toxicity	NOAEL: male - 5 mg/kg; female - 25 mg/kg (rat)
Skin Irritation/Corrosion	No adverse effect observed (not irritating)
Eye Irritation/Corrosion	No adverse effect observed (not irritating)
Skin Sensitization	Category 1B using OECD Guideline 406
Germ Cell Mutagenicity in vitro:	No adverse effects observed.
in vivo:	No adverse effects observed.
Carcinogenicity	This product is not classified as a carcinogen by IARC, NPT, OSHA, or the EU CLP.

Reproductive toxicity oral	No adverse effects observed.
STOT: Single Exposure	No information available.
STOT: Repeated Exposure	Product may cause damage to the kidneys through repeated or prolonged exposure.
Aspiration Hazard	No information available
Neurotoxicity	No adverse effects observed.
Endocrine Disrupting Properties	No

12. ECOLOGICAL INFORMATION

Toxicity

Toxicity to Fish	Fish (low toxicity to fish) LC50: 0.44 mg/L Exposure time: 96 h
Toxicity to Aquatic Invertebrates	Daphnia (harmful to aquatic invertebrates) EC50: 0.3 mg/L Exposure time: 48 h Daphnia EC10, LC10: 0.02 mg/L Exposure time: 21 d
Toxicity to Aquatic Algae and Cyanobacteria	Pseudokirchneriella subcapitata EC50: 0.93 mg/L Exposure time: 96 h
Toxicity to Microorganisms	Activated Sludge EC50: > 10,000 mg/L Exposure time: 3 h
Sediment Toxicity	LC50: 2.81 mg/L Exposure time: 48 h
Toxicity to Soil Macroorganisms Except Anthropods	Enchytraeus crypticus NOEC: 220 µmol/kg soil dw Exposure time: 28 d
Toxicity to Terrestrial Anthropods	Folsomia candida NOEC: 88 µmol/kg soil dw Exposure time: 28 d
Persistence and Degradability	Not persistent.
Bioaccumulative Potential	No bioaccumulation potential.
Mobility in Soil	No further relative information available.
Results of PBT and VPVB Assessment	
PBT	Not applicable
vPvB	Not applicable
Other adverse effects	No further relevant information available.

13. DISPOSAL CONSIDERATIONS

Waste Treatment Methods Must not be disposed together with household garbage. Do not allow product to reach sewage system. Dispose of in accordance with local, regional, national, and international regulations.

14. TRANSPORT INFORMATION

	UN Number	UN Proper Shipping Name	Hazard Class(s)	Packing Group	Environmental Hazards	Other
DOT (Solid)	None	Not Regulated	None	None	Not applicable	None
DOT (Molten)	UN3257	Elevated temperature liquid, n.o.s. at or above 100°C and below its flashpoint (Phenyl-1-naphthylamine)	9	III	Not applicable	None
ADR/RID AND(R)	UN3077	Environmentally hazardous substance, solid, n.o.s. (Phenyl-1-naphthylamine)	9	III	Yes	Classification Code – 90 Labels - 9
IMDG	UN3077	Environmentally hazardous substance, solid, n.o.s. (Phenyl-1-naphthylamine)	9	III	Yes (PP) Marine Pollutant	EmS number – F-A (S_F) MPO: Marine Pollutant Labels - 9
IATA/ICAO	UN3077	Environmentally hazardous substance, solid, n.o.s. (Phenyl-1-naphthylamine)	9	III	Marine Pollutant	Labels - 9

Special Precautions for User Environmentally hazardous substance. Marine pollutants. Keep dry. Avoid heat above +40 °C. Keep separated from foodstuffs.

Transport in Bulk According to Annex II of MARPOL 73/78 and the IBC Code Not applicable

15. REGULATORY INFORMATION

CERCLA This product is not subject to CERCLA reporting requirements. Many states have more stringent release reporting requirements. Report spills required under federal, state and local regulations.

TSCA All of the components of this product are listed on the TSCA inventory.

Clean Water Act (CWA) This material is not regulated under the CWA.

Clean Air Act (CAA) This material is not regulated under the CAA.

SARA 311/312 Immediate Hazard: Yes
Delayed Hazard: No
Fire Hazard: No
Pressure Hazard: No
Reactivity Hazard: No

SARA 313 This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

California Proposition 65 This product contains the following substances known to the state of California to cause cancer and/or reproductive toxicity.

Aniline (CAS Number 62-53-3)

International Regulations Canadian Workplace Hazardous Materials Information System (WHMIS)	Not a controlled product.
Canadian Environmental Protection Act	All of the components in this product are listed on the Domestic Substances List (DSL). This SDS has been prepared according to the criteria of the Controlled Products Regulation (CPR) and the SDS contains all of the information required by the CPR.
European Inventory of Existing Chemicals (EINECS)	All of the components in this product are listed on the EINECS inventory.
German Storage Class (LGK)	13 (Non-flammable solids that cannot be assigned to any of the aforementioned LGK)
Chemical Safety Assessment	A Chemical Safety Assessment has been carried out.

16. OTHER INFORMATION

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

Date of Last Revision	December 19, 2023
Further Information	All the information mentioned in this SDS are compliant with the COMMISSION REGULATION (EU) No 453/2010 of 20 May 2010 amending Regulation (EC) No 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)
Abbreviations and Acronyms	
EC50	Effective concentration, 50 percent
GHS	Globally Harmonized System of Classification and Labelling of Chemicals
EINECS	European Inventory of Existing Commercial Chemical Substances
CAS	Chemical Abstracts Service (division of the American Chemical Society)
LC50	Lethal concentration, 50 percent
LD50	Lethal dose, 50 percent
Annexes	
Annex A	Exposure Scenarios

Annex A.

Substance Name: N-1-naphthylamine
EC Number: 201-983-0
CAS Number: 90-30-2

Scenario 1: Industrial formulation of lubricant additives, lubricants and greases. Includes material transfers, mixing, large and small scale packing, sampling, maintenance and associated laboratory activities. (ATIEL-ATC Group A [i])

This scenario is described by the following combinations of use descriptors. The corresponding contributing scenarios are described in the respective subchapters.

An overall exposure scenario may be described by a number of contributing scenarios which may be subdivided into environmental exposure, worker exposure and consumer exposure.
The following scenarios contribute to the scenario *Industrial formulation of lubricant additives, lubricants and greases. Includes material transfers, mixing, large and small scale packing, sampling, maintenance and associated laboratory activities..*

The corresponding release to the environment, exposure of workers and consumers resulting from these contributing scenarios is summarized in chapter 10.1 ff.

Description of ES 1

Free short title	Industrial formulation of lubricant additives, lubricants and greases. Includes material transfers, mixing, large and small scale packing, sampling, maintenance and associated laboratory activities. (ATIEL-ATC Group A [i])
Systematic title based on use descriptor	ERC 2; PROC 1, 2, 3, 4, 5, 8A, 8B, 9, 15
Name of contributing environmental scenario and corresponding ERC	ERC 2 Formulation of preparations ERC 2 Formulation of preparations
Name(s) of contributing worker scenarios and corresponding PROCs	PROC 1 - Use in closed process, no likelihood of exposure PROC 2 - Use in closed, continuous process with occasional controlled exposure PROC 3 - Use in closed batch process (synthesis or formulation) PROC 4 - Use in batch and other process (synthesis) where opportunity for exposure arises PROC 4 - Use in batch and other process (synthesis) where opportunity for exposure arises PROC 5 - Mixing or blending in batch processes (multistage and/or significant contact) PROC 8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities PROC 8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities PROC 9 - Transfer of chemicals into small containers (dedicated filling line) PROC 15 - Use of laboratory reagents in small scale laboratories

Contributing Scenario (1) controlling environmental exposure for ERC 2

Operational conditions	
Annual site tonnage	70 to/year
Daily amount used at site	233.333 kg/day
Release times per year	300 days/year
Local freshwater dilution factor	10
Local marine water dilution factor	100
Release fraction to air from process	0.01%
Release fraction to wastewater from process	2.00E-11
Release fraction to soil from process	0%

Fraction tonnage to region	100%
Fraction used at main source	100%
STP	yes (municipal)
River flow rate	18000 m ³ /day
Municipal sewage treatment plant discharge	2000000 L/day

Risk management measures

SpERC	<p>ATIEL ATC SPERC 2.A(i)- PANA (release time: 300d) (The spERC is taken from the SPERC factsheet Ai-lubes released by ATIEL on 05 Oct 2012.</p> <p>The emission fraction to municipal wastewater is after application of assumed Risk Management Measures based on sector practices and other regulatory requirements for risk determining substances in base oil, consistent with OECD Emission Scenario Document on Lubricants and Lubricant Additives, No 10, November 2004.</p> <p>The substance was assigned to RDS code 2.2 based on the following substance characteristics:</p> <p style="text-align: center;">log Pow < 5 vp < 1 Pa not readily biodegradable PNEC: 0.0001 ≤ - <0.001 mg/L)</p>
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Contributing Scenario (2) controlling environmental exposure for ERC 2

Operational conditions	
Annual site tonnage	20 to/year
Daily amount used at site	1,000 kg/day
Release times per year	20 days/year
Local freshwater dilution factor	10
Local marine water dilution factor	100
Release fraction to air from process	0.01%
Release fraction to wastewater from process	2.00E-11
Release fraction to soil from process	0%
Fraction tonnage to region	100%
Fraction used at main source	100%
STP	yes (municipal)

River flow rate	18000 m ³ /day
Municipal sewage treatment plant discharge	2000000 L/day
Risk management measures	
SpERC	<p>ATIEL ATC SPERC 2.A(i)- PANA (release time: 20d) (The spERC is taken from the SPERC factsheet Ai-lubes released by ATIEL on 05 Oct 2012.</p> <p>The emission fraction to municipal wastewater is after application of assumed Risk Management Measures based on sector practices and other regulatory requirements for risk determining substances in base oil, consistent with OECD Emission Scenario Document on Lubricants and Lubricant Additives, No 10, November 2004.</p> <p>The substance was assigned to RDS code 2.2 based on the following substance characteristics:</p> <p style="text-align: center;">log Pow < 5 vp < 1 Pa not readily biodegradable PNEC: 0.0001 ≤ - <0.001 mg/L)</p>

Contributing Scenario (3) controlling industrial worker exposure for PROC 1

Name of contributing scenario	1 - Use in closed process, no likelihood of exposure
Scenario subtitle	Material storage
Exposure type	Inhalation: Long-term systemic, Short-term systemic Dermal: Long-term systemic, Short-term systemic
Qualitative Risk Assessment	
General	Handle substance within closed system.
Product characteristics	
Physical state	liquid
Concentration in substance	>25%
Fugacity / Dustiness	negligible
Frequency and duration of use	
Duration of activity	>4 hours (default) [LONG TERM] < 15 mins [SHORT TERM]
Frequency of use	5 days / week

Human factors not influenced by risk management	
Exposed skin surface	240 cm ²
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 0 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 20 95 %
Respiratory protection	no

Contributing Scenario (4) controlling industrial worker exposure for PROC 2

Name of contributing scenario	2 - Use in closed, continuous process with occasional controlled exposure
Scenario subtitle	Material storage; Closed continuous processes at elevated temperature with sampling, including grease manufacture.
Exposure type	Inhalation: Long-term systemic, Short-term systemic Dermal: Long-term systemic, Short-term systemic

Qualitative Risk Assessment

General	<p>Avoid skin contact.</p> <p>Avoid contact with contaminated tools.</p> <p>Wash off any skin contamination immediately.</p> <p>Avoid splashing.</p> <p>Clean up contamination as soon as they occur.</p> <p>Ensure minimization of manual phases.</p> <p>Minimise number of staff exposed.</p> <p>Ensure good work practices are implemented</p> <p>Provide specific employee training to prevent/minimize exposures.</p> <p>In case of potential exposure:</p> <p>Use suitable chemically resistant gloves.</p> <p>Wear suitable coveralls to prevent exposure to the skin.</p>
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Product characteristics

Physical state	liquid
Concentration in substance	>25%
Fugacity / Dustiness	negligible

Frequency and duration of use

Duration of activity	>4 hours (default) [LONG TERM] > 15 minutes [SHORT TERM]
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm ²
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Air concentration is limited to saturated vapour concentration (0.097359 mg/m ³) (<i>justification: The formation of aerosols is not expected during this process. The concentration of the test substance in the air is therefore limited to the saturated concentration.</i>) [LONG TERM]	
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 90 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 20 95 %
Respiratory protection	no
Use of external/measured value dermal	Dermal exposure was estimated using ECETOC 3. As an additional Tier 2 modification, the maximum concentration of the test substance during that process (27%) was taken into account following a linear approach. [LONG TERM]

Contributing Scenario (5) controlling industrial worker exposure for PROC 3

Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)
Scenario subtitle	Batch closed process with sampling. Blending and Filling processes (closed / dedicated). Includes both bulk and small quantity additions. May be at elevated temperature, e.g. grease manufacture.
Exposure type	Inhalation: Long-term systemic, Short-term systemic Dermal: Long-term systemic, Short-term systemic
Qualitative Risk Assessment	
General	Avoid skin contact. Avoid contact with contaminated tools. Wash off any skin contamination immediately. Avoid splashing. Clean up contamination as soon as they occur.

	<p>Ensure minimization of manual phases. Minimise number of staff exposed. Ensure good work practices are implemented Provide specific employee training to prevent/minimize exposures. In case of potential exposure: Use suitable chemically resistant gloves. Wear suitable coveralls to prevent exposure to the skin.</p>
Product characteristics	
Physical state	liquid
Concentration in substance	>25%
Fugacity / Dustiness	negligible
Frequency and duration of use	
Duration of activity	>4 hours (default) [LONG TERM] < 15 minutes [SHORT TERM]
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	240 cm ²
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 90 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 20 95 %
Respiratory protection	no
Use of external/measured value dermal	Dermal exposure was estimated using ECETOC 3. As an additional Tier 2 modification, the maximum concentration of the test substance during that process (27%) was taken into account following a linear approach. [LONG TERM]

Contributing Scenario (6) controlling industrial worker exposure for PROC 4

Name of contributing scenario	4 - Use in batch and other process (synthesis) where opportunity for exposure arises
Scenario subtitle	Batch open process. Blending and Filling processes (open / non dedicated). Includes addition of both bulk and small quantity additions, mixing operations. May be at elevated temperature, e.g. Grease manufacture.
Exposure type	Inhalation: Long-term systemic, Short-term systemic Dermal: Long-term systemic, Short-term systemic
Qualitative Risk Assessment	
General	<p>Avoid skin contact.</p> <p>Avoid contact with contaminated tools.</p> <p>Wash off any skin contamination immediately.</p> <p>Avoid splashing.</p> <p>Clean up contamination as soon as they occur.</p> <p>Ensure minimization of manual phases.</p> <p>Minimise number of staff exposed.</p> <p>Ensure good work practices are implemented</p> <p>Provide specific employee training to prevent/minimize exposures.</p> <p>In case of potential exposure:</p> <p>Use suitable chemically resistant gloves.</p> <p>Wear suitable coveralls to prevent exposure to the skin.</p>
Product characteristics	
Physical state	liquid
Concentration in substance	>25%
Fugacity / Dustiness	negligible
Frequency and duration of use	
Duration of activity	1 - 4 hours [LONG TERM] <15 minutes [SHORT TERM]
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm ²
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 90 %)

Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	98 %, burst-time: >4 hours (default) <i>(justification: For this process, gloves with an effectiveness of 98% are recommended. The 98% effectiveness is achieved and justified by specific activity training of workers in combination with intensive management supervision controls.)</i> [LONG TERM] Gloves APF 20 95 % [SHORT TERM]
Respiratory protection	no
Use of external/measured value dermal [LONG TERM]	Dermal exposure was estimated using ECETOC 3. As an additional Tier 2 modification, the maximum concentration of the test substance during that process (27%) was taken into account following a linear approach. In addition, the reduced duration of activity was taken into account following the banded approach (i.e. a factor of 0.6 was applied)

Contributing Scenario (7) controlling industrial worker exposure for PROC 4

Name of contributing scenario	4 - Use in batch and other process (synthesis) where opportunity for exposure arises
Scenario subtitle	Sample collection of formulation
Exposure type	Inhalation: Long-term systemic, Short-term systemic Dermal: Long-term systemic, Short-term systemic
Qualitative Risk Assessment	
General	Avoid skin contact. Avoid contact with contaminated tools. Wash off any skin contamination immediately. Avoid splashing. Clean up contamination as soon as they occur. Ensure minimization of manual phases. Minimise number of staff exposed. Ensure good work practices are implemented Provide specific employee training to prevent/minimize exposures. In case of potential exposure: Use suitable chemically resistant gloves. Wear suitable coveralls to prevent exposure to the skin.
Product characteristics	
Physical state	liquid

Concentration in substance	>25%
Fugacity / Dustiness	negligible
Frequency and duration of use	
Duration of activity	less than 15 mins
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm ²
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 20 95 %
Respiratory protection	no
Use of external/measured value dermal [LONG TERM]	Dermal exposure was estimated using ECETOC 3. As an additional Tier 2 modification, the maximum concentration of the test substance during that process (27%) was taken into account following a linear approach. In addition, the reduced duration of activity was taken into account following the banded approach (i.e. a factor of 0.1 was applied)

Contributing Scenario (8) controlling industrial worker exposure for PROC 5

Name of contributing scenario	4 - Use in batch and other process (synthesis) where opportunity for exposure arises
Scenario subtitle	Batch open process. Blending and Filling processes (open / non dedicated). Includes addition of both bulk and small quantity additions, mixing operations. May be at elevated temperature, e.g. Grease manufacture.
Exposure type	Inhalation: Long-term systemic, Short-term systemic Dermal: Long-term systemic, Short-term systemic
Qualitative Risk Assessment	
General	Avoid skin contact. Avoid contact with contaminated tools. Wash off any skin contamination immediately. Avoid splashing. Clean up contamination as soon as they occur. Ensure minimization of manual phases.

	<p>Minimise number of staff exposed.</p> <p>Ensure good work practices are implemented</p> <p>Provide specific employee training to prevent/minimize exposures.</p> <p>In case of potential exposure:</p> <p>Use suitable chemically resistant gloves.</p> <p>Wear suitable coveralls to prevent exposure to the skin.</p>
Product characteristics	
Physical state	liquid
Concentration in substance	>25%
Fugacity / Dustiness	negligible
Frequency and duration of use	
Duration of activity	1 - 4 hours [LONG TERM] <15 minutes [SHORT TERM]
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm ²
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 90 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	<p>98 %, burst-time: >4 hours (default) (<i>justification: For this process, gloves with an effectiveness of 98% are recommended. The 98% effectiveness is achieved and justified by specific activity training of workers in combination with intensive management supervision controls.</i>) [LONG TERM]</p> <p>Gloves APF 20 95 % [SHORT TERM]</p>
Respiratory protection	no
Use of external/measured value dermal [LONG TERM]	<p>Dermal exposure was estimated using ECETOC 3. As an additional Tier 2 modification, the maximum concentration of the test substance during that process (27%) was taken into account following a linear approach. In addition, the reduced duration of activity was taken into account following the banded approach (i.e. a factor of 0.6 was applied)</p>

Contributing Scenario (9) controlling industrial worker exposure for PROC 8A & 8B

Name of contributing scenario	8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities
Scenario subtitle	Small pack (drum/bag) transfers - non dedicated facility.
Exposure type	Inhalation: Long-term systemic, Short-term systemic Dermal: Long-term systemic, Short-term systemic
Qualitative Risk Assessment	
General	<p>Avoid skin contact.</p> <p>Avoid contact with contaminated tools.</p> <p>Wash off any skin contamination immediately.</p> <p>Avoid splashing.</p> <p>Clean up contamination as soon as they occur.</p> <p>Ensure minimization of manual phases.</p> <p>Minimise number of staff exposed.</p> <p>Ensure good work practices are implemented</p> <p>Provide specific employee training to prevent/minimize exposures.</p> <p>In case of potential exposure:</p> <p>Use suitable chemically resistant gloves.</p> <p>Wear suitable coveralls to prevent exposure to the skin.</p>
Product characteristics	
Physical state	solid
Concentration in substance	100%
Fugacity / Dustiness	low
Frequency and duration of use	
Duration of activity	15 mins to 1 hour [LONG TERM] < 15 minutes [SHORT TERM]
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm ²
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 90 %)
Conditions and measures related to personal protection, hygiene and health evaluation	

Protective gloves	98 %, burst-time: >4 hours (default) (<i>justification: For this process, gloves with an effectiveness of 98% are recommended. The 98% effectiveness is achieved and justified by specific activity training of workers in combination with intensive management supervision controls.</i>) [LONG TERM] Gloves APF 20 95 % [SHORT TERM]
Respiratory protection	no
Use of external/measured value dermal [LONG TERM]	<p>Dermal exposure was calculated using "Risk of Derm 2.1"</p> <p>The following settings were applied:</p> <ul style="list-style-type: none"> - Scenario: Filling, mixing or loading - ventilation rate: normal or good ventilation - frequency of skin contact: rare contact - kind of contact: light contact - what type of product is handled: low or moderately dusty solid - are significant amounts of aerosols generated: no - what is the level of automation: Manual Task - use rate of the product: 50 kg/min - cumulative duration per shift: 45 min <p>Result: Estimated loading per shift hands = 58.9 mg</p> <p>Exposure in mg/kg bw is calculated as follows: 58.9 / 70 kg bw = 0.84 mg/kg bw</p> <p>This exposure is further reduced by the mandatory use of gloves with 98% effectiveness:</p> <p>$0.84 \text{ mg/kg} * 0.02 = 0.0168 \text{ mg/kg}$</p>

Contributing Scenario (10) controlling industrial worker exposure for PROC 9

Name of contributing scenario	4 - Use in batch and other process (synthesis) where opportunity for exposure arises
Scenario subtitle	Batch open process. Blending and Filling processes (open / non dedicated). Includes addition of both bulk and small quantity additions, mixing operations. May be at elevated temperature, e.g. Grease manufacture.
Exposure type	Inhalation: Long-term systemic, Short-term systemic

Dermal: Long-term systemic, Short-term systemic

Qualitative Risk Assessment

General

Avoid skin contact.
 Avoid contact with contaminated tools.
 Wash off any skin contamination immediately.
 Avoid splashing.
 Clean up contamination as soon as they occur.
 Ensure minimization of manual phases.
 Minimise number of staff exposed.
 Ensure good work practices are implemented
 Provide specific employee training to prevent/minimize exposures.
 In case of potential exposure:
 Use suitable chemically resistant gloves.
 Wear suitable coveralls to prevent exposure to the skin.

Product characteristics

Physical state	liquid
Concentration in substance	>25%
Fugacity / Dustiness	negligible

Frequency and duration of use

Duration of activity	1 - 4 hours [LONG TERM] <15 minutes [SHORT TERM]
Frequency of use	5 days / week

Human factors not influenced by risk management

Exposed skin surface	480 cm ²
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Other given operational conditions affecting workers exposure

Location	indoors
Domain	industrial

Technical conditions and measures to control dispersion and exposure

Local exhaust ventilation	yes (inhalation 90 %)
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Conditions and measures related to personal protection, hygiene and health evaluation

Protective gloves	98 %, burst-time: >4 hours (default) (<i>justification: For this process, gloves with an effectiveness of 98% are recommended. The 98% effectiveness is achieved and justified by specific activity training of workers in combination with intensive management supervision controls.</i>) [LONG TERM] Gloves APF 20 95 % [SHORT TERM]
Respiratory protection	no
Use of external/measured value dermal [LONG TERM]	Dermal exposure was estimated using ECETOC 3. As an additional Tier 2 modification, the maximum concentration of the test substance during that process (27%) was taken into account following a linear approach. In addition, the reduced duration of activity was taken into account following the banded approach (i.e. a factor of 0.6 was applied)

Contributing Scenario (11) controlling industrial worker exposure for PROC 15

Name of contributing scenario	15 - Use of laboratory reagents in small scale laboratories
Scenario subtitle	QC & Laboratory
Exposure type	Inhalation: Long-term systemic, Short-term systemic Dermal: Long-term systemic, Short-term systemic
Qualitative Risk Assessment	
General	Avoid skin contact. Avoid contact with contaminated tools. Wash off any skin contamination immediately. Avoid splashing. Clean up contamination as soon as they occur. Ensure minimization of manual phases. Minimise number of staff exposed. Ensure good work practices are implemented Provide specific employee training to prevent/minimize exposures. In case of potential exposure: Use suitable chemically resistant gloves. Wear suitable coveralls to prevent exposure to the skin.
Product characteristics	
Physical state	solid
Concentration in substance	100%

Fugacity / Dustiness	low
Frequency and duration of use	
Duration of activity	1 - 4 hours [LONG TERM] < 15 minutes [SHORT TERM]
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	240 cm ²
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 90 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 20 95 %
Respiratory protection	no