

Product Stewardship Summary

2-Pyrrolidinone, 1-dodecyl-

General Statement

2-Pyrrolidinone, 1-dodecyl- is a low-foaming, nonionic surfactant that is used within household, industrial and institutional cleaners. This chemical is also a wetting agent and used in adhesive and sealant chemical formulations. 2-Pyrrolidinone, 1-dodecyl- is a low hazard material and risk of adverse health effects associated with both occupational and consumer use of this chemical is anticipated to be low.

Chemical Identity

Name: 2-Pyrrolidinone, 1-dodecyl-

Brand Names: Surfadone™ LP-300

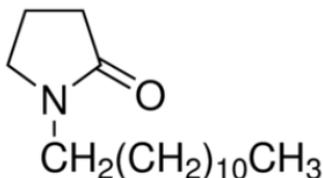
Chemical name (IUPAC): n-(n-dodecyl) pyrrolidinone

CAS number(s): 2687-96-9

EC number: 403-730-1

Molecular formula: C₁₆H₃₁NO

Structure:



Uses and Applications

2-Pyrrolidinone, 1-dodecyl interacts with anionic surfactants, forming mixed micelles, which result in a synergistic surface tension reduction and wetting enhancement. 2-Pyrrolidinone, 1-dodecyl has uses within the pesticide industry. It is also known to be used as a conditioner, foam stabilizer, inks, and in water-borne coatings.



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Physical/Chemical Properties

Phys/Chem Safety Assessment

Property	Value
Form	Substance
Physical state	Liquid
Color	clear/cloudy
Odor	slight, amine-like
Density	0.9041 g/cm ³ @ 20°C
Melting / boiling point	No data available/ 202-205°C
Flammability	No data available
Explosive properties	No data available
Self-ignition temperature	No data available
Vapor pressure	0.00204 Pa @ 25°C
Mol weight	253.43 g/mol
Water solubility	0.0517 g/l (20°C)
Flash point	119.5°C
Octanol-water partition coefficient (Log _{k_{ow}})	4.03

Exposure, Hazard and Safety Assessment

The following section describes possible exposures scenarios and hazards associated with 2-Pyrrolidinone, 1-dodecyl-. The exposure assessment describes both the amount of, and the frequency with which, a chemical substance reaches a person, a population of people, or the environment. Hazard refers to the inherent properties of a substance that make it capable of causing harm to human health or the environment. The safety assessment reports the possibility of a harmful event arising from exposure to a chemical or physical agent under specific conditions. Just because a substance may possess potentially harmful properties does not mean that it automatically poses a substantive risk. It is not possible to make that determination without an understanding of the nature and degree of exposure.

Human Health Effects

Human Exposure Assessment

Consumer: 2-Pyrrolidinone, 1-dodecyl- is used in adhesive and sealant chemical formulations, as a chemical intermediate and a solvent in pesticide formulations. It is also used as a surfactant in hair conditioning and cleaning products. Therefore, consumer exposure may occur to low levels of 2-Pyrrolidinone, 1-dodecyl- present within consumer product formulations.

Worker: In industrial settings, 2-Pyrrolidinone, 1-dodecyl- is manufactured and handled in closed processes as much as possible, which ensures that worker exposure 2-Pyrrolidinone, 1-dodecyl- is minimized. When there is potential for exposure, during loading, unloading, sampling or during maintenance operations, exposure to 2-Pyrrolidinone, 1-dodecyl- can be further minimized by the proper use of personal protective equipment.

Human Hazard Assessment

2-Pyrrolidinone, 1-dodecyl- is associated with low acute toxicity. Mild liver toxicity has been observed following repeat oral exposures. It can cause eye and skin irritation and is associated with skin sensitization.

Effect Assessment	Result
Acute Toxicity Oral / inhalation / dermal	Low toxicity
Irritation / corrosion Skin / eye / respiratory test	Causes sever skin burns and eye damage
Sensitization	May cause an allergic skin reaction
Toxicity after repeated exposure Oral / inhalation / dermal	Associated with mild liver toxicity after repeated exposure in animal studies by oral route
Genotoxicity / Mutagenicity	Not mutagenic or genotoxic
Carcinogenicity	Not classified as carcinogenic
Reproductive / Developmental Toxicity	No adverse effect on fertility and development
Aspiration hazard	Not applicable

Human Health Safety Assessment

Consumer: 2-Pyrrolidinone, 1-dodecyl- is used as a surfactant in some consumer product formulations. Based on the concentration of 2-Pyrrolidinone, 1-dodecyl- within these formulations, there is a possible risk of skin and eye irritation and skin sensitization in exposed consumers.

Worker: In industrial settings, 2-Pyrrolidinone, 1-dodecyl- is manufactured and handled primarily in closed processes which limit exposure. Based on good manufacturing processes and industrial hygiene the occupational health risk associated with 2-Pyrrolidinone, 1-dodecyl- is low.

Environmental Effects

Environmental Exposures

2-Pyrrolidinone, 1-dodecyl- is readily biodegradable (OECD 301B) and has moderate potential for bioaccumulation. It has a low water solubility and low potential for volatilization. If released into the environment it is estimated that 2-Pyrrolidinone, 1-dodecyl- will primarily partition soil and water.

Environmental Hazard Assessment:

Effect Assessment	Result
Aquatic toxicity	Highly acute and chronic aquatic toxicity with possible long lasting effects.

Fate and behavior	Result
Biodegradation	Readily biodegradable (74.2% biodegradation in 28 days in OECD 301B)
Bioaccumulation potential	Moderate potential to bioaccumulative (log Kow = 4.03)
PBT / vPvB conclusion	This substance is not considered to be persistent, bioaccumulating and toxic (PBT) or very persistent and very bioaccumulating (vPvB)

Environmental Safety Assessment

If released into the environment it is anticipated that 2-Pyrrolidinone, 1-dodecyl- will degrade rapidly. 2-Pyrrolidinone, 1-dodecyl- is considered highly toxic to the aquatic environment and large releases to the environment should be avoided.

Risk Management Recommendations

Consumer: Consumer products that contain 2-Pyrrolidinone, 1-dodecyl- should include safety labeling to describe method and frequency of use and provide appropriate handling and disposal methods.

Worker: Exposure to 2-Pyrrolidinone, 1-dodecyl- in the workplace can be controlled by sufficient ventilation, proper handling and storage techniques, and the use of appropriate personal protective equipment as recommended in the SDS.

Regulatory Agency Review

2-Pyrrolidinone, 1-dodecyl- is on the following lists:

- Australian Inventory of Chemical Substances (AICS)
- China - Chemical Inventory of Existing Chemical Substances (IECSC) - CAS Numbers
- Environment Canada - Domestic Substances List (DSL)
- EPA - Chemical Update System (CUS) - 2002
- EPA - Inert Ingredients in Pesticide Products
- EPA - Inert Ingredients Permitted for Use in Nonfood Pesticide Products
- EPA - TSCA - Inventory
- EU - Cosmetic Ingredients and Fragrance Inventory
- EU - European List of Notified Chemical Substances (ELINCS)
- EU - Table 3.1 of Annex VI to the CLP Regulation
- EU - Table 3.2 of Annex VI to the CLP Regulation
- Mexico - National Inventory of Chemical Substances
- New Zealand - Inventory of Chemicals (NZIoC)
- Philippine Inventory of Chemicals and Chemical Substances (PICCS)

Regulatory Information / Classification and Labeling

Under the Globally Harmonized System for classification and labeling (GHS), substances are classified according to their physical, health, and environmental hazards. The hazards are communicated via specific labels and the (Extended) SDS. GHS attempts to standardize hazard communication so that the intended audience (workers, consumers, transport workers, and emergency responders) can better understand the hazards of the chemicals in use.

GHS Classification:

Skin Corrosion, Category 1B
Skin Sensitivity, Category 1
Acute Aquatic toxicity, Category 1
Chronic Aquatic toxicity, Category 1

Hazard Statements:

H314: Causes severe skin burns and eye damage.
H317: May cause allergic skin reaction.
H400: Very toxic to aquatic life.
H410: Very toxic to aquatic life with long-lasting effects.

Signal Word:

Danger

Precautionary Statements:

P280: Wear eye protection/ face protection/ protective gloves/clothing protection.
P302 + P353: IF ON SKIN (or hair): remove/take off immediately all contaminated clothing. Rinse skin with water/shower.
P304: IF INHALED: If inhaled: remove victim to fresh air and keep at rest in a position comfortable for breathing.
P305: IF IN EYES: rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do – continue rinsing.
P405: Store locked up.
P501: Dispose of contents/ container to an approved waste disposal plant.

Hazard Pictograms:



Conclusion

2-Pyrrolidinone, 1-dodecyl- is a useful chemical in the manufacture of adhesive and sealant chemical formulations, as a chemical intermediate and a solvent in pesticide formulations. It is also known to be used as a surfactant in hair conditioning and cleaning products. Consumer products should be formulated to minimize the potential for skin and eye irritation and skin sensitization.

When handled responsibly, the potential for skin and eye irritation and skin sensitization can be minimized, allowing workers to use materials containing 2-Pyrrolidinone, 1-dodecyl- safely.

Contact Information with Company

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Additional Information

For more information on GHS, visit <http://www.osha.gov/dsg/hazcom/ghsguideoct05.pdf> or http://live.unece.org/trans/danger/publi/ghs/ghs_welcome_e.html
Ashland product stewardship summaries are located at <http://www.ashland.com/sustainability/product/product-stewardship>

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REACH registration is specific to Importers/Manufacturers that place the chemical on the EU market, and is specific to registered uses. Inclusion on the list of REACH Registered Substances does not automatically imply registration by Ashland.

Inclusion on the New Zealand Inventory of Chemicals applies only to the pure substance listed. The importer of record must determine whether or not their substances are in compliance.