

File No: NA/394

Date: 3 September 1996

**NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION  
AND ASSESSMENT SCHEME**

**FULL PUBLIC REPORT**

**Vinyl Copolymer**

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 Worksafe Australia which also conducts the occupational health & safety assessment. The assessment of environmental hazard is conducted by the Department of the Environment, Sport, and Territories and the assessment of public health is conducted by the Department of Health and Family Services.

For the purposes of subsection 78(1) of the Act, copies of this full public report may be inspected by the public at the Library, Worksafe Australia, 92-94 Parramatta Road, Camperdown NSW 2050, between the hours of 10.00 a.m. and 12.00 noon and 2.00 p.m. and 4.00 p.m. each week day except on public holidays.

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Director  
Chemicals Notification and Assessment

**FULL PUBLIC REPORT****Vinyl Copolymer****1. APPLICANT**

3M Australia Pty Ltd of 2-74 Dunheved Circuit ST MARYS NSW 2760 has submitted a limited notification statement in support of their application for an assessment certificate for Vinyl Copolymer.

**2. IDENTITY OF THE CHEMICAL**

Vinyl Copolymer is not considered to be hazardous based on the nature of the chemical and the data provided. Therefore the chemical name, chemical abstract service number, molecular and structural formulae, composition of the chemical including purity, methods of detection and determination and spectral data have been exempted from publication in the Full Public Report and the Summary Report.

**Trade Name:** Vinyl Copolymer

**Method of Detection  
and Determination:** not available

**Spectral Data:** not available

**3. PHYSICAL AND CHEMICAL PROPERTIES**

**Appearance at 20°C  
and 101.3 kPa:** clear colourless liquid

**Boiling Point:** 400°C (at 760 mm Hg)

**Density:** 1060 kg/m<sup>3</sup>

**Vapour Pressure:** < 0.1 mm Hg at 60°C

**Water Solubility:** not determined but expected to be low

**Partition Co-efficient  
(n-octanol/water):** not determined

**Hydrolysis as a Function**

<b>of pH:</b>	not determined due to low water solubility
<b>Adsorption/Desorption:</b>	not determined
<b>Dissociation Constant:</b>	not determined
<b>Flash Point:</b>	110°C
<b>Flammability Limits:</b>	not flammable
<b>Autoignition Temperature:</b>	not determined
<b>Explosive Properties:</b>	not explosive
<b>Reactivity/Stability:</b>	not reactive

### **Comments on Physico-Chemical Properties**

The amount of low molecular weight species was not determined, however a Size Exclusion Chromatography (SEC) report was provided for the notified polymer. It depicts a low polydispersity index ( $M_W/M_N = 1.18$ ), indicating the polymer to have a relatively narrow molecular weight distribution (1). It is therefore, likely that the percentage of species < 1000 to be relatively low. It is however not possible to estimate accurately from the SEC trace provided.

## **4. PURITY OF THE CHEMICAL**

<b>Degree of Purity:</b>	< 100%
<b>Additives/Adjuvants:</b>	none

## **5. USE, VOLUME AND FORMULATION**

The notified chemical will be imported into Australia as part of a two pack product used to protect concrete. Between 1-5 tonnes of the notified chemical will be imported per year for the first five years.

## **6. OCCUPATIONAL EXPOSURE**

The notified chemical will be imported in formulation at a concentration of between 10-30%, in US 5 gallon drums and handled by waterside workers during loading onto trucks for road transport to a warehouse facility. Two to five workers will potentially be exposed to the notified chemical 5 times per year for 2 to 3 hours per day.

Warehouse staff will store the formulation in a bunded warehouse until loaded onto

trucks for transport to customer facilities. This will entail potential exposure to two to five transport workers and six to ten warehouse workers ten times per year for 2 to 3 hours per day.

The notified chemical, as part of a two pack product, will be manually mixed with the other components by concrete repairers to initiate a curing process. Following mixing, the solution will be spread evenly over the concrete surface using a modified broom to spread the material. The mixing and spreading will potentially expose around three hundred concrete workers 100 to 200 times per year, for 6 to 8 hours per day.

## **7. PUBLIC EXPOSURE**

The notified polymer will not be sold to the public and is for industrial use only. The product containing the notified polymer is allowed to spread over the concrete surface where it penetrates into the concrete and cures to form a protective barrier. After curing, the notified polymer becomes inextricably bound in the resin matrix and does not migrate. Thus, while there may be public contact with concrete surfaces treated with the product containing the notified polymer, public exposure to the notified polymer itself will be negligible.

## **8. ENVIRONMENTAL EXPOSURE**

### **Release**

There is a potential for spillage during transport to and from the warehouse and to the customer's work site. The warehouse facility is bunded.

As stated above the polymer is Part A of a two part mix. During use Part B is added to Part A to initiate a curing process. The two parts are pre-proportioned so that the entire contents of both parts need to be added together to generate the sealant. The sealant is of relatively low viscosity and is expected to sorb into as well as fill chips and cracks in the degraded concrete surface. Curing begins upon mixing and goes to completion within a few hours. Environmental release as spillage during mixing, application or equipment washings will occur near the work area. No estimated volume of losses was given by the notifier.

Unused product will be fully cured as all of Part A will be mixed with Part B. Therefore the components of Part A will be in an immobile form. Unused cured sealant will be disposed of in containers to landfill.

### **Fate**

Volumes of uncured product containing the notified polymer released to the environment are expected to be low. Any amounts are expected to sorb to sediment.

The volume of released mixed product is not stated by the notifier. These amounts

could be quite high due to the method of application *ie* spread over the concrete surface using a modified broom, and the relatively low viscosity. However, when the two parts are mixed a curing process is initiated which goes to completion in a few hours and only local contamination would be expected. Once the mix is cured, the notified polymer is bound within the sealant.

The cured resin will be disposed of to landfill in containers, where it is likely to sorb to sediments and be immobile.

The notified substance is not likely to bioaccumulate in the environment because bioavailability will be limited due to the large molecular size (2).

Fate of the notified substance is linked to the disposal of the concrete onto which it is applied. The concrete rubble from building demolitions is usually directed to landfill or used as builder's fill where the cured resin is expected to remain immobile and not exhibit any leaching.

## **9. EVALUATION OF TOXICOLOGICAL DATA**

Toxicology data are not required for polymers of number-average molecular weight (NAMW) > 1000 according to the Act and no data were submitted for the notified polymer.

## **10. ASSESSMENT OF ENVIRONMENTAL EFFECTS**

No ecotoxicological data were provided, which is acceptable for polymers of NAMW > 1000 according to the Act.

The notified polymer is not expected to show ecotoxicity effects as it should not cross membranes and belongs to a class of polymers recognised as being of low concern (3).

## **11. ASSESSMENT OF ENVIRONMENTAL HAZARD**

The notified polymer is unlikely to present a hazard to the environment following mixing of the two pack system and application in the proper manner. In this case the product polymerises and the notified substance is bound in the polymer matrix of the concrete coating. Unused mixed product will be fully cured and disposed of to landfill.

Exposure to the environment could occur from spillages during storage or transport as a result of accident. Storage of the polymer is in a bunded warehouse. The product containing the notified polymer is expected to bond quickly to the soil or sediment present at the site of the spill. Addition of adsorbent material would immobilise the spill and allow collection and disposal.

## **12. ASSESSMENT OF PUBLIC AND OCCUPATIONAL HEALTH AND SAFETY EFFECTS**

The notified chemical is a polymer of NAMW > 1000 which is unlikely to cross biological membranes and therefore is unlikely to cause any adverse toxicological reaction.

There is unlikely to be any significant exposure to waterside workers, transport workers or warehouse workers except in the event of a chemical spill. Should this occur, the protective equipment outlined in the recommendations should be utilised to minimise exposure.

Significant levels of dermal or inhalational exposure to the formulation containing the notified chemical may occur to concrete workers during the mixing and application of the formulated products. It is expected that all concrete workers using the cross-linking formulation will wear as a minimum unvented goggles or full face shield, polyethylene gloves and a rubber apron. In areas of poor ventilation a full face organic respirator will also be employed. These precautions against the formulation will serve to minimise exposure to the notified chemical.

Due to the tightly bound nature of the notified polymer in the resin matrix, public exposure is expected to be negligible. In the case of accidental spillage during transport, public may be exposed to the notified polymer. This is minimised by the recommended practices for spills and disposal in the Material Safety Data Sheet (MSDS).

## **13. RECOMMENDATIONS**

To minimise occupational exposure to Vinyl Copolymer the following guidelines and precautions should be observed:

- During use of Vinyl Copolymer the following personal protective equipment which conforms to Australian Standards (AS) or Australian/New Zealand Standards (AS/NZS) should be worn;

Safety goggles should be selected and fitted in accordance with AS 1336 (4) to comply with AS/NZS 1337 (5),

Industrial clothing should conform to the specifications detailed in AS 2919 (6) and AS 3765.1 (7),

Impermeable gloves or mittens conforming to AS 2161 (8),

All occupational footwear should conform to AS/NZS 2210 (9);

- In areas of poor ventilation respiratory devices should be selected and used in accordance with AS/NZS 1715 (10) to comply with AS/NZS 1716 (11);

- Spillage of the notified chemical should be avoided, spillages should be cleaned up promptly with absorbents which should then be put into containers for disposal;
- Good personal hygiene should be practised to minimise the potential for ingestion;
- A copy of the MSDS should be easily accessible to employees.

#### **14. MATERIAL SAFETY DATA SHEET**

The MSDS for CONCRETE PROTECTOR & RESTORER 5740LO, PART A containing the notified chemical was provided in accordance with the *National Code of Practice for the Preparation of Material Safety Data Sheets* (12 ).

This MSDS was provided by the applicant as part of the notification statement. It is reproduced here as a matter of public record. The accuracy of this information remains the responsibility of the applicant.

#### **15. REQUIREMENTS FOR SECONDARY NOTIFICATION**

Under the Act, secondary notification of the notified chemical shall be required if any of the circumstances stipulated under subsection 64(2) of the Act arise. No other specific conditions are prescribed.

#### **16. REFERENCES**

1. Kent, James A. (ed) 1992, "*Riegel's Handbook of Industrial Chemistry*" 9th ed, Chapman & Hall, New York.
2. Connell, DW, (1989) General characteristics of organic compounds which exhibit bioaccumulation. In *Bioaccumulation of Xenobiotic Compounds*, DW Connell (ed). CRC Press, Boca Raton, USA.
3. Nabholz, P. Miller and M. Zeeman, "Environmental Risk Assessment of New Chemicals Under the Toxic Substances Control Act TSCA Section Five", in *Environmental Toxicology and Risk Assessment*, W. G. Landis, J. S. Hughes and M. A. Lewis (Eds), pp 40-55.
4. Standards Australia 1994, *Australian Standard 1336-1994, Eye protection in the Industrial Environment*, Standards Association of Australia Publ., Sydney.
5. Standards Australia/Standards New Zealand 1992, *Australian/New Zealand Standard 1337-1992, Eye Protectors for Industrial Applications*, Standards Association of Australia Publ., Sydney, Standards Association of New Zealand Publ, Wellington.

6. Standards Australia 1987, *Australian Standard 2919-1987, Industrial Clothing*, Standards Association of Australia Publ., Sydney.
7. Standards Australia 1990, *Australian Standard 3765.1-1990, Clothing for Protection against Hazardous Chemicals Part 1 Protection against General or Specific Chemicals*, Standards Association of Australia Publ., Sydney.
8. Standards Australia 1978, *Australian Standard 2161-1978, Industrial Safety Gloves and Mittens (excluding electrical and medical gloves)*, Standards Association of Australia Publ., Sydney.
9. Standards Australia/Standards New Zealand 1994, *Australian/New Zealand Standard 2210-1994, Occupational Protective Footwear*, Standards Association of Australia Publ., Sydney, Standards Association of New Zealand Publ, Wellington.
10. Standards Australia/Standards New Zealand 1994, *Australian/New Zealand Standard 1715-1994, Selection, Use and Maintenance of Respiratory Protective Devices*, Standards Association of Australia Publ., Sydney, Standards Association of New Zealand Publ, Wellington.
11. Standards Australia/Standards New Zealand 1994, *Australian/New Zealand Standard 1716-1994, Respiratory Protective Devices*, Standards Association of Australia Publ., Sydney, Standards Association of New Zealand Publ, Wellington.
12. National Occupational Health and Safety Commission 1994, *National Code of Practice for the Preparation of Material Safety Data Sheets* [NOHSC:2011(1994)], Australian Government Publishing Service, Canberra.



## Attachment 1

The Draize Scale for evaluation of skin reactions is as follows:

<b>Erythema Formation</b>	<b>Rating</b>	<b>Oedema Formation</b>	<b>Rating</b>
No erythema	0	No oedema	0
Very slight erythema (barely perceptible)	1	Very slight oedema (barely perceptible)	1
Well-defined erythema	2	Slight oedema (edges of area well-defined by definite raising)	2
Moderate to severe erythema	3	Moderate oedema (raised approx. 1 mm)	3
Severe erythema (beet redness)	4	Severe oedema (raised more than 1 mm and extending beyond area of exposure)	4

The Draize scale for evaluation of eye reactions is as follows:

### **CORNEA**

<b>Opacity</b>	<b>Rating</b>	<b>Area of Cornea involved</b>	<b>Rating</b>
No opacity	0 none	25% or less (not zero)	1
Diffuse area, details of iris clearly visible	1 slight	25% to 50%	2
Easily visible translucent areas, details of iris slightly obscure	2 mild	50% to 75%	3
Opalescent areas, no details of iris visible, size of pupil barely discernible	3 moderate	Greater than 75%	4
Opaque, iris invisible	4 severe		

### **CONJUNCTIVAE**

<b>Redness</b>	<b>Rating</b>	<b>Chemosis</b>	<b>Rating</b>	<b>Discharge</b>	<b>Rating</b>
Vessels normal	0 none	No swelling	0 none	No discharge	0 none
Vessels definitely injected above normal	1 slight	Any swelling above normal	1 slight	Any amount different from normal	1 slight
More diffuse, deeper crimson red with individual vessels not easily discernible	2 mod.	Obvious swelling with partial eversion of lids	2 mild	Discharge with moistening of lids and adjacent hairs	2 mod.
Diffuse beefy red	3 severe	Swelling with lids half-closed	3 mod.	Discharge with moistening of lids and hairs and considerable area around eye	3 severe
		Swelling with lids half-closed to completely closed	4 severe		

### **IRIS**

<b>Values</b>	<b>Rating</b>
Normal	0 none
Folds above normal, congestion, swelling, circumcorneal injection, iris reacts to light	1 slight
No reaction to light, haemorrhage, gross destruction	2 severe