SAFETY DATA SHEET

n-Undecanal
11270

Version / Revision	6	**Revision Date**	07-Jan-2021
Supersedes Version	5.00***	**Issuing date**	07-Jan-2021

SECTION 1: Identification

1.1. Product identifier

Identification of the substance/preparation **n-Undecanal**

CAS-No 112-44-7

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

Use of the Substance / Preparation Intermediate

Uses advised against None

1.3. Details of the supplier of the safety data sheet

Supplier

OQ Chemicals Corporation
15375 Memorial Drive
West Memorial Place I
Suite 300
Houston, TX 77079
USA
Phone +1 346 378 7300

Product Information

Product Stewardship
FAX: +49 (0)208 693 2053
email: sc.psq@oq.com

1.4. Emergency telephone number

Emergency telephone number NCEC +1 202 464 2554
available 24/7

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

This substance is classified in accordance with paragraph (d) of §1910.1200 (GHS-US classification).

Skin corrosion/irritation Category 2, H315
Environmental hazard Aquatic Acute 1; H400; Aquatic Chronic 2; H411

OSHA Specified Hazards Not applicable.

2.2. Label elements

Labeling according to §1910.1200 (GHS-US labeling).

Hazard symbol(s)

Signal word	**Warning**
Hazard statements	H315: Causes skin irritation. H400: Very toxic to aquatic life. H411: Toxic to aquatic life with long lasting effects.
Precautionary statements	
Prevention	P264: Wash hands thoroughly after handling. P273: Avoid release to the environment. P280: Wear protective gloves.
Response	P302 + P352: IF ON SKIN: Wash with plenty of soap and water. P332 + P313: If skin irritation occurs: Get medical advice/ attention. P362 + P364: Take off contaminated clothing and wash it before reuse. P391: Collect spillage.
Disposal	P501: Dispose of contents/container in accordance with local regulation.

2.3. Other hazards

None known

SECTION 3: Composition / information on ingredients

3.1. Substances

Component	CAS-No	Concentration (%)
Undecanal	112-44-7	> 90,0

SECTION 4: First aid measures

4.1. Description of first aid measures

Inhalation
Keep at rest. Aerate with fresh air. When symptoms persist or in all cases of doubt seek medical advice.

Skin
Wash off immediately with soap and plenty of water. When symptoms persist or in all cases of doubt seek medical advice.

Eyes
Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Remove contact lenses. Obtain medical attention.

Ingestion
Do not induce vomiting without medical advice. Call a physician immediately.

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

Main symptoms
shortness of breath.

Special hazard
Lung oedema.

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

General advice
Remove contaminated, soaked clothing immediately and dispose of safely. First aider needs to protect himself.

Treat symptomatically. In case of lung irritation, first treatment with cortisone spray.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media
alcohol-resistant foam, dry chemical, carbon dioxide (CO2), water spray

Unsuitable Extinguishing Media
Do not use a solid water stream as it may scatter and spread fire.

5.2. Special hazards arising from the substance or mixture

Under conditions giving incomplete combustion, hazardous gases produced may consist of:
carbon monoxide (CO)
carbon dioxide (CO2)
Combustion gases of organic materials must in principle be graded as inhalation poisons
Vapours are heavier than air and may spread along floors

5.3. Advice for firefighters

Special protective equipment for firefighters
Fire fighter protection should include a self-contained breathing apparatus (NIOSH-approved or EN 133) and full fire-fighting turn out gear.

Precautions for firefighting
Cool containers / tanks with water spray. Dike and collect water used to fight fire. Keep people away from and upwind of fire. Water run-off can cause environmental damage.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

For non-emergency personnel: For personal protective equipment see section 8. Avoid contact with skin and eyes. Avoid breathing vapors or mists. Keep people away from and upwind of spill/leak. Ensure adequate ventilation, especially in confined areas. Keep away from heat and sources of ignition.
For emergency responders: Personal protection see section 8.

6.2. Environmental precautions

Prevent further leakage or spillage. Do not discharge product into the aquatic environment without pretreatment (biological treatment plant). Water runoff can cause environmental damage.

6.3. Methods and material for containment and cleaning up

Methods for containment
Stop the flow of material, if possible without risk. Dike spilled material, where this is possible.

Methods for cleaning up
Soak up with inert absorbent material. DO NOT use combustible materials such as sawdust. Keep in suitable, closed containers for disposal. If liquid has been spilt in large quantities clean up promptly by scoop or vacuum. Take necessary action to avoid static electricity discharge (which might cause ignition of organic vapours).

6.4. Reference to other sections

For personal protective equipment see section 8.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Advice on safe handling
Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product. Provide sufficient air exchange and/or exhaust in work rooms. Refill and handle product only in closed system.

Hygiene measures
When using, do not eat, drink or smoke. Take off all contaminated clothing immediately. Wash hands before breaks and immediately after handling the product.

Advice on the protection of the environment

See Section 8: Environmental exposure controls.

Incompatible products
acids and bases
amines
oxidizing agents

7.2. Conditions for safe storage, including any incompatibilities

Advice on protection against fire and explosion
Keep away from sources of ignition - No smoking. Take necessary action to avoid static electricity discharge (which might cause ignition of organic vapours). In case of fire, emergency cooling with water spray should be available. Ground and bond containers when transferring material.

Technical measures/Storage conditions
Keep containers tightly closed in a cool, well-ventilated place. Handle and open container with care. Handle under nitrogen, protect from moisture.

SECTION 8: Exposure controls / personal protection

8.1. Control parameters

Exposure limits United States of America

No exposure limits established regarding ACGIH, OSHA Z-1 and OSHA Z-2.

8.2. Exposure controls

Appropriate Engineering controls
General or dilution ventilation is frequently insufficient as the sole means of controlling employee exposure. Local ventilation is usually preferred. Explosion-proof equipment (for example fans, switches, and grounded ducts) should be used in mechanical ventilation systems.

Individual protection measures, such as personal protective equipment

General industrial hygiene practice
Avoid contact with skin, eyes and clothing. Do not breathe vapours or spray mist. Ensure that eyewash stations and safety showers are close to the workstation location.

Hygiene measures
When using, do not eat, drink or smoke. Take off all contaminated clothing immediately. Wash hands before breaks and immediately after handling the product.

Eye protection
Tightly fitting safety goggles. In addition to goggles, wear a face shield if there is a reasonable chance for splash to the face.

Hand protection
Wear protective gloves. Recommendations are listed below. Other protective material may be used, depending on the

situation, if adequate degradation and permeation data is available. If other chemicals are used in conjunction with this chemical, material selection should be based on protection for all chemicals present.

Suitable material	nitrile rubber
Reference substance	n/i-Undecanal
Evaluation	according to EN 374: level 6
Glove thickness	approx 0,55 mm
Break through time	> 480 min

Suitable material	Viton
Reference substance	n/i-Undecanal
Evaluation	according to EN 374: level 6
Glove thickness	approx 0,5 mm
Break through time	> 480 min

Skin and body protection
Impervious clothing. Wear face-shield and protective suit for abnormal processing problems.

Respiratory protection
Respirator with filter for organic vapour. Use the indicated respiratory protection if the occupational exposure limit is exceeded and/or in case of product release (vapor or mist). Equipment should conform to NIOSH.

Environmental exposure controls
If possible use in closed systems. If leakage can not be prevented, the substance needs to be suck off at the emersion point, if possible without danger. Observe the exposure limits, clean exhaust air if needed. If recycling is not practicable, dispose of in compliance with local regulations. Inform the responsible authorities in case of leakage into the atmosphere, or of entry into waterways, soil or drains.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Appearance	liquid
Colour	colourless
Odour	floral
Odour threshold	No data available
pH	6,7 (0,012 g/l in water @ 20 °C (68 °F))
Melting point/range	14 °F (-10 °C) (Pour point) @ 1013 hPa
Method	DIN ISO 3016
Boiling point/range	437 °F (225 °C) @ 1 atm (101,3 kPa)
Method	OECD 103
Flash point	221 °F (105 °C) @ 1 atm (101,3 kPa)
Method	ISO 2719
Evaporation rate	No data available
Flammability (solid, gas)	Does not apply, the substance is a liquid
Lower explosion limit	No data available
Upper explosion limit	No data available

Vapour pressure

Values [hPa]	Values [kPa]	Values [atm]	@ °C	@ °F	Method
0,38	0,038	< 0,001	20	68	OECD 104
1,4	0,14	0,001	51,4	124,5	OECD 104

Vapour density 5,94 (Air = 1) @ 20 °C (68 °F)

Relative density

Values	@ °C	@ °F	Method
0,828	20	68	DIN 51757

Solubility ≤ 828,3 g/l @ 20 °C (68 °F), Octanol
Water solubility 0,012 g/l @ 68 °F (20 °C) OECD 105
log Pow 5,1 @ 25 °C (77 °F) OECD 117
Autoignition temperature 392 °F (200 °C) @ 1014 hPa
Method DIN 51794
Decomposition temperature No data available
Viscosity 2,295 mPa*s @ 68 °F (20 °C)
Method ASTM D445, dynamic

9.2. Other information

Molecular weight 170,29
Molecular formula C11 H22 O
log Koc 2,84 calculated
Oxidizing properties Does not apply, substance is not oxidising. There are no chemical groups associated with oxidizing properties
Refractive Index 1,413 - 1,435 @ 68 °F (20 °C)
Explosive properties Does not apply, substance is not explosive. There are no chemical groups associated with explosive properties
Surface tension 44,8 mN/m (0,0115 g/l @ 20°C (68°F)), OECD 115

SECTION 10: Stability and Reactivity

10.1. Reactivity

The reactivity of the product corresponds to the typical reactivity shown by the substance group as described in any text book on organic chemistry.

10.2. Chemical stability

Stable under recommended storage conditions.

10.3. Possibility of hazardous reactions

Hazardous reactions occur in the presence of acids, base or oxidizing agents. This reaction is exothermic and may create heat. When finely distributed, self-ignition is possible. May form explosive peroxides.***

10.4. Conditions to avoid

Avoid contact with heat, sparks, open flame and static discharge. Avoid any source of ignition.

10.5. Incompatible materials

bases, amines, acids, oxidizing agents.

10.6. Hazardous decomposition products

No decomposition if stored and applied as directed.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Likely routes of exposure Ingestion, Inhalation, Eye contact, Skin contact

Undecanal, CAS: 112-44-7
Main symptoms
shortness of breath.
Target Organ Systemic Toxicant - Single exposure
Based on available data, the classification criteria are not met for:
STOT SE
Target Organ Systemic Toxicant - Repeated exposure
Based on available data, the classification criteria are not met for:
STOT RE

Acute toxicity				
Undecanal (112-44-7)				
Routes of Exposure	Endpoint	Values	Species	Method
Oral	LD50	> 5000 mg/kg	rat, male/female	OECD 401
Dermal	LD50	> 5000 mg/kg	rabbit	

Undecanal, CAS: 112-44-7
Assessment
Based on available data, the classification criteria are not met for:
Acute oral toxicity
Acute dermal toxicity
For acute inhalation toxicity, no data are available

Irritation and corrosion				
Undecanal (112-44-7)				
Target Organ Effects	Species	Result	Method	
Skin	rabbit	irritating	OECD 404	4h read across
Eyes	rabbit	No eye irritation	OECD 405	read across

Undecanal, CAS: 112-44-7
Assessment
The available data lead to the classification given in section 2
Based on available data, the classification criteria are not met for:
eye irritation/corrosion

For respiratory irritation, no data are available

Sensitization				
Undecanal (112-44-7)				
Target Organ Effects	Species	Evaluation	Method	
Skin	Human experience	not sensitizing	Maximisation Test	

Undecanal, CAS: 112-44-7
Assessment
Based on available data, the classification criteria are not met for:
Skin sensitization

Subacute, subchronic and prolonged toxicity				
Undecanal (112-44-7)				
Type	Dose	Species	Method	
Subacute toxicity	NOAEL: 1000 mg/kg/d	rat, male/female	OECD 422	Oral

Undecanal, CAS: 112-44-7
Assessment
Based on available data, the classification criteria are not met for:
STOT RE

Carcinogenicity, Mutagenicity, Reproductive toxicity					
Undecanal (112-44-7)					
Type	Dose	Species	Evaluation	Method	
Mutagenicity		Salmonella typhimurium	negative	OECD 471 (Ames)	In vitro study
Mutagenicity		human lymphocytes	negative	OECD 487	In vitro study
Mutagenicity		V79 cells, Chinese hamster	negative	OECD 476 (Mammalian Gene Mutation)	In vitro study
Reproductive toxicity	NOAEL > 1000 mg/kg/d	rat, parental		OECD 422, Oral	
Reproductive toxicity	NOAEL > 1000 mg/kg/d	rat, 1. Generation, male/female		OECD 422, Oral	

Undecanal, CAS: 112-44-7
CMR Classification
The available data on CMR properties are summarized in the table above. They do not indicate a classification into categories 1A or 1B
Evaluation
In vitro tests did not show mutagenic effects
Did not show reprotoxic effects in animal experiments
In the absence of specific alerts no cancer testing is required

Undecanal, CAS: 112-44-7
Aspiration toxicity

Due to the viscosity, this product does not present an aspiration hazard
Note
Handle in accordance with good industrial hygiene and safety practice. Further details on substance data can be found in the registration dossier under the following link:
http://echa.europa.eu/information-on-chemicals/registered-substances.

SECTION 12: Ecological information

12.1. Toxicity

Acute aquatic toxicity			
Undecanal (112-44-7)			
Species	Exposure time	Dose	Method
Actinopterygii	96h	LC50: 1,97 mg/l	QSAR
Daphnia magna (Water flea)	48h	EC50: 1459 µg/l	OECD 202
Pseudokirchneriella subcapitata	72h	EC50: 132 µg/l	OECD 201 Growth inhibition
Activated sludge (domestic)	3 h	EC50: 85,3 mg/l	OECD 209

Long term toxicity				
Undecanal (112-44-7)				
Type	Species	Dose	Method	
Aquatic toxicity	Pseudokirchneriella subcapitata	NOEC: 23,5 µg/l (3 d) Growth inhibition	OECD 201	

12.2. Persistence and degradability

Undecanal, CAS: 112-44-7
Biodegradation
65 % (28 d), activated sludge (domestic), non-adapted, aerobic, OECD 301 B.

Abiotic Degradation		
Undecanal (112-44-7)		
Type	Result	Method
Hydrolysis	not expected	
Photolysis	No data available	

12.3. Bioaccumulative potential

Undecanal (112-44-7)		
Type	Result	Method
log Pow	5,1 @ 25 °C (77 °F)	OECD 117
BCF	156,6	calculated

12.4. Mobility in soil

Undecanal (112-44-7)		
Type	Result	Method
Surface tension	44,8 mN/m (0,0115 g/l @ 20°C (68°F))	OECD 115
Adsorption/Desorption	log Koc: 2,84	calculated
Distribution to environmental compartments	no data available	

12.5. Results of PBT and vPvB assessment

Undecanal, CAS: 112-44-7
PBT and vPvB assessment
This substance is not considered to be persistent, bioaccumulating nor toxic (PBT), nor very persistent nor very bioaccumulating (vPvB)

12.6. Other adverse effects

Undecanal, CAS: 112-44-7
No data available

Note
Avoid release to the environment.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Product Information
Disposal required in compliance with all waste management related state and local regulations. The choice of the appropriate method of disposal depends on the product composition by the time of disposal as well as the local statutes and possibilities for disposal.

Uncleaned empty packaging
Contaminated packaging should be emptied as far as possible and after appropriate cleansing may be taken for reuse.

SECTION 14: Transport information

D.O.T. (49CFR)

14.1. UN number	UN 3082
14.2. UN proper shipping name	Environmentally hazardous substance, liquid, n.o.s. (n-Undecanal)
14.3. Transport hazard class(es)	9
14.4. Packing group	III

14.5. Environmental hazards

Marking	Fish and tree
Marine pollutant	yes

14.6. Special precautions for user

Emergency Response Guide	171

ICAO-TI / IATA-DGR

14.1. UN number	UN 3082
14.2. UN proper shipping name	Environmentally hazardous substance, liquid, n.o.s. (n-Undecanal)
14.3. Transport hazard class(es)	9
14.4. Packing group	III
14.5. Environmental hazards	Fish and tree

IMDG

14.1. UN number	UN 3082
14.2. UN proper shipping name	Environmentally hazardous substance, liquid, n.o.s. (n-Undecanal)
14.3. Transport hazard class(es)	9
14.4. Packing group	III
14.5. Environmental hazards	
Marking	Fish and tree
Marine pollutant	yes
14.6. Special precautions for user	
EmS	F-A, S-F

14.7. Transport in bulk according to Annex II of MARPOL and the IBC Code not applicable

SECTION 15: Regulatory information

Federal and State Regulations

Components of the product are listed in the quoted regulations. For details please refer to the regulations directly. This list is not exhaustive, please check for other applicable regulations.

Federal Regulations

This product is listed on the TSCA inventory

State Regulations

Undecanal, CAS: 112-44-7
NJ Right to Know
NY Right to Know

International Inventories

Undecanal, CAS: 112-44-7
AICS (AU)
DSL (CA)
IECSC (CN)
EC-No. 2039726 (EU)
ENCS (2)-217 (JP)
ENCS (2)-494 (JP)
ISHL (2)-217 (JP)
ISHL (2)-494 (JP)
KECI KE-35050 (KR)
PICCS (PH)
TSCA (US)
NZIoC-NZ May be used as single component chemical
TCSI (TW)

SECTION 16: Other information

Revision Date	07-Jan-2021
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Hazard Rating Systems

NFPA (National Fire Protection Association)

Health Hazard	2
Fire Hazard	1
Reactivity	0

HMIS (Hazardous Material Information System)

Health Hazard	1
Flammability	1
Physical Hazard	0

Abbreviations
A table of terms and abbreviations can be found under the following link:
http://echa.europa.eu/documents/10162/13632/information_requirements_r20_en.pdf

Training advice
For effective first-aid, special training / education is needed.

Sources of key data used to compile the datasheet
Information contained in this safety data sheet is based on OQ owned data and public sources deemed valid or acceptable. The absence of data elements required by OSHA, ANSI or Annex II, Regulation 1907/2006/EC indicates, that no data meeting these requirements is available.

Further information for the safety data sheet
Changes against the previous version are marked by ***. Observe national and local legal requirements. For more information, other material safety data sheets or technical data sheets please consult the OQ homepage (www.chemicals.oq.com).
The use of a comma in section 3 and section 7 to 12 is the same as a period.

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End of Safety Data Sheet