File No: STD/1573

March 2016

NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME (NICNAS)

PUBLIC REPORT

2-Propanol, 1,1'-[(2-hydroxyethyl)imino]bis-

This Assessment has been compiled in accordance with the provisions of the *Industrial Chemicals (Notification and Assessment) Act 1989* (the Act) and Regulations. This legislation is an Act of the Commonwealth of Australia. The National Industrial Chemicals Notification and Assessment Scheme (NICNAS) is administered by the Department of Health, and conducts the risk assessment for public health and occupational health and safety. The assessment of environmental risk is conducted by the Department of the Environment.

This Public Report is available for viewing and downloading from the NICNAS website or available on request, free of charge, by contacting NICNAS. For requests and enquiries please contact the NICNAS Administration Coordinator at:

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Director
NICNAS

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SUMMARY

The following details will be published in the NICNAS *Chemical Gazette:*

ASSESSMENT REFERENCE	APPLICANT(S)	CHEMICAL OR TRADE NAME	HAZARDOUS CHEMICAL	INTRODUCTION VOLUME	USE
STD/1573	Grace (Australia) Pty Ltd	2-Propanol, 1,1'-[(2-hydroxyethyl)imino]bis-	Yes	<80 tonnes per annum	Cement additive

CONCLUSIONS AND REGULATORY OBLIGATIONS

Hazard classification
Based on the available information, the notified chemical is recommended for hazard classification according to the *Globally Harmonised System of Classification and Labelling of Chemicals (GHS),* as adopted for industrial chemicals in Australia. The recommended hazard classification is presented in the following table.

Hazard classification	*Hazard statement*
Skin corrosion/irritation (Category 2)	H315 – Causes skin irritation
Serious eye damage/eye irritation (Category 2A)	H319 – Causes serious eye irritation
Specific target organ toxicity, single exposure; Respiratory tract irritation (Category 3)	H335 – May cause respiratory irritation

Based on the available information, the notified chemical is recommended for hazard classification according to the *Approved Criteria for Classifying Hazardous Substances* (NOHSC, 2004), with the following risk phrase(s):
R37/38: Irritating to respiratory system and skin.

Human health risk assessment
Under the conditions of the occupational settings described, the notified chemical is not considered to pose an unreasonable risk to the health of workers.

When used in the proposed manner, the notified chemical is not considered to pose an unreasonable risk to public health.

Environmental risk assessment
On the basis of the reported use pattern and limited expected aquatic release, the notified chemical is not considered to pose an unreasonable risk to the environment.

Recommendations

CONTROL MEASURES

Occupational Health and Safety

- A person conducting a business or undertaking at a workplace should implement the following safe work practices to minimise occupational exposure during handling of the notified chemical as introduced (at 86% concentration) and as diluted for use, in the product cement admixture at up to 25%:
  - Avoid contact with skin and eyes
  - Avoid dust in eyes during bagging and dispensing
  - Avoid inhalation of dust during bagging and dispensing of cement

- A person conducting a business or undertaking at a workplace should ensure that the following personal protective equipment is used by workers to minimise occupational exposure to the notified chemical as introduced (at 86% concentration) and as diluted for use, in the product cement admixture at up to 25%:
  - Gloves

- Eye protection
- Respiratory protection when dust is likely generated
- Enclosed shoes

Guidance in selection of personal protective equipment can be obtained from Australian, Australian/New Zealand or other approved standards.

- Preventive measures should be taken to avoid formation of carcinogenic nitrosamine. The following measures should be taken regarding handling of the notified chemical:
  - Do not use sodium nitrite or other nitrosating agents in formulations containing the notified chemical.

- A copy of the (M)SDS should be easily accessible to employees.

- If products and mixtures containing the notified chemical are classified as hazardous to health in accordance with the *Globally Harmonised System of Classification and Labelling of Chemicals (GHS)* as adopted for industrial chemicals in Australia, workplace practices and control procedures consistent with provisions of State and Territory hazardous substances legislation should be in operation.

Disposal

- Where reuse or recycling are not appropriate, dispose of the notified chemical in an environmentally sound manner in accordance with relevant Commonwealth, state, territory and local government legislation.

Storage

- The handling and storage of the notified chemical should be in accordance with the Safe Work Australia Code of Practice for *Managing Risks of Hazardous Chemicals in the Workplace* (SWA, 2012) or relevant State or Territory Code of Practice.

Emergency procedures

- Spills or accidental release of the notified chemical should be handled by containment, physical collection and subsequent safe disposal.

Regulatory Obligations

Secondary Notification
This risk assessment is based on the information available at the time of notification. The Director may call for the reassessment of the chemical under secondary notification provisions based on changes in certain circumstances. Under Section 64 of the *Industrial Chemicals (Notification and Assessment) Act (1989)* the notifier, as well as any other importer or manufacturer of the notified chemical, have post-assessment regulatory obligations to notify NICNAS when any of these circumstances change. These obligations apply even when the notified chemical is listed on the Australian Inventory of Chemical Substances (AICS).

Therefore, the Director of NICNAS must be notified in writing within 28 days by the notifier, other importer or manufacturer:

(1) Under Section 64(2) of the Act; if
  - the function or use of the chemical has changed from a cement additive, or is likely to change significantly;
  - the amount of chemical being introduced has increased, or is likely to increase, significantly;
  - the chemical has begun to be manufactured in Australia;
  - additional information has become available to the person as to an adverse effect of the chemical on occupational health and safety, public health, or the environment.

The Director will then decide whether a reassessment (i.e. a secondary notification and assessment) is required.

No additional secondary notification conditions are stipulated.

(Material) Safety Data Sheet
The (M)SDS of the notified chemical provided by the notifier was reviewed by NICNAS. The accuracy of the information on the (M)SDS remains the responsibility of the applicant.

ASSESSMENT DETAILS

1. APPLICANT AND NOTIFICATION DETAILS

APPLICANT(S)
Grace (Australia) Pty. Ltd (ABN: 41 080 660 117)
14 Colebard Street West,
ARCHERFIELD QLD 4108

NOTIFICATION CATEGORY
Standard: Chemical other than polymer (more than 1 tonne per year).

EXEMPT INFORMATION (SECTION 75 OF THE ACT)
Data items and details claimed exempt from publication: analytical data, degree of purity, use details, manufacture/import volume and site of manufacture/reformulation.

VARIATION OF DATA REQUIREMENTS (SECTION 24 OF THE ACT)
Variation to the schedule of data requirements is claimed for all physico-chemical endpoints.

PREVIOUS NOTIFICATION IN AUSTRALIA BY APPLICANT(S)
None

NOTIFICATION IN OTHER COUNTRIES
TSCA (2015), NDSL (1998), EU (2009), ECL (2012) and PICCS (2010).

2. IDENTITY OF CHEMICAL

MARKETING NAME(S)
EDIPA (product containing the notified chemical at 86%)

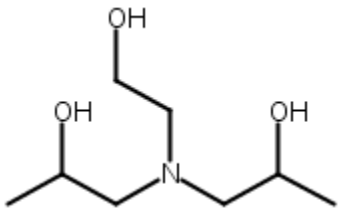
CAS NUMBER
10353-86-3

CHEMICAL NAME
2-Propanol, 1,1'-[(2-hydroxyethyl)imino]bis-

OTHER NAME(S)
1,1'-[(2-Hydroxyethyl)imino]dipropan-2-ol
Di-(2-hydroxypropyl)-ethanolamine
Diisopropanolethanolamine
N,N-Bis(2-hydroxypropyl)-2-aminoethanol
N,N-Bis(2-hydroxypropyl)-*N*-(hydroxyethyl)amine
N,N-Bis(2-hydroxypropyl)ethanolamine

MOLECULAR FORMULA
$C_8H_{19}NO_3$

STRUCTURAL FORMULA



MOLECULAR WEIGHT
177.24

ANALYTICAL DATA
Reference IR spectra was provided.

3. COMPOSITION

DEGREE OF PURITY
> 95%

HAZARDOUS IMPURITIES/RESIDUAL MONOMERS
None

NON HAZARDOUS IMPURITIES/RESIDUAL MONOMERS (> 1% BY WEIGHT)
None

ADDITIVES/ADJUVANTS

Chemical Name	Water		
CAS No.	7732-18-5	*Weight %*	14%

4. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE AT 20 °C AND 101.3 kPa: Clear liquid.

Property	Value	Data Source/Justification
Melting Point/Freezing Point	Expected to be < 0 °C	Estimated
Boiling Point	328.2 °C at 101.3 kPa	(M)SDS
Density	1055 kg/m^3 at 20 °C	(M)SDS
Vapour Pressure	2.23 × 10^{-7} kPa at 25 °C	Calculated (MPBVP EPIWEB v4.11; US EPA, 2011)
Water Solubility	1 × 10^3 g/L at 25 °C	Calculated (WSKOW v1.42; US EPA, 2011). The notified chemical is considered completely water soluble based on the modelling result, and is consistent with the hydrophilicity of the chemical based on its molecular structure.
Hydrolysis as a Function of pH	Not determined	Contains no hydrolysable functionalities.
Partition Coefficient (n-octanol/water)	log Pow = -1.64	Calculated (KOWWIN v1.68; US EPA, 2011)
Adsorption/Desorption	log K_{oc} = -0.87	Calculated (KOCWIN v2.00; US EPA, 2011)
Dissociation Constant	pKa = 14.5 ± 0.5 (strongest acid) pKa = 7.8 ± 0.4 (strongest base)	Calculated (ACD/I-Lab v2.0). Expected to be ionised under environmental conditions (pH 4-9).
Flash Point	170.9 ± 21.0 °C	Calculated (ACD/Labs v11.02)
Flammability	Not determined	Not expected to be flammable based on flash point.
Autoignition Temperature	Not determined	Not performed due to its boiling point
Explosive Properties	Not determined	Not expected to have explosive properties based on structure.
Oxidising Properties	Not determined	Not expected to have oxidising properties based on structure.

DISCUSSION OF PROPERTIES
For full details of tests on physical and chemical properties, refer to Appendix A.

Reactivity
The notified chemical is expected to be stable under normal conditions of use.

Physical hazard classification
Based on the submitted physico-chemical data depicted in the above table, the notified chemical is not recommended for hazard classification according to the *Globally Harmonised System of Classification and Labelling of Chemicals (GHS),* as adopted for industrial chemicals in Australia.

5. INTRODUCTION AND USE INFORMATION

MODE OF INTRODUCTION OF NOTIFIED CHEMICAL (100%) OVER NEXT 5 YEARS
The notified chemical will be imported in an aqueous solution at a concentration of 86%.

MAXIMUM INTRODUCTION VOLUME OF NOTIFIED CHEMICAL (100%) OVER NEXT 5 YEARS

Year	*1*	*2*	*3*	*4*	*5*
Tonnes	10-80	10-80	10-80	10-80	10-80

PORT OF ENTRY
Melbourne, Sydney and Brisbane

TRANSPORTATION AND PACKAGING
The notified chemical will not be manufactured in Australia. It will be imported at 86% concentration in 1,200 kg IBCs and transported by road to the notifier warehouses for storage. The reformulated cement admixture containing up to 25% concentration of the notified chemical will be transported by road to cement producers in 1,000 L bulk tanks or 205 L plastic drums. Finished cement containing the notified chemical at < 0.015% will be transported by road, rail or sea to concrete production facilities, industrial customers or to construction sites.

USE
The notified chemical will be used as a component of a cement additive. Initially, the notified chemical will be used in the manufacture of cement admixtures which will contain up to 25% concentration of the notified chemical. These will be mixed with cement (at up to 0.015% notified chemical) and subsequently used to manufacture concrete (containing up to 0.007% of the notified chemical).

OPERATION DESCRIPTION
Cement admixture production
The imported notified chemical (at 86% concentration) will be moved from warehouses to the formulation site, where it will be weighed on scales then pumped to a closed mixing vessel. The notified chemical will be blended with other ingredients to produce the cement admixture at up to 25% concentration of the notified chemical. At the end of the blending process, a sample of the admixture will be taken for quality control testing.

The admixture will then be transferred via pipeline into bulk storage tanks and subsequently into tanker trucks or totes. The mixing vessel and fill lines will be cleaned by flushing the system with water and the residues collected for re-use in later production.

Cement production
At the production plants (Grace customers' sites), the admixture containing up to 25% notified chemical will be mixed with other cement components (to form a grinding aid) and applied to the raw cement materials either on the conveyer belt or directly into the cement mill. The raw materials are ground to produce the finished powdered cement containing < 0.015% notified chemical. The cement will be packaged and transported to concrete production facilities, industrial customers and construction sites.

Concrete production
The cement (< 0.015% notified chemical) will be mixed with other materials (such as sand or water) to produce concrete containing < 0.007% notified chemical within a mixing drum. The concrete will be pumped or gravity fed to the construction area, where workers will shovel and rake fresh concrete and finish the surface with vibrators, trowels and possibly a "helicopter" finishing tool.

6. HUMAN HEALTH IMPLICATIONS

6.1. Exposure Assessment

6.1.1. Occupational Exposure

CATEGORY OF WORKERS

Category of Worker	*Exposure Duration (hours/day)*	*Exposure Frequency (days/year)*
Cement admixture production		
Plant operator	2	20
Truck driver	2	20
Quality Control	1	20
Supervisor	1	20
Salesman	4	20
Cement production		
Process engineers	2	30
Lab technician	1	30
Maintenance fitter	1	30
Mill workers	8	30
Concrete production		
Quality control	4	30
Labourer	4	240
Truck driver	4	240
Placing & finishing crew	8	240
Technician - concrete testing	6	100

EXPOSURE DETAILS

Cement admixture production

During cement admixture formulation, exposure to the imported notified chemical (at 86% concentration) will mainly be via the dermal route with possibility of ocular and inhalation exposure when connecting and disconnecting transfer pumps, collecting samples for quality control testing and during cleaning of mixing vessels and fill lines. Exposure is expected to be reduced through the use of automated pumping and mixing systems, local exhaust ventilation and personal protective equipment (PPE) such as gloves, protective clothing and eye protection.

Cement production

At the production plants, possible dermal and ocular exposure to the admixture containing up to 25% notified chemical may occur during mixing process (with other cement components) and during grinding processes (inside a mill at 80 to 200 °C) to produce finished powdered cement containing < 0.015% notified chemical. Inhalation exposure to powdered finished cement could occur during packaging/bagging of cement. The level of exposure will be reduced by the use of bag filters or electrostatic precipitators to collect dust during transfer.

Concrete production and use

The main route of exposure of workers to the notified chemical (< 0.015% notified chemical) during the concrete production process will be dermal. Dermal exposure to wet concrete containing < 0.007% notified chemical may also occur during use of concrete in construction and other industries. Inhalation of the cement dust may occur when mixing and transferring of the powder with other materials.

6.1.2. Public Exposure

The unreformulated notified chemical will not be sold to the general public. The public may have dermal, ocular and inhalation exposure to cement containing the notified chemical at concentrations of < 0.015% and also from contact with the cured concrete containing < 0.007% notified chemical.

6.2. Human Health Effects Assessment

No toxicity data were submitted on the notified chemical. The analogue ethanol, 2,2',2"-nitrilotris- (CAS number: 102-71-6) was used to estimate the toxicity of the notified chemical.

Toxicokinetics, metabolism and distribution.
No information on the toxicokinetics of the notified chemical was provided. For dermal absorption, molecular weights below 100 Da. are favourable for absorption and molecular weights above 500 Da. do not favour absorption (ECHA, 2014). Water solubility above 10,000 mg/L and log P values < –1 suggest that a substance is not likely to be sufficiently lipophilic to cross the stratum corneum, and therefore dermal absorption may be low (ECHA, 2014). Therefore, dermal absorption of the notified chemical may occur based on its low molecular weight and liquid physical state, though absorption may be limited by its poor lipophilicity. The analogue ethanol, 2,2',2"-nitrilotris- has been shown to be readily absorbed through the gastrointestinal tract and the skin of animals (NICNAS).

Acute toxicity.
The analogue ethanol, 2,2',2"-nitrilotris- was of low acute toxicity in animal tests following oral, dermal and inhalation exposure (NICNAS).

Irritation and sensitisation.
The analogue ethanol, 2,2',2"-nitrilotris- is considered to be a skin irritant (based on observations in humans), an eye irritant and a respiratory irritant (NICNAS).

The analogue ethanol, 2,2',2"-nitrilotris- showed no evidence of skin sensitisation in several guinea pig maximisation tests and one local lymph node assay (NICNAS).

Repeated dose toxicity.
The analogue ethanol, 2,2',2"-nitrilotris- was of low toxicity following repeated oral exposure (NICNAS). Systemic renal effects were observed in female rats only in a 90 day repeated dose dermal toxicity study with the NOAEL determined to be 250 mg/kg bw/day (NICNAS).

The analogue ethanol, 2,2',2"-nitrilotris- caused irritation of the upper respiratory tract (larynx) (NICNAS).

Mutagenicity/Genotoxicity/Carcinogenicity.
The analogue ethanol, 2,2',2"-nitrilotris- was not considered to be genotoxic based on the *in vitro* and *in vivo* genetoxicity studies, and did not warrant carcinogenicity hazard classification (NICNAS).

As a tertiary amine, under certain conditions, the notified chemical may indirectly give rise to the formation of nitrosamines that are potent carcinogens (CIR, 2011; SCCS, 2012). However, the potential for nitrosamine formation is significantly less when compared with secondary amines such as diethanolamine.

Toxicity for reproduction.
The available data did not warrant a hazard classification for reproductive or developmental toxicity (NICNAS).

Health hazard classification
Based on the available information, the notified chemical is recommended for hazard classification according to the *Globally Harmonised System of Classification and Labelling of Chemicals (GHS),* as adopted for industrial chemicals in Australia. The recommended hazard classification is presented in the following table.

Hazard classification	***Hazard statement***
Skin corrosion/irritation (Category 2)	H315 – Causes skin irritation
Serious eye damage/eye irritation (Category 2A)	H319 – Causes serious eye irritation
Specific target organ toxicity, single exposure; Respiratory tract irritation (Category 3)	H335 – May cause respiratory irritation

Based on the available information, the notified chemical is recommended for hazard classification according to the *Approved Criteria for Classifying Hazardous Substances* (NOHSC, 2004), with the following risk phrase(s):

R37/38: Irritating to respiratory system and skin.

6.3. Human Health Risk Characterisation

6.3.1. Occupational Health and Safety

Toxicological studies on the analogue chemical ethanol, 2,2',2"-nitrilotris- indicate that the notified chemical may be a skin, eye and respiratory irritant. Therefore, the notified chemicals use is only considered to be reasonable when sufficient engineering controls, safe work practices and personal protective equipment (PPE) are used to reduce the potential for exposure.

During cement admixture formulation and cement production worker exposure to the notified chemical at 86% and 25% concentrations respectively will be minimised by the use of automated pumping and mixing systems, the use of engineering controls (local ventilation) and the use of PPE (gloves, safety glasses, respiratory protection and enclosed shoes).

During the cement production and end use of the concrete products, worker exposure will be limited by the low concentrations of the notified chemical present in these products (< 0.015% and < 0.007% respectively) and further minimised by the use of PPE. Adverse effects arising from exposure to the notified chemical are not expected at these low concentrations. Potential inhalation exposure to powdered finished cement containing < 0.015% notified chemical during bagging of cement will be minimised by the use of bag filters or electrostatic precipitators.

Therefore, the risk to workers from use of the notified chemical is not considered to be unreasonable.

6.3.2. Public Health

The unreformulated notified chemical will not be sold to the general public. The public may have dermal, ocular and inhalation exposure to cement containing the notified chemical at concentrations of < 0.015% and also from contact with the cured concrete containing < 0.007% notified chemical. Adverse effects arising from exposure to the notified chemical are not expected at these low concentrations.

Therefore, the risk to the public from exposure to the concrete containing the notified chemical is not considered to be unreasonable.

7. ENVIRONMENTAL IMPLICATIONS

7.1. Environmental Exposure & Fate Assessment

7.1.1. Environmental Exposure

RELEASE OF CHEMICAL AT SITE

The notified chemical will be imported into Australia for use as a component of cement. There is unlikely to be any significant release to the environment from transport and storage, except in the case of accidental spills and leaks. In the event of spills, the product containing the notified chemical is expected to be collected with inert material, and disposed of to landfill in accordance with local government regulations.

The cement additive containing the notified chemical is supplied in bulk, and minor releases may occur during the transfer of the additive from the tanker truck to storage tanks. Once the additive containing the notified chemical is incorporated into the powdered cement products, potential release is expected to be low as the notified chemical is expected to bind strongly in the cement. It is estimated by the notifier that release of the notified chemical from accidental spills and leaks, transport, and reformulation is expected to be less than 1% (or up to 800 kg) of the import volume.

RELEASE OF CHEMICAL FROM USE

The majority of the notified chemical will be used in cement admixtures for the production of concrete. Release to the environment is expected to be minimal at concrete contractor sites, where workers will shovel, rake, consolidate, and trowel-finish the wet concrete containing the notified chemical. Once cured, the notified chemical will be irreversibly bound within an inert concrete matrix, and is expected to share the fate of the concrete.

RELEASE OF CHEMICAL FROM DISPOSAL

The notified chemical in cement admixtures is expected to share the fate of the concrete within which it is bound, and is predominantly expected to be disposed of to landfill at the end of its useful life.

Wastes containing the notified chemical include equipment wash water, empty packaging, container residues, old concrete, and spilt materials. Residues on concrete application equipment are expected to be rinsed, and the wash water collected and allowed to cure before disposal as solid wastes to landfill. As a worst case scenario, a minor amount of the notified chemical may be disposed of to the sewer from washing of application equipment. Empty packaging, residues, old concrete, and spilt materials will be disposed of as builder's rubble in accordance with local government regulations, most likely to landfill.

7.1.2. Environmental Fate

No environmental fate data were submitted for the notified chemical. The majority of the notified chemical is expected to be cured within an inert concrete matrix and is expected to share the fate of the concrete, which will involve eventual disposal to landfill. The notified chemical is also expected to enter landfill as collected wastes and residues. Once cured, the notified chemical is not expected to be bioavailable nor biodegradable.

An estimate of the biodegradability of the notified chemical has been calculated using BIOWIN v4.10 (US EPA, 2011). Based on its molecular structure, the notified chemical is expected to be readily biodegradable. The notified chemical is not expected to be bioaccumulative, based on its high water solubility and low calculated partition coefficient (log P_{OW} = -1.46). This is supported by the low bioconcentration factor (BCF = 3.16), calculated using BCFBAF v3.01 (US EPA, 2011). Based on its calculated adsorption coefficient (log K_{OC} = -0.87), release to surface waters is expected to occur as partitioning to sludge and sediment is not expected under environmental pH. In surface waters and in landfill, the notified chemical is expected to eventually degrade via biotic and abiotic processes to form water and oxides of carbon and nitrogen.

7.1.3. Predicted Environmental Concentration (PEC)

The predicted environmental concentration (PEC) has not been calculated, since significant release of the notified chemical to the aquatic environment is not expected from the reported use pattern.

7.2. Environmental Effects Assessment

No ecotoxicity data were submitted for the notified chemical. The results from ecotoxicological investigations in fish and aquatic invertebrates conducted on the analogue ethanol, 2,2',2"-nitrilotris- were used to estimate the toxicity of the notified chemical. The result from a microbial respiration investigation is also available in the submitted SDS. These results are summarised in the table below. However, as the full study reports have not been provided for these data, these results should be treated with caution.

Ecotoxicological endpoints for the notified chemical were also calculated based on ecological structure activity relationship (ECOSAR v1.11; US EPA, 2012) equations. The acute and chronic endpoints are summarised in the table below.

Endpoint	*Result*	*Assessment Conclusion*
Fish Toxicity*	96 h LC50 = 1,180 mg/L	Not harmful to fish
Daphnia Toxicity*	48 h EC50 = 610 mg/L	Not harmful to aquatic invertebrates
Inhibition of Bacterial Respiration[#]	3 h IC50 > 1,000 mg/L	Not inhibitory to microbial respiration
ECOSAR Predictions		
Acute Toxicity		
Fish	96 h LC50 = 8397.442 mg/L	Not predicted to be harmful to fish (acute)
Daphnia	48 h EC50 = 655.513 mg/L	Not predicted to be harmful to aquatic invertebrates (acute)
Algae	96 h EC50 = 1249.705 mg/L	Not predicted to be harmful to algae (acute)
Chronic Toxicity		
Fish	ChV = 1776.567 mg/L	Not predicted to be harmful to fish (chronic)
Daphnia	ChV = 35.679 mg/L	Not predicted to be harmful to aquatic invertebrates (chronic)
Algae	ChV = 305.759 mg/L	Not predicted to be harmful to algae (chronic)

* Study conducted on the analogue ethanol, 2,2',2"-nitrilotris- (US EPA, 1014).
# From the SDS for the notified chemical

Based on the above ecotoxicological endpoints for the analogue ethanol, 2,2',2"-nitrilotris-, and therefore the notified chemical, it is not expected to be harmful to aquatic life. This is supported by the ECOSAR estimations which show the notified chemical is not predicted to be harmful to aquatic life on both an acute and chronic basis. Therefore, the notified chemical is not formally classified under the Globally Harmonised System of Classification and Labelling of Chemicals (GHS) (United Nations, 2009) for acute and chronic toxicities.

7.2.1. Predicted No-Effect Concentration

The predicted no-effects concentration (PNEC) has been calculated from the most sensitive endpoint for *Daphnia*. A safety factor of 1,000 was used given only two endpoints are available for the analogue, and only modelled endpoints are available for the notified chemical.

Predicted No-Effect Concentration (PNEC) for the Aquatic Compartment		
ChV (*Daphnia*, 21 d)	35.679	mg/L
Assessment Factor	1,000	
Mitigation Factor	1.00	
PNEC:	35.679	µg/L

7.3. Environmental Risk Assessment

The risk quotient (Q = PEC/PNEC) of the notified chemical has not been calculated, since the PEC was not calculated due to its low potential for release to the aquatic compartment. When used as a component of cement admixtures, the notified chemical will be irreversibly bound within the inert concrete matrix, and is not likely to be released into the aquatic environment in a bioavailable form. The notified chemical is predicted to be readily biodegradable, and is expected to have a low potential for bioaccumulation based on the low calculated log P_{OW} and bioconcentration factor. Therefore, on the basis of its limited aquatic exposure, low predicted toxicity to aquatic organisms, and assessed use pattern, the notified chemical is not expected to pose an unreasonable risk to the environment.

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