1 PRODUCT AND COMPANY IDENTIFICATION

PRODUCT INFORMATION

Product Name: TerraCair Urea Solution, AUS 32

Recommended Use:

SCR NOx Control

External Keys:

PMRV0957	PMRV
9986284	Productive Materials
CN36333	GM of Canada Approval Number
88862659	Distributable Material (Part #)
88863523	Distributable Material (Part #)
Diesel Exhaust Fluid	Primary Tradename - Distributable Material
88863494	Distributable Material (Part #)
88863495	Distributable Material (Part #)
19286291	Distributable Material (Part #)
10-4022	Distributable Material (Part #)
19286292	Distributable Material (Part #)
10-4023	Distributable Material (Part #)

MANUFACTURER INFORMATION

Manufacturer: Terra Industries Inc.

Address:

Terra Centre - 600 Fourth Street	USA	Iowa	51101	Sioux City	P.O. Box 6000	Mailing

Communication Lines:

Phone	712-277-1340	Information
Internet	www.terraindustries.com	MSDS available
Phone	800-424-9300	CHEMTREC (U.S.)
Phone	613-996-6666	CANUTEC (Canada)

SUPPLIER INFORMATION

Supplier: GM of Canada - Oshawa

Address:

1908 Colonel Sam Drive	CAN	ON	L1H8P7	Oshawa	Mailing

2 INGREDIENT INFORMATION

Chemical Family: Amide

FORMULATION

Chemical Characterization:

Formula: CH4N2O + H2O

Ingredients:

Chemical Name	CAS Number	Prefix	Value	Unit	Exposure Limits
UREA	57-13-6	Range	31.8 - 33.2	%Wt	No
AMMONIA	7664-41-7	<	0.2	%Wt	Yes
Imidodicarbonic diamide	108-19-0	<	0.3	%Wt	No
WATER	7732-18-5	Range	67.7 - 66.3	%Wt	No

3 HAZARDS IDENTIFICATION

Hazards Overview:

EMERGENCY OVERVIEW

Colorless liquid. With slight ammonia (pungent) odor. Reacts with sodium hypochlorite or calcium hypochlorite to form the explosive nitrogen trichloride. When heated, urea

3 HAZARDS IDENTIFICATION

Hazards Overview:

releases ammonia and when heated to decomposition it emits toxic fumes of nitrogen oxides (NOx), ammonia, and cyanuric acid. Use water to control fires involving urea solution if water is compatible with burning material. Urea solution itself is non flammable.

Specific Hazards:

Primary Routes of Entry: Skin contact/absorption, eye contact, and vapor inhalation.

Specific Hazards (Routes Of Exposure):

Exposure Routes	Exposure Duration	Observation
Eye Contact	Acute	May cause irritation to eyes.
Skin Contact	Acute	May cause irritation to skin.

Medical Conditions Aggravated By Exposure:

No test data available.

Additional Health Hazard Data:

Ammonia and carbon dioxide vapors may accumulate in a confined space.
General Chronic Exposure: No test data available.

4 FIRST AID MEASURES

First Aid By::

Inhalation	If irritation develops move patient to fresh air and monitor. If cough or difficulty in breathing develops, evaluate for respiratory tract irritation. If trained to do so, administer supplemental oxygen if needed. If irritation, coughing, or difficulty in breathing persists the patient should be seen in a health care facility.
Skin Contact	If irritation occurs, flush exposed area with copious amounts of tepid water for at least 15 minutes followed by washing area thoroughly with soap and water. The patient should be seen in a health care facility if irritation or pain persists.
Eye Contact	Flush eyes with copious amounts of tepid water for at least 15 minutes. If irritation, pain, swelling, excessive tearing, or light sensitivity persists, the patient should be seen in a health care facility.
Ingestion	If conscious, give the patient large quantities of water to drink and induce vomiting. Seek medical attention.

5 FIRE FIGHTING MEASURES

Product Flammability:

Urea solution is not flammable.

Extinguishing Media:

Use water to extinguish a fire involving urea solution if water is compatible with the burning material.

Fire and Explosion Hazards:

At elevated temperature, urea solution may decompose to form cyanuric acid, ammonia, biuret, and/or nitrogen oxides.

Special Fire Fighting Procedures:

Positive pressure self-contained breathing apparatus (SCBA) should be used when there is a potential for inhalation of vapors and/or fumes.
Wear full fire fighting protective equipment that is appropriate for conditions.
Runoff from fire control or dilution water may cause pollution.

6 ACCIDENTAL RELEASE MEASURES

PRECAUTIONS IN CASE OF ACCIDENTAL RELEASE

Personal Precautions:

Keep unnecessary people away and isolate hazard area. Urea solution may be toxic to cattle (ruminants) when ingested if amount ingested is not controlled properly.
Generally, a small spill is one that involves a single, small package (i.e. up to a 55 gallon drum), small cylinder, or a small (non-continuing) leak from a large container. Spilled urea solution may cause slippery conditions.

Environmental Precautions:

6 ACCIDENTAL RELEASE MEASURES

PRECAUTIONS IN CASE OF ACCIDENTAL RELEASE

Environmental Precautions:

Runoff may cause pollution.

SPILL OR LEAK PROCEDURES

Recovery:

Recover and use as fertilizer.
If disposal of product or contaminated by-products is necessary, follow guidelines set forth by local, state, and federal environmental agencies.

7 HANDLING AND STORAGE

HANDLING

Safe Handling Procedures:

Use proper personal protective equipment when working with or around urea solution. (See section 8).

STORAGE

Storage Conditions:

No unusual storage precautions are necessary.

8 EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Measures:

If necessary to enter an area that contains urea solution, monitor for ammonia and oxygen content. Oxygen levels should be maintained between 19.5% and 23.5%, if outside of this range use appropriate precautions. Adequate ventilation should be supplied. Safety shower and eyewash fountain or at least 5 gallons of accessible clean water should be provided in a urea solution storage/handling area.

EXPOSURE LIMITS

Limit Values:

Chemical Name	CAS Number	Type	Value	Specification	Source
AMMONIA	7664-41-7	PEL-TWA	50ppm	-	OSHA - Permissible Exposure Limits (PELs)
AMMONIA	7664-41-7	GM OEG -TWA	25ppm	-	GM Occupational Exposure Guidelines (OEG)
AMMONIA	7664-41-7	GM OEG -STEL	35ppm	-	GM Occupational Exposure Guidelines (OEG)
AMMONIA	7664-41-7	TLV-TWA	25ppm	-	Threshold Limit Values (TLVs) - ACGIH
AMMONIA	7664-41-7	TLV-STEL	35ppm	-	Threshold Limit Values (TLVs) - ACGIH
AMMONIA	7664-41-7	State-STEL	35ppm	-	MICHIGAN
AMMONIA	7664-41-7	State-STEL	35ppm	-	NEW YORK
AMMONIA	7664-41-7	State-STEL	35ppm	-	TENNESSEE

PERSONAL PROTECTIVE EQUIPMENT

Personal Protective Equipment (PPE):

8 EXPOSURE CONTROLS/PERSONAL PROTECTION

PERSONAL PROTECTIVE EQUIPMENT

Personal Protective Equipment (PPE):

Respiratory Protection	Urea solution may pose an inhalation hazard in confined areas due to its ability to produce ammonia and carbon dioxide vapors. If ammonia vapors are present, protect as follows: <25 ppm: No protection required. 25 to 35 ppm: Protection required if the daily TWA is exceeded. 35 to 50 ppm: Protection required if exposed for more than 15 minutes 50 to 250 ppm: Minimum of an air-purifying respirator equipped with ammonia canister(s) or cartridge (s). 250 to 300 ppm: Minimum of a full-face air-purifying respirator equipped with ammonia canister(s) or cartridge (s). >300 ppm: A fresh air supply system must be used (i.e. positive pressure self contained breathing apparatus)
Hand Protection	Chemically Impervious gloves should be worn.
Eye Protection	It is recommended that safety glasses or goggles be used and if there is a potential for splashing liquid, a face shield should be used in conjunction with the safety glasses or goggles.

9 PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE

Physical State: Liquid.
Color: Colorless.
Odor: Slight ammonia odor (pungent)

PHYSICAL PROPERTIES

pH Value:

No test results

Vapor Pressure:

No test results

Vapor Density:

No test results

Density:

Density	=	9.1	lb/gal

Specific Gravity:

Range	1.087 - 1.093	at 20 C.

Solubility:

=	100	'%'

Total Amount Of::

Percent Volatile by Volume	No test results

Additional Chemical and Physical Data:

Refractive Index	Range	1.3814 - 1.3843	at 20 C.
Molecular Weight:	Not Applicable		
Critical Temperature			No test results

9 PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL PROPERTIES

Additional Chemical and Physical Data:

Critical Pressure — No test results

10 STABILITY AND REACTIVITY

STABILITY INFORMATION

Stability Under Normal Conditions: Stable

Incompatible Materials:

Reacts with sodium hypochlorite or calcium hypochlorite to form nitrogen trichloride that may explode spontaneously in air. Incompatible with sodium nitrite, phosphorus pentachloride, and nitrosyl or gallium perchlorate. Urea will form urea nitrate when mixed with nitric acid at low pH. Urea nitrate may become unstable and/or explosive under certain conditions.

Hazardous Polymerization:

Will not occur.

HAZARDOUS DECOMPOSITION

Reactions:

Type of Reaction	Reaction Products
Thermal Decomposition	At elevated temperature, urea solution may decompose to form cyanuric acid, ammonia, biuret, and/or nitrogen oxides.
Decomposition	Urea solution forms ammonia, cyanuric acid, biuret, and/or nitrogen oxides (NOx) upon decomposition.

11 TOXICOLOGICAL INFORMATION

SCIENTIFIC OBSERVATIONS

LETHAL LIMIT VALUES

Product Data:

Exposure Routes	Type	Prefix	Value	Unit	Species	Comment
Ingestion	LD50	Range	14300 - 15000	mg/kg	Rat	
Ingestion	LD50	Range	11500 - 13000	mg/kg	Mouse	
Ingestion	LD50	=	510	mg/kg	Cattle	
Skin Contact		=	40	'%'	Rat	Repeated Dose Toxicity: NOAEL = 40% in ointment (24 wks; dermal)

CLASSIFICATION OF INGREDIENTS

Carcingenicity:

NTP: Not Listed
IARC: Not Listed
OSHA: Not Regulated

12 ECOLOGICAL INFORMATION

ENVIRONMENTAL IMPACT

Comment:

Notify local health and wildlife officials and operators of any nearby water intakes of contamination or discharge into or leading to waterways.

ECOTOXICITY

Comment:

Acute Toxicity to Fish
LC50 Barillius barna 9,100 mg/L (96 hr)

12 ECOLOGICAL INFORMATION

ECOTOXICITY

Comment:

Acute Toxicity to Aquatic Invertebrates
EC50 Daphnia magna >10,000 mg/L (DIN 38412 Part II; 24 hr)
Toxicity to Aquatic Plants
TT Scenedesmus quadracauda >10,000 mg/L (192 hr cell multiplication inhibition test)

Note: Data is for Urea
Source: TFI Product Testing Program April 2003

13 DISPOSAL CONSIDERATIONS

Waste Disposal Information:

Urea solution is not listed by the Federal EPA as a hazardous waste. Consult state/provincial and local environmental agencies for acceptable disposal methods. Recover product for use as a fertilizer if possible.

14 TRANSPORT INFORMATION

Comment:

Urea solution is not listed by any U.S. or Canadian transportation authority as a hazardous material and as such, no specific information is available.

15 REGULATORY INFORMATION

LABELLING

Hazard Codes:

NFPA Health	1
NFPA Flammability	0
NFPA Reactivity	0

Comment:

NFPA assigned by General Motors Technical Review.

NATIONAL REGULATIONS

SARA 311/312: No
SARA 313: Yes
Immediate Health: No
Delayed Health: No
Fire: No
Sudden Pressure Release: No
Reactive: No
Other Regulation:

SARA 313:	SARA 313 inherited from ingredient list.
CERCLA Hazardous Substances List:	Not Listed
TSCA Inventory:	Listed

16 OTHER INFORMATION

Comments:

Additional Exposure Limits: GM Occupational Exposure Guidelines (OEG) and State-TWA's were provided by General Motors.