1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

Product information

Trade name : AdBlue®
Synonyms : Aqueous Urea Solution

Use of the Substance/Mixture : For reducing of nitrogen oxides in exhaust gases of Diesel engines (SCR-technology).

Supplier : Borealis L.A.T GmbH
St.-Peter-Strasse 25, 4021 Linz, Austria
Telephone: +43 732 6915-0

E-mail address : product.safety@borealisgroup.com

2. HAZARDS IDENTIFICATION

GHS Classification (1272/2008 (EC))
Not a hazardous substance or mixture according to Regulation (EC) No. 1272/2008.

Classification (67/548/EEC, 1999/45/EC)
Not a hazardous substance or mixture according to EC-directives 67/548/EEC or 1999/45/EC.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical nature : Aqueous solution

Components

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CAS-No.</th>
<th>EC-No.</th>
<th>Concentration [%]</th>
</tr>
</thead>
<tbody>
<tr>
<td>urea</td>
<td>57-13-6</td>
<td>200-315-5</td>
<td>&gt;= 31,8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>01-2119463277-33</td>
<td></td>
</tr>
<tr>
<td>water</td>
<td>7732-18-5</td>
<td>231-791-2</td>
<td>&lt;= 68,2</td>
</tr>
</tbody>
</table>

AdBlue is a registered trademark of Verband der Automobilindustrie e.V. (VDA).
4. FIRST AID MEASURES

General advice : No specific instructions needed.

Inhalation : Move to fresh air.
If symptoms persist, call a physician.

Skin contact : Wash off with soap and plenty of water.
Take off contaminated clothing and wash before reuse.
If skin irritation persists, call a physician.

Eye contact : Rinse cautiously with water for several minutes.

Ingestion : Rinse mouth with water.
Do NOT induce vomiting.
If conscious, drink plenty of water.

Notes to physician

Symptoms : Inhalation:
Cough
Shortness of breath
Sore throat

Skin contact:
Redness

Eye contact:
Redness

Ingestion:
Convulsions
Headache
Nausea
Vomiting

Treatment : Treat symptomatically.

5. FIREFIGHTING MEASURES

Suitable extinguishing media : Carbon dioxide (CO2)
Water mist
Alcohol-resistant foam

Unsuitable extinguishing : High volume water jet
media

Specific hazards during firefighting: The product itself does not burn. Burning produces irritant fumes.

Special protective equipment for firefighters: Wear self-contained breathing apparatus and protective suit.

Further information: Standard procedure for chemical fires.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions: Use personal protective equipment. Material can create slippery conditions. Use non-slip safety shoes in areas where spills or leaks can occur. Avoid inhalation of vapour or mist. Avoid contact with skin, eyes and clothing. Ensure adequate ventilation, especially in confined areas.

Environmental precautions: Prevent product from entering drains.

Methods for cleaning up: Soak up with inert absorbent material (e.g. sand, silica gel, acid binder, universal binder, sawdust). Keep in suitable, closed containers for disposal. After cleaning, flush away traces with water.

7. HANDLING AND STORAGE

Handling

Advice on safe handling: Avoid contact with skin, eyes and clothing.

Advice on protection against fire and explosion: No special protective measures against fire required.

Storage

Requirements for storage areas and containers: Suitable materials for containers: Highly alloyed austenitic Cr-Ni-steels and Cr-Ni-Mo-steels (acc. to DIN EN 10088-1 to 3; e.g. 1.4541 and 1.4571) Titanium HDPE Polypropylene

Unsuitable container: Copper alloys Copper Unalloyed steels
Zinced steel

Store at room temperature.
Protect from sunlight.

Advice on common storage:
Do not store together with oxidizing and acidic materials.
Do not store or transport together with nitrites and salts containing nitrates.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

<table>
<thead>
<tr>
<th>DNEL</th>
<th>End Use: Workers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Exposure routes: Skin contact</td>
</tr>
<tr>
<td></td>
<td>Potential health effects: Acute systemic effects</td>
</tr>
<tr>
<td></td>
<td>Value: 580 mg/kg bw/d</td>
</tr>
<tr>
<td>Urea</td>
<td>End Use: Workers</td>
</tr>
<tr>
<td></td>
<td>Exposure routes: Inhalation</td>
</tr>
<tr>
<td></td>
<td>Potential health effects: Acute systemic effects</td>
</tr>
<tr>
<td></td>
<td>Value: 292 mg/m³</td>
</tr>
<tr>
<td>Urea</td>
<td>End Use: Workers</td>
</tr>
<tr>
<td></td>
<td>Exposure routes: Skin contact</td>
</tr>
<tr>
<td></td>
<td>Potential health effects: Long-term systemic effects</td>
</tr>
<tr>
<td></td>
<td>Value: 580 mg/kg bw/d</td>
</tr>
<tr>
<td>Urea</td>
<td>End Use: Workers</td>
</tr>
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<td>Exposure routes: Inhalation</td>
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<tr>
<td></td>
<td>Potential health effects: Long-term systemic effects</td>
</tr>
<tr>
<td></td>
<td>Value: 292 mg/m³</td>
</tr>
<tr>
<td>Urea</td>
<td>End Use: Consumers</td>
</tr>
<tr>
<td></td>
<td>Exposure routes: Skin contact</td>
</tr>
<tr>
<td></td>
<td>Potential health effects: Acute systemic effects</td>
</tr>
<tr>
<td></td>
<td>Value: 580 mg/kg bw/d</td>
</tr>
<tr>
<td>Urea</td>
<td>End Use: Consumers</td>
</tr>
<tr>
<td></td>
<td>Exposure routes: Inhalation</td>
</tr>
<tr>
<td></td>
<td>Potential health effects: Acute systemic effects</td>
</tr>
<tr>
<td></td>
<td>Value: 125 mg/m³</td>
</tr>
<tr>
<td>Urea</td>
<td>End Use: Consumers</td>
</tr>
<tr>
<td></td>
<td>Exposure routes: Ingestion</td>
</tr>
<tr>
<td></td>
<td>Potential health effects: Acute systemic effects</td>
</tr>
<tr>
<td></td>
<td>Value: 42 mg/kg bw/d</td>
</tr>
</tbody>
</table>
Urea
: End Use: Consumers
Exposure routes: Skin contact
Potential health effects: Long-term systemic effects
Value: 580 mg/kg bw/d

Urea
: End Use: Consumers
Exposure routes: Inhalation
Potential health effects: Long-term systemic effects
Value: 125 mg/m3

Urea
: End Use: Consumers
Exposure routes: Ingestion
Potential health effects: Long-term systemic effects
Value: 42 mg/kg bw/d

PNEC: Fresh water
Value: 0.47 mg/l
Urea

Engineering measures
Provide adequate ventilation.

Personal protective equipment
Respiratory protection
: No personal respiratory protective equipment normally required.

Hand protection
: In case of contact through splashing:
  Gloves

Eye protection
: Safety goggles

Skin and body protection
: Lightweight protective clothing

Hygiene measures
: Keep away from food and drink.
  When using do not eat, drink or smoke.
  Wash hands before breaks and at the end of workday.
  Shower or bathe at the end of working.
  Take off immediately all contaminated clothing.
  Keep working clothes separately.

Environmental exposure controls
General advice
: Prevent product from entering drains.
9. PHYSICAL AND CHEMICAL PROPERTIES

**Appearance**
- Form: liquid
- Colour: colourless

**Safety data**
- Flammability (solid, gas): not auto-flammable
- Explosive properties: Not explosive
- pH: 8.8
- Melting point: -11.5 °C
- Density: 1,090 g/cm³
- Water solubility: soluble
- Viscosity, dynamic: 1.4 mPa.s

10. STABILITY AND REACTIVITY

**Reactivity**: Thermal decomposition from ~ 30°C, with formation of ammonia.

**Materials to avoid**: Nitrates, Nitrites, Strong oxidizing agents, Strong acids, Base metals

**Hazardous decomposition products**: Ammonia

**Thermal decomposition**: > 30 °C

**Hazardous reactions**: Violent hydrolysis at high temperatures. Risk of burst of containers.

11. Toxicological information

**Information on toxicological effects**
### Product

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute oral toxicity</td>
<td>LD50: 14.300 mg/kg, rat, OECD Test Guideline 401, Test substance: Urea</td>
</tr>
<tr>
<td>Acute inhalation toxicity</td>
<td>no data available</td>
</tr>
<tr>
<td>Acute dermal toxicity</td>
<td>study scientifically unjustified</td>
</tr>
<tr>
<td>Skin corrosion/irritation</td>
<td>rabbit, OECD Test Guideline 404, Test substance: Urea, No skin irritation</td>
</tr>
<tr>
<td>Serious eye damage/eye irritation</td>
<td>rabbit, OECD Test Guideline 405, Test substance: Urea, No eye irritation</td>
</tr>
<tr>
<td>Respiratory or skin sensitisation</td>
<td>No known effect.</td>
</tr>
<tr>
<td>Germ cell mutagenicity</td>
<td></td>
</tr>
<tr>
<td>Genotoxicity in vitro</td>
<td>Ames test, Result: negative, Test substance: Urea</td>
</tr>
<tr>
<td>Assessment</td>
<td>Not mutagenic in Ames Test.</td>
</tr>
<tr>
<td>Carcinogenicity</td>
<td>rat, Oral, NCI screening study, Test substance: Urea</td>
</tr>
<tr>
<td></td>
<td>Animal testing did not show any carcinogenic effects.</td>
</tr>
<tr>
<td>Reproductive toxicity</td>
<td>rat, Dose: 500 mg/kg, Oral, Test substance: Urea</td>
</tr>
<tr>
<td></td>
<td>Lowest observed adverse effect level Based on available data, the classification criteria are not met.</td>
</tr>
<tr>
<td>STOT - repeated exposure</td>
<td>rat, Oral, 365 d, NOAEL: 2.250 mg/kg, NCI screening study, Test substance: Urea, Health injuries are not known or expected under normal use.</td>
</tr>
<tr>
<td>Further information</td>
<td>According to our experience and to the information provided to us, the product does not have any harmful effects if it is used and handled as specified.</td>
</tr>
</tbody>
</table>

### 12. Ecological information

#### Toxicity

**Product**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toxicity to fish</td>
<td>LC50: &gt; 6.810 mg/l, 96 h, Leuciscus idus (Golden orfe), Test substance: Urea</td>
</tr>
<tr>
<td>Toxicity to daphnia and other</td>
<td>EC50: &gt; 10.000 mg/l, 24 h, Daphnia magna (Water flea), static test, Test substance: Urea, Fresh water</td>
</tr>
</tbody>
</table>
Toxicity to algae: NOEC: 47 mg/l, 192 h, Microcystis aeruginosa, Cell multiplication inhibition test, Test substance: Urea, Fresh water

Persistence and degradability


Bioaccumulative potential

Bioaccumulation: Test substance: Urea, Bioaccumulation not expected: Partition coefficient (n-octanol/water) log Pow < 3.

Mobility in soil

Distribution among environmental compartments: Adsorption/Soil, Medium: Soil, Adsorbs on soil.

Results of PBT and vPvB assessment

Assessment: This mixture contains no substances that are assessed to be a PBT or a vPvB.

Other adverse effects

Additional ecological information: The product is not considered dangerous for the environment.

13. DISPOSAL CONSIDERATIONS

Where possible recycling is preferred to disposal or incineration. Contact the proper local authorities. Do not dispose of together with household waste. Dispose of wastes in an approved waste disposal facility. Contact manufacturer.
Aqueous Urea Solution

European waste code:
06 10 99: wastes not otherwise specified

Contaminated packaging: In accordance with local and national regulations.

14. TRANSPORT INFORMATION

Not dangerous goods in the meaning of ADR/RID, ADNR, IMDG-Code, ICAO/IATA-DGR
Avoid temperatures above 30°C.

15. REGULATORY INFORMATION

Chemical Safety Assessment: A Chemical Safety Assessment has been carried out for this substance.
(Urea)

16. OTHER INFORMATION

Further information:
Other information: Issued in accordance with Article 32 of Regulation (EC) No 1907/2006, and its amendments.

Issuer: Borealis, Group Product Stewardship / Mikaela Eriksson.

Sources of key data used to compile the Safety Data Sheet:
Chemical Safety Report, Urea. FARM REACH Consortium, 2014
International Chemical Safety Card, Urea, 1997
(http://www.ilo.org/dyn/icsc/showcard.display?p_lang=en&p_card_id=0595)
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It is the customer's responsibility to inspect and test our products in order to satisfy itself as to the suitability of the products for the customer's particular purpose. The customer is responsible for the appropriate, safe and legal use, processing and handling of our products.

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