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**NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME  
(NICNAS)**

**FULL PUBLIC REPORT**

**Polymer in Viscoplex® 9-320**

This Assessment has been compiled in accordance with the provisions of the *Industrial Chemicals (Notification and Assessment) Act 1989* (Cwlth) (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 Ageing, 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 and Heritage.

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**Director  
NICNAS**

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**FULL PUBLIC REPORT****Polymer in Viscoplex® 9-320****1. APPLICANT AND NOTIFICATION DETAILS**

## APPLICANT(S)

Degussa Australia Pty Ltd (ABN 16 079 823 313)  
30 Commercial Dr.  
Dandenong VIC 3175

## NOTIFICATION CATEGORY

Polymer of Low Concern

## EXEMPT INFORMATION (SECTION 75 OF THE ACT)

Data items and details claimed exempt from publication:

Chemical Name, Other Names, CAS Number, Molecular and Structural Formulae, Molecular Weight, Polymer Constituents, Residual Monomers/Impurities, Means of Identification, Specific Uses, and Import Volume

## VARIATION OF DATA REQUIREMENTS (SECTION 24 OF THE ACT)

No variation to the schedule of data requirements is claimed.

## PREVIOUS NOTIFICATION IN AUSTRALIA BY APPLICANT(S)

None

## NOTIFICATION IN OTHER COUNTRIES

USA 2005; Korea 2006; Philippines 2006

**2. IDENTITY OF CHEMICAL**

## MARKETING NAME(S)

Viscoplex® 9-320

## MOLECULAR WEIGHT (MW)

Number Average Molecular Weight (Mn) >10000

## REACTIVE FUNCTIONAL GROUPS

None

**3. PLC CRITERIA JUSTIFICATION**

<i>Criterion</i>	<i>Criterion met (yes/no/not applicable)</i>
Molecular Weight Requirements	Yes
Functional Group Equivalent Weight (FGEW) Requirements	Yes
Low Charge Density	Yes
Approved Elements Only	Yes
Stable Under Normal Conditions of Use	Yes
Not Water Absorbing	Yes
Not a Hazard Substance or Dangerous Good	Yes

The notified polymer meets the PLC criteria.

#### 4. PHYSICAL AND CHEMICAL PROPERTIES

<b>Appearance at 20°C and 101.3 kPa</b>	Rubber-like solid
<b>Melting Point/Glass Transition Temp</b>	Approximately 50 °C (expected to be a broad range)
<b>Density</b>	~ 950 kg/m <sup>3</sup> (estimated)
<b>Water Solubility</b>	~ 6×10 <sup>-3</sup> g/L at 20°C. Tests were also conducted at pH 2, 7 and 9 with the pH 7 test conducted at 37°C. (OECD TG 120) The results ranged from 4-5 × 10 <sup>-3</sup> g/L. The test was conducted on extractable dissolved organic carbon and expressed as the test item.
<b>Dissociation Constant</b>	Not applicable
<b>Particle Size</b>	Not applicable (rubber-like solid)
<b>Reactivity</b>	Stable unless heated to temperatures above 200 °C. Contains hydrolysable groups but unlikely to undergo hydrolysis except under extreme pH and temperature conditions.
<b>Degradation Products</b>	Stable under normal conditions. Will thermally degrade above 200°C to H <sub>2</sub> O, CO <sub>2</sub> and traces of SO <sub>2</sub> .

#### 5. INTRODUCTION AND USE INFORMATION

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

<i>Year</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>
<i>Tonnes</i>	1-3	3-10	10-30	10-30	10-30

##### USE AND MODE OF INTRODUCTION AND DISPOSAL

###### Mode of Introduction

The notified polymer is not manufactured in Australia. It is imported as highly viscose solutions (at a concentration of >60%) in petroleum solvents. It will be imported by sea into Melbourne in drums (175 kg) or bulk containers. It is then transported by road either to the customers' or Degussa Australia's storage facilities. No repackaging occurs before end uses.

###### Use

The notified polymer is used in crude oil refining. At the oil refineries, a sealed delivery system is used to transfer VISCOPLEX® 9-320 from drums or bulk containers to blending vessels and mix with other ingredients in an enclosed system before being dosed into feed stock lines (at dose of 0.01 to 0.1%) for crude oil refining. The whole process is automated and computer-controlled, except maintenance and equipment cleaning. The end products of the refining process include mineral oil (which contains only negligible amounts of the notified polymer) and paraffin wax containing <0.16% of the notified polymer. Paraffin wax with oil content of approximately 10% is packaged and transported in drums or containers, whilst those with lower oil content may be packaged and transported in sacks.

The resulting paraffin wax will be used by a number of industries including the paper and packaging, construction and isolation, and corrosion protection industries. It is also used in manufacturing consumer products such as candles, tarpaulins, and polishes.

###### *Use of waxes in the paper and packaging industry*

The resulting paraffin waxes containing <0.16% of the notified polymer are used to impregnate, laminate or coat different paper stocks. Depending on the application requirements, these wax coatings may be applied directly or further blended with other additives before application. Wax emulsion can

also act as sizing agents in news- and magazine paper and pulp production.

*Use of waxes in the construction and isolation industry*

The resulting paraffin waxes are used as auxiliaries for concrete surfaces, residential construction, ceramic industry, sintering aid, lubricating and processing aid, and insulation materials.

*Use of waxes in the corrosion protection industry*

The resulting paraffin waxes are used for the production of solvent- or water-based corrosion protection compounds. These products may be blended with synthetic polymers, resins, and/or combined with anti-corrosion agents.

*Use of waxes in manufacture of consumer products*

The resulting paraffin waxes containing <0.16% of the notified polymer are used for the production of consumer products such as candles, tarpaulins, and polishes. The concentration of the notified polymer in these end products will be much below 0.1%.

## 6. HUMAN HEALTH IMPLICATIONS

### 6.1. Exposure Assessment

#### OCCUPATIONAL EXPOSURE

Dermal and ocular exposure may potentially occur during use of VISCOPLEX® 9-320 in oil refining processes involving the notified polymer. However, exposure to significant amounts of the notified polymer is limited because of the fully automated processes, the engineering controls and personal protective equipment worn by workers.

Worker's exposure during use of resulting paraffin wax products is also limited due to the low concentration of the notified polymer, in addition to possible automated processes and use of engineering controls and personal protective equipment.

#### PUBLIC EXPOSURE

Since the notified polymer will be in products sold to the general public, there is the potential for dermal, and to a much lesser extent oral exposure. However, exposure is likely to be significantly limited due to the very low concentrations of the notified polymer.

### 6.2. Toxicological Hazard Characterisation

The notified polymer meets the PLC criteria and can therefore be considered to be of low hazard. This is supported by genotoxicity studies conducted on the low molecular weight fraction of the notified polymer (Oligomer I) and on an analogue oligomer (Oligomer II). No indication of mutagenic activity was found in the Bacterial Reverse Mutation Test (OECD 471) conducted on Oligomer I and Oligomer II, or the chromosomal aberration assay *in vitro* (OECD 473) conducted on Oligomer I.

<i>Endpoint</i>	<i>Test Substance</i>	<i>Result</i>	<i>Classified?</i>	<i>Effects Observed?</i>	<i>Test Guideline</i>
Genotoxicity - bacterial reverse mutation	Oligomer I	non mutagenic	no	no	OECD TG 471
Genotoxicity - bacterial reverse mutation	Oligomer II	non mutagenic	no	no	OECD TG 471
Genotoxicity – in vitro chromosome aberration	Oligomer I	non genotoxic	no	no	OECD TG 473

In addition, an expert opinion summarising toxicological data for four polymers similar to the notified polymer, with lower molecular weight, was submitted. By analogy, it was concluded that the notified polymer would be non-toxic by oral and dermal exposure, non-irritating to the skin, and slightly irritating to the eyes. In a 14 day repeat dose study one of the analogues was applied (10 applications total) to the skin of rabbits at 0, 0.25, 0.50, 1.00 g/kg bw/day. It did not produce any systemic effects but did produce moderate to severe irritation at all doses. The no observed effect level (NOEL) for toxicity was found to be > 1000 mg/kg/day.

All results were indicative of low hazard.

### 6.3. Human Health Risk Assessment

#### OCCUPATIONAL HEALTH AND SAFETY

The OHS risk presented by the notified polymer is expected to be low, based on the minimal exposure to workers and the low intrinsic hazard of the polymer.

#### PUBLIC HEALTH

The notified polymer will not be available to the public. Members of the public may make dermal contact with products containing the notified polymer. However, the risk to public health will be negligible because the notified polymer is of low hazard, and is present at low concentrations.

## 7. ENVIRONMENTAL IMPLICATIONS

### 7.1. Exposure Assessment

#### ENVIRONMENTAL RELEASE

The notified polymer is manufactured overseas and is imported as the ready to use product. The polymer is expected to be used at oil refineries. It is expected that steps such as using process fluid to remove residue from empty packaging and reuse of the process fluid, will occur. Any remaining residue (~0.1%; < 50 kg) is expected to be rinsed with solvent, which will then be recycled. The residues from recycling of solvents are expected to be incinerated or disposed of to authorised landfill. The empty packaging with minimal notified polymer remaining in the drums is expected to be sent to licensed drum recyclers.

During use the notified polymer is expected to partition to the paraffin wax, with negligible amounts partitioning to the oil phase. The polymer will then share the same fate as the paraffin wax.

#### ENVIRONMENTAL FATE

The likely products in which paraffin wax containing the notified polymer will be used are: paper and packaging; construction and isolation including lubricating and processing aids for investment casting and electrical insulation; corrosion protection; and consumer products such as candles, tarpaulins and polishes. These products will have a diverse fate depending on the wax's application. However, it is expected that ultimately the wax will be landfilled, incinerated, combusted during use, thermally decomposed during metal recycling, enter sewers from paper recycling or be widely dispersed throughout Australia during use. As the polymer has low water solubility, any present in sewage is likely to adsorb to the sludge during treatment. The polymer is expected to ultimately degrade to landfill gases such as methane, oxides of carbon, traces of hydrogen sulphide, oxides of sulphur; and water vapour. If combusted, the products are expected to be oxides of carbon, traces of oxides of sulphur; and water vapour.

### 7.2. Environmental Hazard Characterisation

The notified polymer meets the PLC criteria and can therefore be considered to be of low hazard. This is supported by environmental endpoints observed in testing conducted on an analogue polymer.

<i>Endpoint</i>	<i>Result</i>	<i>Effects Observed?</i>	<i>Test Guideline</i>
Fish Toxicity	EC50 > 1000 mg/L*	no	OECD TG 203
Daphnia Toxicity	EC50 > 1000 mg/L*	no	OECD TG 202

\* Studies conducted on Water Soluble Fraction (WSF) of nominal concentrations.

All results were indicative of low hazard. The analogue polymer has a hydroxyl group and different carbon chain lengths for its monomers when compared with the notified polymer.

### 7.3. Environmental Risk Assessment

The paraffin wax in which the polymer will be incorporated will have a wide range of uses and potential uses. A predicted environmental concentration (PEC) therefore cannot be readily calculated. However, it is still expected to be low. In particular, although some of the notified polymer when used in paraffin waxes may be discharged to sewer from the recycling of paper packaging, due to the polymer's low water solubility it is expected to adsorb to the sludge. Similarly some uses of paraffin wax may lead to environmental exposure (eg waxes for skis and waterproofing of equipment, etc). However, the notified polymer and paraffin wax in which it is incorporated are expected to be widely distributed, virtually immobile and are likely to eventually undergo in-situ degradation. Other uses for paraffin are unlikely to lead to environmental exposure with the paraffin wax being ultimately combusted or landfilled.

An analogue polymer showed no toxicity to fish or daphnia to the limits of its solubility.

Therefore the notified polymer does not pose an unacceptable risk to the environment.

## 8. CONCLUSIONS

### 8.1. Level of Concern for Occupational Health and Safety

There is No Significant Concern to occupational health and safety under the conditions of the occupational settings described.

### 8.2. Level of Concern for Public Health

There is No Significant Concern to public health when used in the proposed manner.

### 8.3. Level of Concern for the Environment

The polymer is not considered to pose a risk to the environment based on its reported use pattern.

## 9. MATERIAL SAFETY DATA SHEET

### 9.1. Material Safety Data Sheet

The notifier has provided MSDS as part of the notification statement. The accuracy of the information on the MSDS remains the responsibility of the applicant.

## 10. RECOMMENDATIONS

### CONTROL MEASURES

#### Occupational Health and Safety

- No specific engineering controls, work practices or personal protective equipment are required for the safe use of the notified polymer itself, however, these should be selected on the basis of all ingredients in the formulation.

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

- A copy of the MSDS should be easily accessible to employees.
- If products and mixtures containing the notified polymer are classified as hazardous to health in accordance with the NOHSC *Approved Criteria for Classifying Hazardous Substances*, workplace practices and control procedures consistent with provisions of State and Territory hazardous substances legislation must be in operation.

#### Environment

#### Disposal

- The notified polymer should be disposed of by authorised incineration or landfill.

#### Emergency procedures

- Spills and/or accidental release of the notified polymer should be handled by covering with damp absorbent (sand, soil, vermiculite, inert material, etc). Physically collect material by shovelling, sweeping or vacuuming, whilst avoiding dust generation. Seal in labelled containers for disposal.

#### 10.1. Secondary Notification

The Director of Chemicals Notification and Assessment must be notified in writing within 28 days by the notifier, other importer or manufacturer:

- (1) Under subsection 64(1) of the Act; if
  - the notified polymer is introduced in a chemical form that does not meet the PLC criteria.

or

- (2) Under subsection 64(2) of the Act:
  - if any of the circumstances listed in the subsection arise.

The Director will then decide whether secondary notification is required.