

NONOX

Chemwatch Independent Material Safety Data Sheet
Issue Date: 12-Nov-2009
NC317ECP

CHEMWATCH 4669-55
Version No:6
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Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME

NONOX

PRODUCT USE

■ Used according to manufacturer's directions.
Used for NOx reduction in exhaust gases from vehicles with diesel engines.

SUPPLIER

Company: Nonox Australia Pty Ltd
Address:
Level 2, 40 Yeo Street
Neutral Bay
NSW, 2089
AUS
Telephone: +61 2 9908 9100
Emergency Tel: 1800 039 008 (24 hours)
Emergency Tel: +61 3 9573 3112
Fax: +61 2 9908 9111
Email: info@nonox.com.au

Section 2 - HAZARDS IDENTIFICATION

STATEMENT OF HAZARDOUS NATURE

NON-HAZARDOUS SUBSTANCE. NON-DANGEROUS GOODS. According to NOHSC Criteria, and ADG Code.

POISONS SCHEDULE

None

RISK

None under normal operating conditions.

SAFETY

Safety Codes

S23

S24

Safety Phrases

■ Do not breathe gas/ fumes/ vapour/ spray.

■ Avoid contact with skin.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS RN	%
urea	57-13-6	30-40
water	7732-18-5	>60

Section 4 - FIRST AID MEASURES

SWALLOWED

■ - Immediately give a glass of water.

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Section 4 - FIRST AID MEASURES

- First aid is not generally required. If in doubt, contact a Poisons Information Centre or a doctor.

EYE

- If this product comes in contact with eyes:
 - Wash out immediately with water.
 - If irritation continues, seek medical attention.
 - Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

SKIN

- If skin contact occurs:
 - Immediately remove all contaminated clothing, including footwear.
 - Flush skin and hair with running water (and soap if available).
 - Seek medical attention in event of irritation.

INHALED

- - If fumes or combustion products are inhaled remove from contaminated area.
- Other measures are usually unnecessary.

NOTES TO PHYSICIAN

- Treat symptomatically.
-

Section 5 - FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA

- The product contains a substantial proportion of water, therefore there are no restrictions on the type of extinguishing media which may be used. Choice of extinguishing media should take into account surrounding areas.

Though the material is non-combustible, evaporation of water from the mixture, caused by the heat of nearby fire, may produce floating layers of combustible substances.

In such an event consider:

- foam.
- dry chemical powder.
- carbon dioxide.

FIRE FIGHTING

- - Alert Fire Brigade and tell them location and nature of hazard.
- Wear breathing apparatus plus protective gloves for fire only.
- Prevent, by any means available, spillage from entering drains or water courses.
- Use fire fighting procedures suitable for surrounding area.
- DO NOT approach containers suspected to be hot.
- Cool fire exposed containers with water spray from a protected location.
- If safe to do so, remove containers from path of fire.
- Equipment should be thoroughly decontaminated after use.

FIRE/EXPLOSION HAZARD

- - Non combustible.
- Not considered to be a significant fire risk.
- Expansion or decomposition on heating may lead to violent rupture of containers.
- Decomposes on heating and may produce toxic fumes of carbon monoxide (CO).
- May emit acrid smoke.

Decomposition may produce toxic fumes of: carbon dioxide (CO₂), nitrogen oxides (NO_x), other pyrolysis products typical of burning organic material.

FIRE INCOMPATIBILITY

- None known.

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Section 5 - FIRE FIGHTING MEASURES

HAZCHEM: None

PERSONAL PROTECTION

Glasses:

Chemical goggles.

Gloves:

PVC chemical resistant type.

Respirator:

Particulate

Section 6 - ACCIDENTAL RELEASE MEASURES

MINOR SPILLS

- - Clean up all spills immediately.
- Avoid breathing vapours and contact with skin and eyes.
- Control personal contact by using protective equipment.
- Contain and absorb spill with sand, earth, inert material or vermiculite.
- Wipe up.
- Place in a suitable, labelled container for waste disposal.

MAJOR SPILLS

- Minor hazard.
- Clear area of personnel.
- Alert Fire Brigade and tell them location and nature of hazard.
- Control personal contact by using protective equipment as required.
- Prevent spillage from entering drains or water ways.
- Contain spill with sand, earth or vermiculite.
- Collect recoverable product into labelled containers for recycling.
- Absorb remaining product with sand, earth or vermiculite and place in appropriate containers for disposal.
- Wash area and prevent runoff into drains or waterways.
- If contamination of drains or waterways occurs, advise emergency services.

Personal Protective Equipment advice is contained in Section 8 of the MSDS.

Section 7 - HANDLING AND STORAGE

PROCEDURE FOR HANDLING

- - Limit all unnecessary personal contact.
- Wear protective clothing when risk of exposure occurs.
- Use in a well-ventilated area.
- Avoid contact with incompatible materials.
- When handling, DO NOT eat, drink or smoke.
- Keep containers securely sealed when not in use.
- Avoid physical damage to containers.
- Always wash hands with soap and water after handling.
- Work clothes should be laundered separately.
- Use good occupational work practice.
- Observe manufacturer's storing and handling recommendations.
- Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions are maintained.
- DO NOT allow clothing wet with material to stay in contact with skin.

SUITABLE CONTAINER

- - Polyethylene or polypropylene container.

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Section 7 - HANDLING AND STORAGE

- Packing as recommended by manufacturer.
- Check all containers are clearly labelled and free from leaks.

STORAGE INCOMPATIBILITY

- - Avoid reaction with oxidising agents.
- Avoid strong acids, acid chlorides, acid anhydrides and chloroformates.

STORAGE REQUIREMENTS

- - Store in original containers.
- Keep containers securely sealed.
- Store in a cool, dry, well-ventilated area.
- Store away from incompatible materials and foodstuff containers.
- Protect containers against physical damage and check regularly for leaks.
- Observe manufacturer's storing and handling recommendations.

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE CONTROLS

The following materials had no OELs on our records

- urea: CAS:57- 13- 6
- water: CAS:7732- 18- 5

MATERIAL DATA

NONOX:

None assigned.

UREA:

- For urea:

CEL TWA: 10 mg/m³ (compare WEEL-TWA)

Even if individuals inhaled 10 mg/m³ of urea through the whole workday, they would only inhale 100 mg/day.

This increment, even if totally absorbed, would be insignificant when compared to the 30 g/day normal excretion rate. The workplace environmental exposure limit (WEEL) established by the AIHA is protective against the effects of urea as a nuisance dust.

WATER:

- No exposure limits set by NOHSC or ACGIH.

PERSONAL PROTECTION

EYE

- - Safety glasses with side shields.
- Chemical goggles.
- Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lens or restrictions on use, should be created for each workplace or task. This should include a review of lens absorption and adsorption for the class of chemicals in use and an account of injury experience. Medical and first-aid personnel should be trained in their removal and suitable equipment should be readily available. In the event of chemical exposure, begin eye irrigation immediately and remove contact lens as soon as practicable. Lens should be removed at the first signs of eye redness or irritation - lens should be removed in a clean environment only after workers have washed hands thoroughly. [CDC NIOSH Current Intelligence Bulletin 59].

HANDS/FEET

- Suitability and durability of glove type is dependent on usage. Factors such as:
 - frequency and duration of contact,
 - chemical resistance of glove material,

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Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

- glove thickness and
 - dexterity,
- are important in the selection of gloves.
- Wear chemical protective gloves, eg. PVC.
 - Wear safety footwear or safety gumboots, eg. Rubber.

OTHER

- - Overalls.
- P.V.C. apron.
- Barrier cream.
- Skin cleansing cream.
- Eye wash unit.

RESPIRATOR

■ Selection of the Class and Type of respirator will depend upon the level of breathing zone contaminant and the chemical nature of the contaminant. Protection Factors (defined as the ratio of contaminant outside and inside the mask) may also be important.

Breathing Zone Level ppm (volume)	Maximum Protection Factor	Half- face Respirator	Full- Face Respirator
1000	10	- AUS P	-
1000	50	-	- AUS P
5000	50	Airline *	-
5000	100	-	- 2 P
10000	100	-	- 3 P
	100+		Airline**

* - Continuous Flow

** - Continuous-flow or positive pressure demand.

The local concentration of material, quantity and conditions of use determine the type of personal protective equipment required. For further information consult site specific CHEMWATCH data (if available), or your Occupational Health and Safety Advisor.

ENGINEERING CONTROLS

■ General exhaust is adequate under normal operating conditions. If risk of overexposure exists, wear SAA approved respirator. Correct fit is essential to obtain adequate protection. Provide adequate ventilation in warehouse or closed storage areas.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE

Clear liquid with a slightly ammoniacal odour; mixes with water.

PHYSICAL PROPERTIES

Liquid.
Mixes with water.

Molecular Weight: Not
Applicable

Specific Gravity (water=1):
1.09@20C

pH (1% solution): 9.8- 10 (10%)

Evaporation Rate: Not Available

Lower Explosive Limit (%): Not
Applicable

Boiling Range (°C): 100

Solubility in water (g/L):
Miscible

Vapour Pressure (kPa): 6.4@40C

Relative Vapour Density (air=1):
Not Available

Upper Explosive Limit (%): Not
Applicable

Melting Range (°C): - 11.5

pH (as supplied): Not
Available

Volatile Component (%vol): Not
Available

Flash Point (°C): Not
Applicable

Autoignition Temp (°C): Not
Available

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Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

Decomposition Temp (°C): 100

State: Liquid

Viscosity: Not A available

Section 10 - CHEMICAL STABILITY AND REACTIVITY INFORMATION

CONDITIONS CONTRIBUTING TO INSTABILITY

■ - Presence of incompatible materials.

- Product is considered stable.

- Hazardous polymerisation will not occur.

For incompatible materials - refer to Section 7 - Handling and Storage.

Section 11 - TOXICOLOGICAL INFORMATION

POTENTIAL HEALTH EFFECTS

ACUTE HEALTH EFFECTS

SWALLOWED

■ The material has NOT been classified by EC Directives or other classification systems as "harmful by ingestion". This is because of the lack of corroborating animal or human evidence. The material may still be damaging to the health of the individual, following ingestion, especially where pre-existing organ (eg. liver, kidney) damage is evident. Present definitions of harmful or toxic substances are generally based on doses producing mortality rather than those producing morbidity (disease, ill-health). Gastrointestinal tract discomfort may produce nausea and vomiting. In an occupational setting however, ingestion of insignificant quantities is not thought to be cause for concern.

EYE

■ The liquid may produce eye discomfort causing smarting, pain and redness.

SKIN

■ The material may cause skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the production of vesicles, scaling and thickening of the skin.

INHALED

■ Not normally a hazard due to non-volatile nature of product.

The material is not thought to produce adverse health effects or irritation of the respiratory tract (as classified by EC Directives using animal models). Nevertheless, good hygiene practice requires that exposure be kept to a minimum and that suitable control measures be used in an occupational setting.

CHRONIC HEALTH EFFECTS

■ Long-term exposure to the product is not thought to produce chronic effects adverse to the health (as classified by EC Directives using animal models); nevertheless exposure by all routes should be minimised as a matter of course.

As with any chemical product, contact with unprotected bare skin; inhalation of vapour, mist or dust in work place atmosphere; or ingestion in any form, should be avoided by observing good occupational work practice.

TOXICITY AND IRRITATION

■ Not available. Refer to individual constituents.

UREA:

■ unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances.

TOXICITY

Oral (rat) LD50: 8471 mg/kg

Intraperitoneal (rat) LD50: >5000 mg/kg

Subcutaneous (rat) LD50: 8200 mg/kg

IRRITATION

Skin (human): 22 mg/3 d (I)- Mild

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Section 11 - TOXICOLOGICAL INFORMATION

Intratracheal (rat) LD50: 567 mg/kg

Oral (mouse) LD50: 11000 mg/kg

Subcutaneous (mouse) LD50: 9200 mg/kg

Intravenous (mouse) LD50: 4600 mg/kg

Intraperitoneal (Mouse) LD: 6608 mg/kg

Intravenous (Rat) LD50: 5300 mg/kg

Intravenous (Rabbit) LD: 4800 mg/kg

Subcutaneous (Pig) LD: 14800 mg/kg

■ The material may cause skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the production of vesicles, scaling and thickening of the skin.

For urea:

There is little data that relates urea to human health other than its use in dermatology and some more limited applications in clinical medicine. The use of urea (at 10% concentration or less) in ointments and creams to treat dry skin has been widespread, and long term follow-up studies have indicated that the substance is nonallergenic and virtually free from side effects. Among other clinical therapeutic uses, the treatment of inappropriate secretion of antidiuretic hormone (SIADH) should be noted, because its chronic form has involved long term oral administration of large amounts of urea. Most patients have tolerated urea well, although diarrhoea is sometimes reported after ingestion of 60-90 g/day. The possibility exists that infection of *H. pylori* in human stomach may aggravate local effects by urea because of ammonia generation. Acute toxicity: The acute toxicity by urea is well delineated by the oral route. Toxicity is low in mammals other than ruminants, especially cattle, and sheep, in which the rumen micro-organisms contain urease activity and metabolise urea to ammonia at a high rate. In mice and rats, urea is of low toxicity even by the subcutaneous and intravenous route.

Repeated dose toxicity: No well-conducted repeated dose toxicity studies on urea were located. Chronic toxicity and carcinogenicity screening studies in mice and rats fed with 4500, 9000 or 45000 ppm in diet (up to about 6750 mg/kg body weight/day for mice and about 2250 mg/kg body weight/day for rats) did not uncover any treatment-related toxic syndromes in the various organs studied. Neither was any weight depression noted at terminal necropsy for animals of either sex or species at any dose levels. Thus the NOAELs were about 6750 mg/kg body weight/day for mice and about 2250 mg/kg body weight/day for rats.

Repeated dose toxicity studies with rats by skin application over 4 weeks and 25 weeks were conducted using urea ointment at 10%, 20% and 40% concentrations, and no consistent treatment-related toxic effects were found. The ointments were applied on a 20 cm² area of the back skin; it is concluded that the repeated dose toxicity of urea by dermal route is low.

Reproductive/developmental toxicity: The studies cited under repeated dose toxicity did not indicate any toxic effects on the reproductive organs of mice and rats. No adequate teratogenicity/developmental toxicity studies of urea with mammals were located. According to one rat study, 50 g/kg body weight/day administered by gavage in two doses 12 hours apart for an average of 14 days did not cause outstanding (external) teratogenicity; the mean birthweight of the newborn was lower but the litter size greater. Injection of urea into the air sack of eggs shows that urea is toxic to the development of chick embryo.

No NOAEL can be given for the reproductive/developmental toxicity of urea because appropriate studies are lacking.

Genetic toxicity: Urea has been negative in several appropriately conducted bacterial mutagenicity tests. Urea caused DNA single strand breaks in mammalian cells in vitro and was clastogenic for mammalian cells in vitro and in vivo but only at concentrations much beyond the physiological range (about 50-100 higher concentrations than found in human blood). The mechanism of genotoxicity is probably non-specific (e.g. difference in osmotic pressure across the cell membrane).

NOTE: Substance has been shown to be mutagenic in at least one assay, or belongs to a family of chemicals producing damage or change to cellular DNA.

Altered sleep time, change in motor activity, antipsychosis, dyspnea, methaemoglobinaemia, convulsions, lymphomas recorded.

Carcinogenic by RTECS criteria.

WATER:

■ No significant acute toxicological data identified in literature search.

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Section 12 - ECOLOGICAL INFORMATION

- DO NOT discharge into sewer or waterways.

UREA:

- Algae IC50 (72hr.) (mg/l): 10000
- log Kow (Prager 1995): - 1.09
- log Kow (Sangster 1997): - 2.11
- log Pow (Verschueren 1983): 1.31415929

- For urea:

log Kow : -2.97 - -2.26

Environmental fate:

According to fugacity modelling there is 99.84% and 0.16% partitioning into water and air, respectively.

Air: Urea is essentially non-volatile in solid form. Its high water solubility, low vapour pressure (solid pure urea 80 Pa at 20 C; calculated) and consequently low Henry's law constant (4.4E-8 atm m³/mol) indicate that urea will not evaporate from water to atmosphere. When released into the air, urea is expected to be readily degraded by reaction with photochemically produced hydroxyl radicals; half-life is expected to be less than 1 day.

Degradation of urea to ammonia causes NH₃-emissions to air. Emissions are higher in alkaline soil (pH>7).

Soil: When released to soil, urea will hydrolyse into ammonium in a matter of days to several weeks.

According to the worldwide use pattern of urea, when 85 - 90% of urea is used as a fertilizer, the highest environmental exposure is to soil. Urea is, however, relatively leachable from the soil into surface water and groundwater because of its weak adsorption to the soil, high water solubility and low soil-water partition coefficient. This can happen especially if the soil surface is saturated with water, as might be the case after rainfall.

Water: When released into water, urea material may biodegrade to a moderate extent. Urea is not expected to evaporate significantly. Urea can be leached relatively easily into the surface water and the groundwater. The concentration of urea itself, however, is not generally detected, because of its high degradation rate. Therefore usually degradation products e.g. nitrate, nitrite and ammonium can be measured.

Bioaccumulation: Due to low log Pow value (- 1.59 at 20-25 C) urea is not likely to undergo bioaccumulation.. This material has an experimentally-determined bioconcentration factor (BCF) of less than 100.

Biodegradation: Urea is very soluble in water and degrades ultimately in the inherent biodegradability test

Ecotoxicity:

Urea has generally low acute ecotoxicity to organisms. The degradation product of urea, ammonia, is known to be toxic to all vertebrates. In neutral and acidic conditions, however, ammonia exists in the form of ammonium ion.

Of importance may be the indirect influence of urea on the environment via eutrophication and the pollution risk of urea to groundwater, when urea is used as a fertiliser and a deicer agent in airports. Ecosystems may be affected following long-term use of urea in the control of soil acidification and by ammonia emissions to air..

Ecotoxicity

Ingredient	Persistence: Water/Soil	Persistence: Air	Bioaccumulation	Mobility
Nonox		No data		
urea	LOW	No data	LOW	HIGH
water	LOW	No data	LOW	HIGH

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Section 13 - DISPOSAL CONSIDERATIONS

- - Recycle wherever possible.
- Consult manufacturer for recycling options or consult local or regional waste management authority for disposal if no suitable treatment or disposal facility can be identified.
- Dispose of by: Burial in a licenced land-fill or incineration in a licenced apparatus (after admixture with suitable combustible material).
- Decontaminate empty containers. Observe all label safeguards until containers are cleaned and destroyed.

Section 14 - TRANSPORTATION INFORMATION

HAZCHEM: None (ADG7)

NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS: ADG7, UN, IATA, IMDG

Section 15 - REGULATORY INFORMATION

POISONS SCHEDULE: None

REGULATIONS

Regulations for ingredients

urea (CAS: 57-13-6) is found on the following regulatory lists;

"Australia High Volume Industrial Chemical List (HVICL)", "Australia Inventory of Chemical Substances (AICS)", "GESAMP/EHS Composite List of Hazard Profiles - Hazard evaluation of substances transported by ships", "IMO IBC Code Chapter 17: Summary of minimum requirements", "IMO MARPOL 73/78 (Annex II) - List of Other Liquid Substances", "OECD Representative List of High Production Volume (HPV) Chemicals"

water (CAS: 7732-18-5) is found on the following regulatory lists;

"Australia Inventory of Chemical Substances (AICS)", "GESAMP/EHS Composite List of Hazard Profiles - Hazard evaluation of substances transported by ships", "IMO IBC Code Chapter 18: List of products to which the Code does not apply", "OECD Representative List of High Production Volume (HPV) Chemicals"

No data for Nonox (CW: 4669-55)

Section 16 - OTHER INFORMATION

■ Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

A list of reference resources used to assist the committee may be found at:
www.chemwatch.net/references.

■ The (M)SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

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Section 16 - OTHER INFORMATION

permission from CHEMWATCH. TEL (+61 3) 9572 4700.

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This is the end of the MSDS.