

RISK ASSESSMENT FOR FUSO CANTER



SINGLE CAB – CAB CHASSIS ASSESSMENT ONLY

Provided by Fuso Australia as a guide only



For Fuso Canter products plated 2011 and beyond

FORWARD

The purpose of this document is to provide Fuso Canter customers with a guide to assist with assessing and managing risks associated with the vehicle in cab chassis form.

This risk assessment is conducted from an operator's point of view and on a static vehicle (not driving). This document does not cover risks associated with servicing the Fuso Fighter range of vehicles.

As Fuso cab chassis vehicles are not fit for purpose without the addition of a body / other additional equipment, it is strongly advised that customers seek a risk assessment on the complete and final vehicle. This document is only intended to be used as a starting point for risk identification and management.

This information specifically relates to Fuso Canter models plated on or after 2011.

Further information

Information: How to operate the cab chassis
Document: Fuso Canter Owner's Manual
Location: Provided in every vehicle

Information: Risk Assessment concepts and procedures
Document: ISO 31000:2009
Location: SAI Global
www.saiglobal.com/

Document: AS 4360:2004
Location: Australian Standards
www.standards.org.au/

RISK ASSESSMENT METHOD

Identify the hazards and describe the risk

What can happen? THE RISK
How could it happen? THE HAZARD

Assess the risk

Identify the factors/issues that contribute to the risk

What is the LIKELIHOOD of an event occurring?
What are the CONSEQUENCES should an event occur?

		Consequence				
		Insignificant	Minor	Moderate	Major	Critical
		Insignificant injuries.	Minor first aid required.	External Medical care require. Lost time injury.	Permanent loss of function or disability	A loss of life.
Likelihood	Rare May occur in exceptional circumstances.	LOW	LOW	MEDIUM	MEDIUM	HIGH
	Unlikely Not expected to happen. May occur once in 5	LOW	MEDIUM	MEDIUM	MEDIUM	HIGH
	Possible Foreseeable. May occur once per year.	MEDIUM	MEDIUM	MEDIUM	HIGH	HIGH
	Likely Is expected to occur occasionally.	MEDIUM	MEDIUM	HIGH	HIGH	HIGH
	Almost Certain Is expected to occur frequently	HIGH	HIGH	HIGH	HIGH	HIGH

Risk Control Measures

Identify actions that can reduce or eliminate the risk

DAILY CHECKS

CHECK VEHICLE LIGHTS AND MARKINGS

Check all exterior lights & indicators as well as licence plate & rego sticker

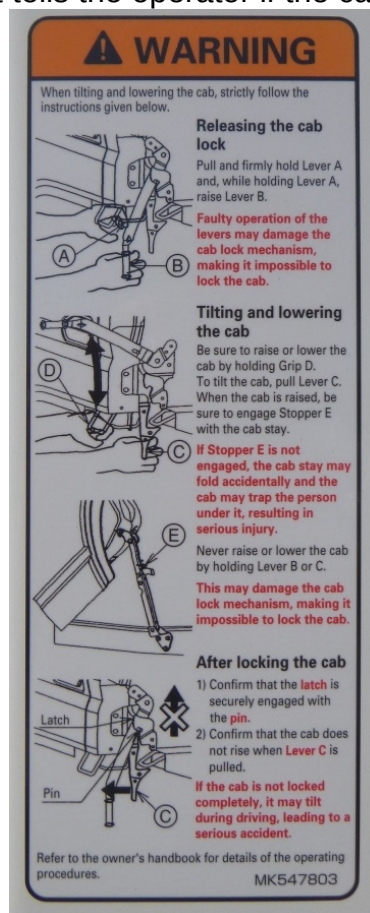
TILT CABIN

Before tilting the cab down:

- Ensure there are no loose items inside the cab
- Ensure the park brake is on
- Ensure the air conditioner is turned off to prevent water leakage inside cab
- Ensure the radio antenna is lowered
- Ensure there is 1.0m space in front of and above the cab
- Ensure there are no other people in the area

The cab tilt system includes the following features:

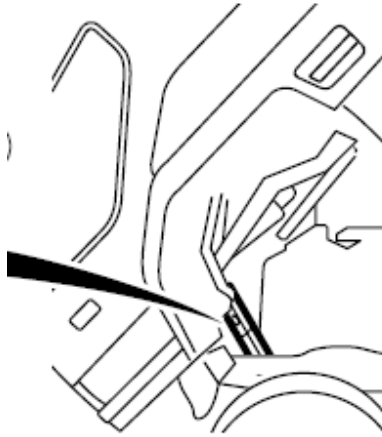
- A manual tilt system with clear instructions and tilt handle
- A locking system to ensure the cab stays in position
- Two hands are required to release the cab so that it cannot be accidentally released
- A dash warning light tells the operator if the cab is not locked down



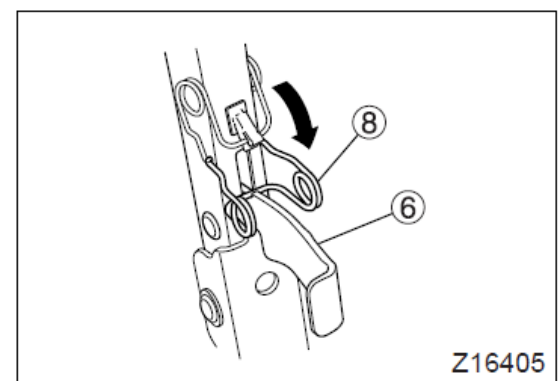
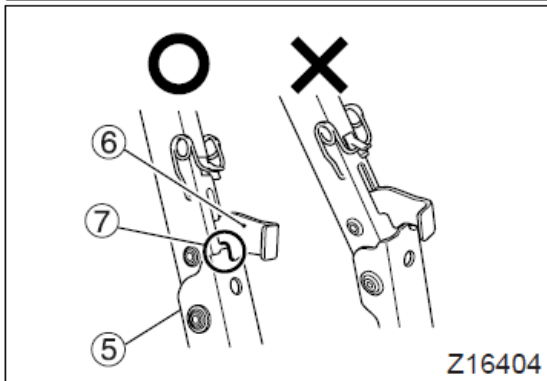
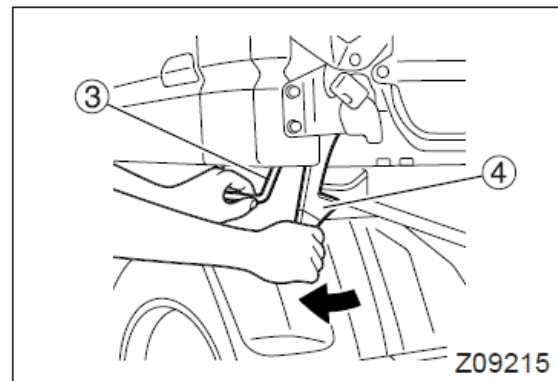
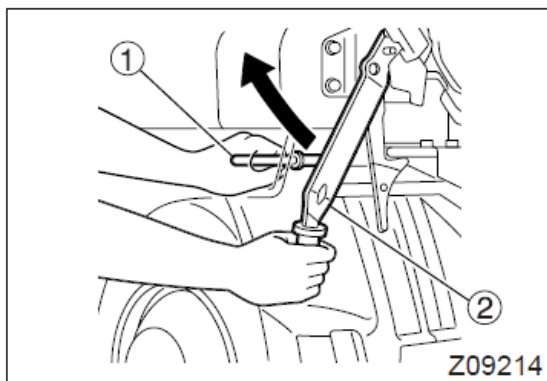
Instructions near controls



Tilted cab locking mechanism



Location of locking mechanism



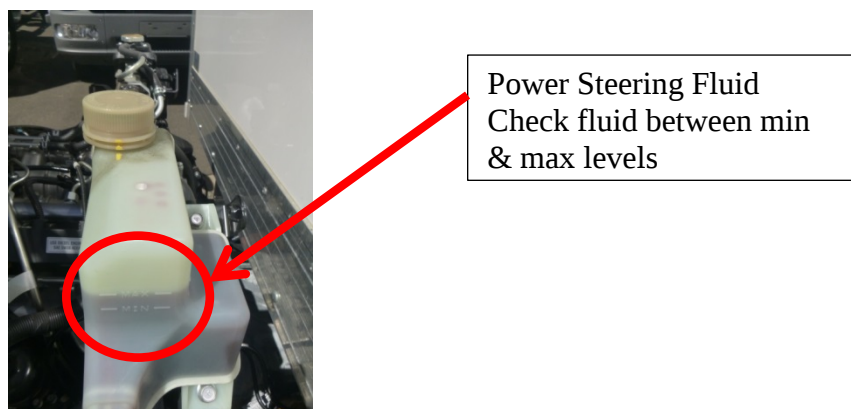
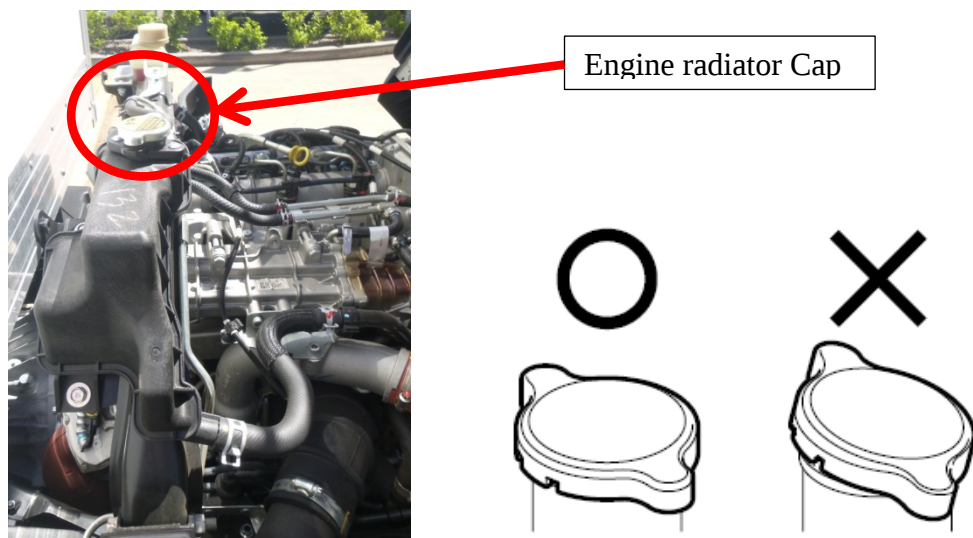
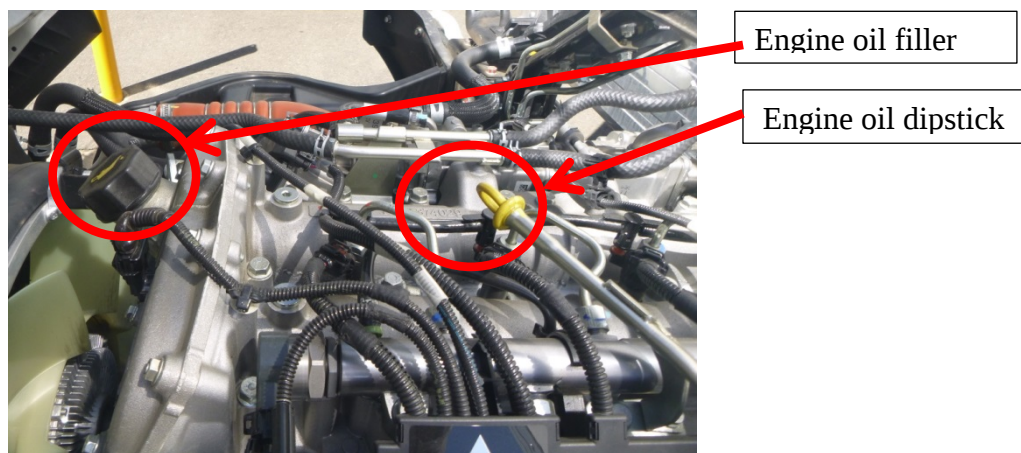
Risk: Operator is hurt while using force to tilt the cab
Assessment: Unlikely / Moderate: Medium

Risk: Another person maybe in the way of the tilting cab.
Assessment: Unlikely / Moderate: Medium
Management: Ensure the area is clear before tilting the cab

Risk: The safety locking mechanism is not used to secure the cab in the tilted position and the release lever is accidentally knocked while working under the cab
Assessment: **Unlikely / Critical: High**
Management: Ensure the locking mechanism is used after the cab is raised.

Checks that can be performed when cab is tilted forward and locked in the tilted position:

- Check oil using dipstick
- Front tyres tread (visual check)
- Fan belt check (visual check)
- Radiator pressure cap is properly fitted (visual check)
- Power Steering Fluid level (visual check)



Before returning the cab to its upright position:

Ensure there are no rags or tools left in the engine compartment

Ensure there are no other people in the area

The operator does not require force to return the cab to its lower position

Risk: The operator is hit by the cab when the cab is returning to normal position

Assessment: **Unlikely / Critical: High**

Management: Follow the procedure shown on a sticker beside the controls



Risk: The cab is not securely locked in the non-tilted position and operator drives away

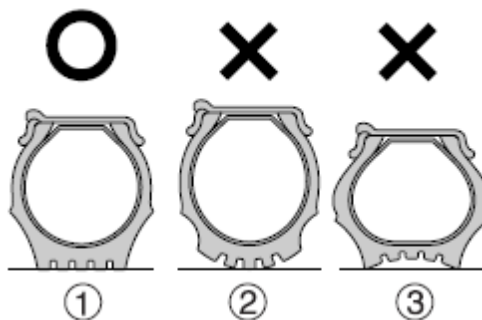
Assessment: **Unlikely / Critical: High**

Management: A dash display warns the driver if the cab is not locked down

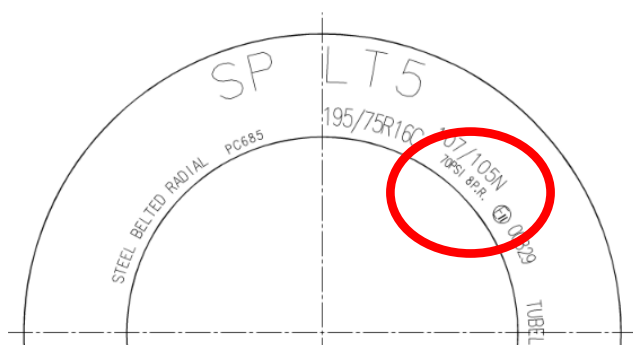
CHASSIS CHECKS

Tyre Check

Visual Check



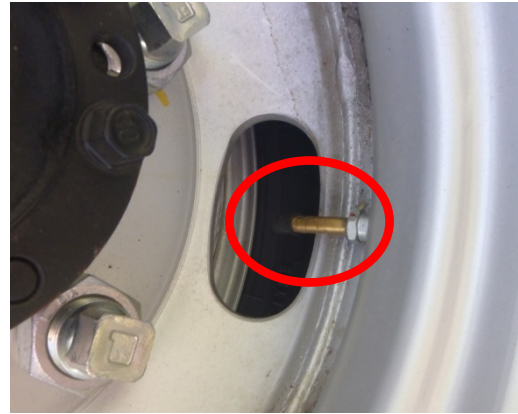
Using a tyre gauge



Please refer to the pressure on the side wall of the tyre as shown above.



Inside rear tyre

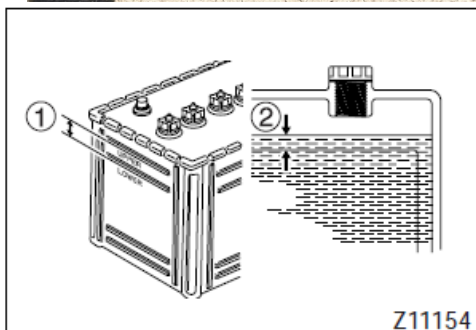


Outside rear tyre

Also ensure tyres are above their minimum tread depth and display no cracks, blisters, embedded objects or other damage

Battery

The battery box cover unscrews to show the batteries. The operator should visually inspect the battery fluid level from looking at the upper & lower lines on the battery case (without removing the battery caps). If the battery fluid level is below the lower limit, a technician should be contacted to add battery fluid.



! WARNING

The battery generates flammable hydrogen gas and should be kept away from open flame and spark.

Risk:	The operator tops up the battery fluid level without adequate clothing and eye protection and is splashed by battery fluid
Assessment:	Possible / Moderate: Medium
Management:	The operator only needs to check and report if the battery fluid level is low using a visual inspection

Engine Coolant Visual Check between “Full” & “Low” mark
(Except Crew Cab models)



Windscreen cleaning

The vehicles windscreen can be cleaned at ground level without risks.

DAILY CHECKS - INSIDE THE VEHICLE

Windscreen washer fluid

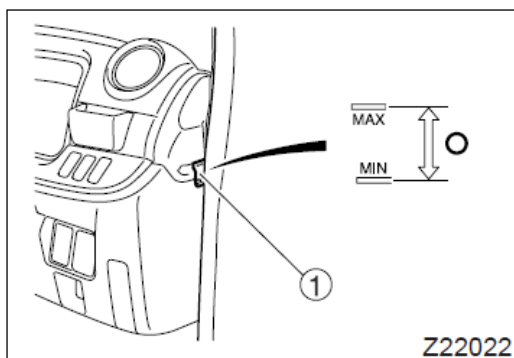


Fluid top up point

Fluid level check

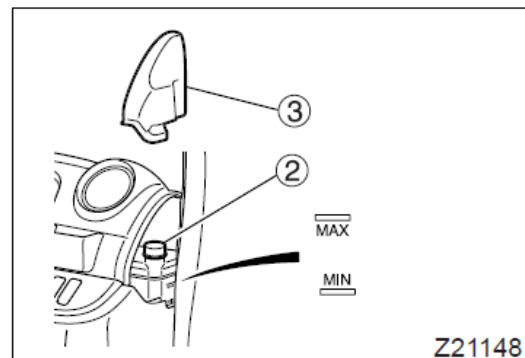
Windscreen washer fluid visual check
(Location LH passenger door)

Brake Fluid



Brake fluid visual check

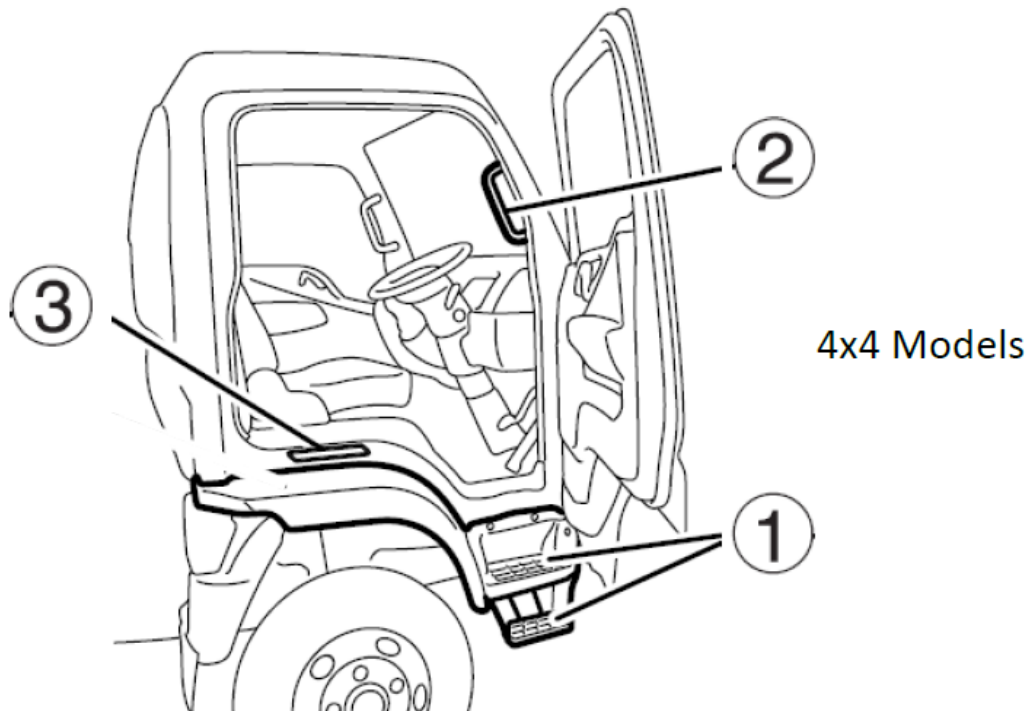
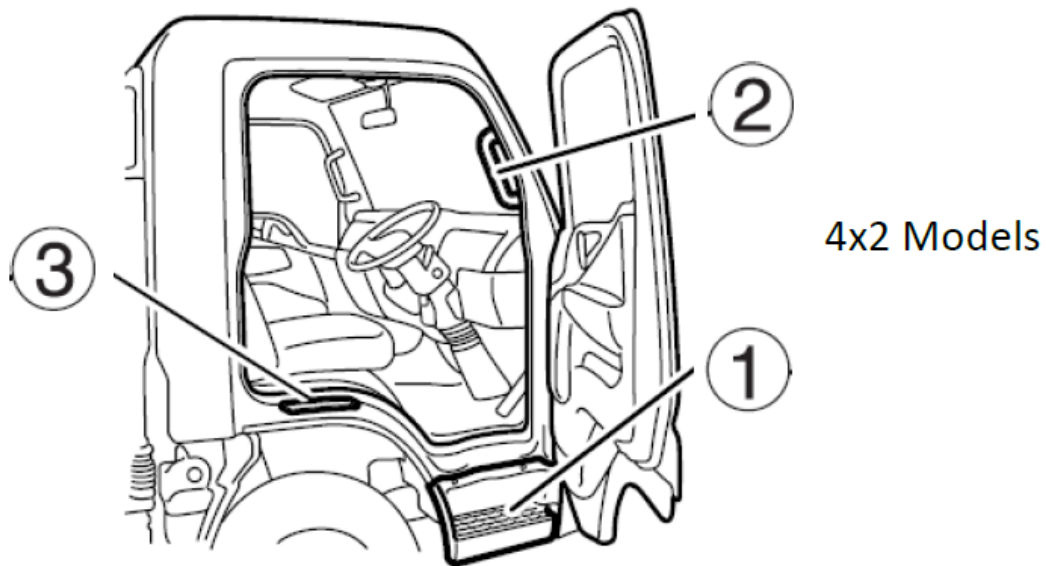
(Location inside RH driver's door)



Brake Fluid top up point

CABIN ACCESS

The doors open wide for access to the steps and grab handles.
The body should be supported by 3 or more points when entering the cab.



Risk: Operator does not use 3 points of entry method and falls.
Assessment: Possible / Moderate: Medium

DRIVER'S POSITION & VISION

The vehicle is fitted with the following features for comfort and safety

Driver & far passenger air bags

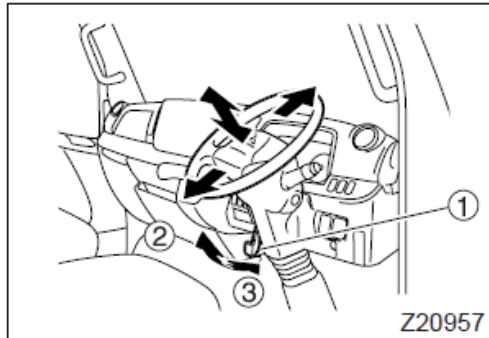
Air conditioning /heating system proven in Australian conditions

Suspended driver's seat (wide cab models only)

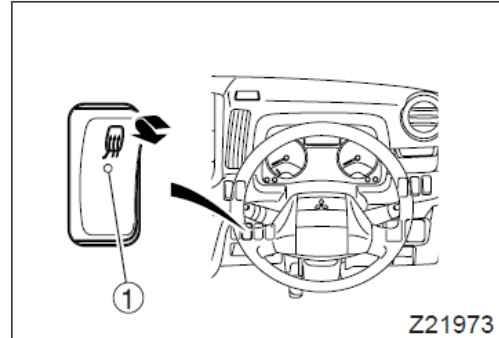
Drivers lumbar support & LH arm rest

Steering column adjustable for height as well as tilt forward / backward

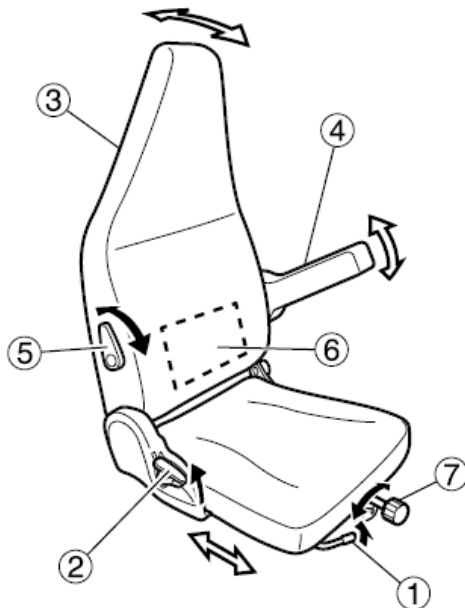
Heated main mirrors to remove condensation



Steering wheel adjustments



Heated mirror to remove condensation



- 1 Slide seat fwd or back
- 2 & 3 Lever to recline seat angle
- 4 LH arm rest (can be folded up)
- 5 & 6 Lumbar support adjustment
- 7 Weight adjustment
(suspended seat models only)

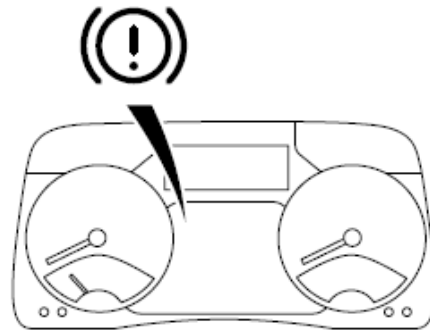
After adjusting the seat, gently rock backward and forward to ensure the seat is locked into position

After adjusting the steering column, gently pull the steering wheel backward and forward to ensure it is locked in position

Inspect the seat belt before buckling up. Make sure the belt retracts smoothly and is not worn or twisted.

PARK BRAKE

Risk:	The truck may roll away if the handbrake is not applied.
Assessment:	Rare / Critical: High
Management:	The park brake must be applied prior to leaving the vehicle.



TRANSMISSION PARK POSITION – AUTOMATED TRANS "DUONIC" MODELS

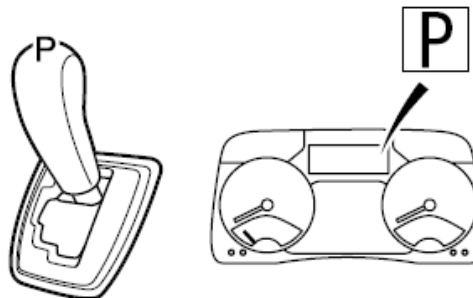
Canter models can be specified with either

- a) Manual transmissions OR
- b) "Duonic" Automated manual transmissions.

"Duonic" Automated manual transmissions are equipped with the following additional safety features:

The Transmission lever can select "P" for Parking.
Park position should always be selected before the driver leaves the vehicle

A buzzer will sound if a door is opened while the engine is running & the Transmission has "D" for Drive selected



FUEL & ADBLUE FILLING

Most Canter models only require diesel refuelling.

Canter “918” models are equipped with AdBlue tanks which require periodic refuelling.

The diesel fuel tank and AdBlue tanks are both within easy reach for filling.

The AdBlue tank is clearly marked. It has been designed to prevent a diesel pump nozzle from fitting. A visual indicator tube so the operator can stop filling the AdBlue tank before a spill occurs.



Risk:	The operator gets a splash of Diesel or AdBlue on their skin.
Assessment:	Unlikely / Minor: Medium
Management:	Material Safety Data Sheets (MSDS) documents should be consulted for materials handling.

APPENDIX

MSDS for AdBlue

ADBLUE AQUEOUS UREA SOLUTION - DIAMOND CUT

Chemwatch Independent Material Safety Data Sheet

Issue Date: 30-Sep-2011

NC317LCP(cs)

CHEMWATCH 28-4056

Version No:2.0

CD 2011/3 Page 1 of 10

Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME

ADBLUE AQUEOUS UREA SOLUTION - DIAMOND CUT

SYNONYMS

"AdBlue Aqueous Urea Solution - Diamond Cut 20L", "AdBlue Aqueous Urea Solution - Diamond Cut 208L", "AdBlue Aqueous Urea Solution - Diamond Cut 1000L"

PRODUCT USE

Stabilized urea premix for use in reducing nitrogen oxides in diesel engines.

SUPPLIER

Company: FUSO Truck & Bus

Address:

44 Lexia Place

Mulgrave

VIC, 3170

Australia

Telephone: +61 3 9566 9266

Emergency Tel: 1800 039 008 (24 Hours)

Emergency Tel: +61 3 9573 3112

Section 2 - HAZARDS IDENTIFICATION

STATEMENT OF HAZARDOUS NATURE

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

RISK

•None under normal operating conditions.

SAFETY

- Do not breathe gas/ fumes/ vapour/ spray.
- Avoid contact with skin.
- Avoid contact with eyes.
- Wear suitable gloves.
- Wear eye/ face protection.
- In case of contact with eyes, rinse with plenty of water and contact Doctor or Poisons Information Centre.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS RN	%
urea	57-13-6	30-50

Section 4 - FIRST AID MEASURES

SWALLOWED

- - Immediately give a glass of water.
- First aid is not generally required. If in doubt, contact a Poisons Information Centre or a doctor.

continued...

ADBLUE AQUEOUS UREA SOLUTION - DIAMOND CUT

Chemwatch Independent Material Safety Data Sheet

Issue Date: 30-Sep-2011

NC317LCP(cs)

CHEMWATCH 28-4056

Version No:2.0

CD 2011/3 Page 2 of 10

Section 4 - FIRST AID MEASURES

EYE

- If this product comes in contact with the eyes:
 - Wash out immediately with fresh running water.
 - Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.
 - Seek medical attention without delay; if pain persists or recurs 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.
- Lay patient down. Keep warm and rested.
- Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures.
- Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary.
- Transport to hospital, or doctor, without delay.

NOTES TO PHYSICIAN

- Treat symptomatically.

Section 5 - FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA

- - There is no restriction on the type of extinguisher which may be used.
- Use extinguishing media suitable for surrounding area.

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 a significant fire risk, however containers may burn.
- Decomposition may produce toxic fumes of: carbon dioxide (CO₂), nitrogen oxides (NO_x), other pyrolysis products typical of burning organic material.
- May emit poisonous fumes.
- May emit corrosive fumes.

In fire situation urea melts and flows, on further heating it decomposes giving off ammonia gas. Thermal and oxidative degradation products can include ammonia, biuret, and cyanuric acid,.

FIRE INCOMPATIBILITY

- - Avoid contamination with oxidising agents i.e. nitrates, oxidising acids, chlorine bleaches, pool chlorine etc. as ignition may result.

continued...

ADBLUE AQUEOUS UREA SOLUTION - DIAMOND CUT

Chemwatch Independent Material Safety Data Sheet

Issue Date: 30-Sep-2011

NC317LCP(cs)

CHEMWATCH 28-4056

Version No:2.0

CD 2011/3 Page 3 of 10

Section 5 - FIRE FIGHTING MEASURES

HAZCHEM

None

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

- Moderate hazard.
- Clear area of personnel and move upwind.
- Alert Fire Brigade and tell them location and nature of hazard.
- Wear breathing apparatus plus protective gloves.
- Prevent, by any means available, spillage from entering drains or water course.
- Stop leak if safe to do so.
- Contain spill with sand, earth or vermiculite.
- Collect recoverable product into labelled containers for recycling.
- Neutralise/decontaminate residue (see Section 13 for specific agent).
- Collect solid residues and seal in labelled drums for disposal.
- Wash area and prevent runoff into drains.
- After clean up operations, decontaminate and launder all protective clothing and equipment before storing and re-using.
- 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

- - Avoid all personal contact, including inhalation.
- Wear protective clothing when risk of exposure occurs.
- Use in a well-ventilated area.
- Avoid contact with moisture.
- 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. Launder contaminated clothing before re-use.
- 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.
- Packing as recommended by manufacturer.
- Check all containers are clearly labelled and free from leaks.

continued...

ADBLUE AQUEOUS UREA SOLUTION - DIAMOND CUT

Chemwatch Independent Material Safety Data Sheet

Issue Date: 30-Sep-2011

NC317LCP(cs)

CHEMWATCH 28-4056

Version No:2.0

CD 2011/3 Page 4 of 10

Section 7 - HANDLING AND STORAGE

STORAGE INCOMPATIBILITY

■ Urea:

- forms anhydrous ammonia and nitrous vapours on contact with hot surfaces
- reacts violently with strong oxidisers, chlorine, inorganic chlorides, chlorites, chromyl chloride, dichromates, dicyanofurazan, fluorine, gallium perchlorate, hydrogen peroxide, lead dioxide, nitrates, nitrites, permanganates, perchlorates, titanium tetrachloride, triethylenetetramine
- ignites or explodes on reaction with ammonium nitrate, chromyl chloride, nitrosyl perchlorate, phosphorus pentachloride
- may form highly explosive nitrogen trichloride on contact with hexanitroethane, perchloryl fluoride, sodium perchlorate, trichloroisocyanuric acid, hypochlorites and other chlorinating agents
- is incompatible with oxalic acid, sodium dichlorocyanurate.
- Avoid reaction with oxidising agents.

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

MATERIAL DATA

ADBLUE AQUEOUS UREA SOLUTION - DIAMOND CUT:

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.

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], [AS/NZS 1336 or national equivalent].

HANDS/FEET

- - Wear chemical protective gloves, eg. PVC.
 - Wear safety footwear or safety gumboots, eg. Rubber.
- Suitability and durability of glove type is dependent on usage. Important factors in the selection of gloves

continued...

ADBLUE AQUEOUS UREA SOLUTION - DIAMOND CUT

Chemwatch Independent Material Safety Data Sheet

Issue Date: 30-Sep-2011

NC317LCP(cs)

CHEMWATCH 28-4056

Version No:2.0

CD 2011/3 Page 5 of 10

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

include:

- frequency and duration of contact,
- chemical resistance of glove material,
- glove thickness and
- dexterity

Select gloves tested to a relevant standard (e.g. Europe EN 374, US F739, AS/NZS 2161.1 or national equivalent).

- When prolonged or frequently repeated contact may occur, a glove with a protection class of 5 or higher (breakthrough time greater than 240 minutes according to EN 374, AS/NZS 2161.10.1 or national equivalent) is recommended.

- When only brief contact is expected, a glove with a protection class of 3 or higher (breakthrough time greater than 60 minutes according to EN 374, AS/NZS 2161.10.1 or national equivalent) is recommended.

- Contaminated gloves should be replaced.

Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly.

Application of a non-perfumed moisturiser is recommended.

OTHER

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

RESPIRATOR

•Type A Filter of sufficient capacity. (AS/NZS 1716 & 1715, EN 143:2000 & 149:2001, ANSI Z88 or national equivalent)

■ Cartridge respirators should never be used for emergency ingress or in areas of unknown vapour concentrations or oxygen content. The wearer must be warned to leave the contaminated area immediately on detecting any odours through the respirator. The odour may indicate that the mask is not functioning properly, that the vapour concentration is too high, or that the mask is not properly fitted. Because of these limitations, only restricted use of cartridge respirators is considered appropriate.

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

■ Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection.

The basic types of engineering controls are:

Process controls which involve changing the way a job activity or process is done to reduce the risk.

Enclosure and/or isolation of emission source which keeps a selected hazard "physically" away from the worker and ventilation that strategically "adds" and "removes" air in the work environment. Ventilation can remove or dilute an air contaminant if designed properly. The design of a ventilation system must match the particular process and chemical or contaminant in use.

Employers may need to use multiple types of controls to prevent employee overexposure.

General exhaust is adequate under normal operating conditions. Local exhaust ventilation may be required in special circumstances. If risk of overexposure exists, wear approved respirator. Supplied-air type respirator may be required in special circumstances. Correct fit is essential to ensure adequate protection. Provide adequate ventilation in warehouses and enclosed storage areas.

continued...

ADBLUE AQUEOUS UREA SOLUTION - DIAMOND CUT

Chemwatch Independent Material Safety Data Sheet

Issue Date: 30-Sep-2011

NC317LCP(cs)

CHEMWATCH 28-4056

Version No:2.0

CD 2011/3 Page 6 of 10

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE

Clear colourless slightly alkaline liquid with an ammoniacal odour; mixes with water.

PHYSICAL PROPERTIES

Liquid.

Mixes with water.

State	Liquid	Molecular Weight	Not Applicable
Melting Range (°C)	Not Available	Viscosity	Not Available
Boiling Range (°C)	Not Available	Solubility in water (g/L)	Miscible
Flash Point (°C)	Not Applicable	pH (1% solution)	Not Available
Decomposition Temp (°C)	Not Available	pH (as supplied)	9.5
Autoignition Temp (°C)	Not Applicable	Vapour Pressure (kPa)	Not Available
Upper Explosive Limit (%)	Not Applicable	Specific Gravity (water=1)	1.094
Lower Explosive Limit (%)	Not Applicable	Relative Vapour Density (air=1)	Not Available
Volatile Component (%vol)	Not Available	Evaporation Rate	Not Available
urea			
log Kow (Prager 1995):		- 1.09	
log Kow (Sangster 1997):		- 2.11	

Section 10 - STABILITY AND REACTIVITY

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

- Urea may cause irritation to the digestive tract, nausea, vomiting, diarrhoea, salt depletion, headache and confusion.

EYE

- The material may be irritating to the eye, with prolonged contact causing inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.

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.

Urea is a common ingredient of skin ointment and acts to soften dry scaly skin. Prolonged skin contact may cause stinging sensation, irritation and skin inflammation in some people. High doses in clinical application has caused nausea and vomiting.

Entry into the blood-stream, through, for example, cuts, abrasions or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage

continued...

ADBLUE AQUEOUS UREA SOLUTION - DIAMOND CUT

Chemwatch Independent Material Safety Data Sheet

Issue Date: 30-Sep-2011

NC317LCP(cs)

CHEMWATCH 28-4056

Version No:2.0

CD 2011/3 Page 7 of 10

Section 11 - TOXICOLOGICAL INFORMATION

is suitably protected.

INHALED

■ There is some evidence to suggest that the material can cause respiratory irritation in some persons. The body's response to such irritation can cause further lung damage.

Urea is generally regarded as non-harmful in small amounts. However, exposure should be kept as low as practicable. People with asthma should avoid prolonged contact with urea dust. Urea may cause irritation of the respiratory tract, causing coughing and shortness of breath. Urea may be absorbed into the bloodstream, producing symptoms similar to those caused by swallowing.

CHRONIC HEALTH EFFECTS

■ Substance accumulation, in the human body, may occur and may cause some concern following repeated or long-term occupational exposure.

Urea is a body metabolic waste but high exposure to it was reported to cause emphysema, disturbances in protein metabolism and chronic weight loss. However skin exposure of rats produced no reddening but low brain and prostate weights were recorded. It should be avoided in those with kidney or liver impairment.

TOXICITY AND IRRITATION

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

■ 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).

■ 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.

continued...

ADBLUE AQUEOUS UREA SOLUTION - DIAMOND CUT

Chemwatch Independent Material Safety Data Sheet

Issue Date: 30-Sep-2011

NC317LCP(cs)

CHEMWATCH 28-4056

Version No:2.0

CD 2011/3 Page 8 of 10

Section 11 - TOXICOLOGICAL INFORMATION

■ Asthma-like symptoms may continue for months or even years after exposure to the material ceases. This may be due to a non-allergenic condition known as reactive airways dysfunction syndrome (RADS) which can occur following exposure to high levels of highly irritating compound. Key criteria for the diagnosis of RADS include the absence of preceding respiratory disease, in a non-atopic individual, with abrupt onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. A reversible airflow pattern, on spirometry, with the presence of moderate to severe bronchial hyperreactivity on methacholine challenge testing and the lack of minimal lymphocytic inflammation, without eosinophilia, have also been included in the criteria for diagnosis of RADS. RADS (or asthma) following an irritating inhalation is an infrequent disorder with rates related to the concentration of and duration of exposure to the irritating substance. Industrial bronchitis, on the other hand, is a disorder that occurs as result of exposure due to high concentrations of irritating substance (often particulate in nature) and is completely reversible after exposure ceases. The disorder is characterised by dyspnea, cough and mucus production.

UREA:

TOXICITY

Oral (rat) LD50: 8471 mg/kg

Intraperitoneal (rat) LD50: >5000 mg/kg

Subcutaneous (rat) LD50: 8200 mg/kg

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

■ 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.

IRRITATION

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

Section 12 - ECOLOGICAL INFORMATION

UREA:

■ 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.

continued...

ADBLUE AQUEOUS UREA SOLUTION - DIAMOND CUT

Chemwatch Independent Material Safety Data Sheet

Issue Date: 30-Sep-2011

NC317LCP(cs)

CHEMWATCH 28-4056

Version No:2.0

CD 2011/3 Page 9 of 10

Section 12 - ECOLOGICAL INFORMATION

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..

DO NOT discharge into sewer or waterways.

Ecotoxicity

Ingredient	Persistence: Water/Soil	Persistence: Air	Bioaccumulation	Mobility
AdBlue Aqueous Urea Solution - Diamond Cut urea	No Data Available LOW	No Data Available No Data Available	LOW	HIGH

Section 13 - DISPOSAL CONSIDERATIONS

■ Legislation addressing waste disposal requirements may differ by country, state and/ or territory. Each user must refer to laws operating in their area. In some areas, certain wastes must be tracked.

A Hierarchy of Controls seems to be common - the user should investigate:

- Reduction
- Reuse
- Recycling
- Disposal (if all else fails)

This material may be recycled if unused, or if it has not been contaminated so as to make it unsuitable for its intended use. If it has been contaminated, it may be possible to reclaim the product by filtration, distillation or some other means. Shelf life considerations should also be applied in making decisions of this type. Note that properties of a material may change in use, and recycling or reuse may not always be appropriate.

- DO NOT allow wash water from cleaning or process equipment to enter drains.
- It may be necessary to collect all wash water for treatment before disposal.
- In all cases disposal to sewer may be subject to local laws and regulations and these should be considered first.
- Where in doubt contact the responsible authority.
- 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 land-fill specifically licenced to accept chemical and / or pharmaceutical wastes 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

continued...

ADBLUE AQUEOUS UREA SOLUTION - DIAMOND CUT

Chemwatch Independent Material Safety Data Sheet

Issue Date: 30-Sep-2011

NC317LCP(cs)

CHEMWATCH 28-4056

Version No:2.0

CD 2011/3 Page 10 of 10

Section 14 - TRANSPORTATION INFORMATION

Section 15 - REGULATORY INFORMATION

POISONS SCHEDULE None

REGULATIONS

Regulations for ingredients

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

"Australia Inventory of Chemical Substances (AICS)"

No data for AdBlue Aqueous Urea Solution - Diamond Cut (CW: 28-4056)

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.

This document is copyright. Apart from any fair dealing for the purposes of private study, research, review or criticism, as permitted under the Copyright Act, no part may be reproduced by any process without written permission from CHEMWATCH. TEL (+61 3) 9572 4700.

Issue Date: 30-Sep-2011

Print Date: 30-Sep-2011

This is the end of the MSDS.