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September 1997

**NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION  
AND ASSESSMENT SCHEME**

**FULL PUBLIC REPORT**

**Acrylic Polymer in DURO-TAK 373-0037**

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Director  
Chemicals Notification and Assessment

**FULL PUBLIC REPORT****Acrylic Polymer in DURO-TAK 373-0037****1. APPLICANT**

National Starch & Chemical Pty Ltd of 7 Stanton Road SEVEN HILLS NSW 2147 has submitted a notification statement accompanying an application for assessment of a synthetic polymer of low concern, 'Acrylic Polymer in DURO-TAK 373-0037'.

**2. IDENTITY OF THE CHEMICAL**

Acrylic Polymer in DURO-TAK 373-0037 meets the definition of a Polymer of Low Concern under the Act, and is not considered to be hazardous according to Worksafe Criteria (1, 2), based on the nature of the polymer and the data provided. Therefore the chemical name, molecular formula, structural formula, molecular weight, spectral data, monomer identity and formulation details have been exempted from publication in the full public report.

**Trade Name:** DURO-TAK 373-0037 (approximately 50% notified polymer)

**Number-Average Molecular Weight:** > 1 000

**Maximum Percentage of Low Molecular Weight Species (Polymers and Oligomers)**  
 (Molecular Weight < 1 000): < 5%  
 (Molecular Weight < 500): < 2%

**Means of Identification (List of Spectral Data Available):** an infrared spectrum was provided for the notified polymer

**3. PHYSICAL AND CHEMICAL PROPERTIES**

**Appearance at 20°C and 101.3 kPa:** off white solid

**Melting Point** not determined - see comments below

**Density:** not determined

<b>Water Solubility:</b>	not provided - see comments below
<b>Flammability Limits:</b>	not determined
<b>Autoignition Temperature:</b>	not determined
<b>Explosive Properties:</b>	not expected to be explosive
<b>Reactivity:</b>	not expected to be reactive
<b>Particle Size Distribution:</b>	not determined - polymer is imported as a solvent solution

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

The material is essentially a copolymer of three main monomer components. The random disposition and nature of the pendant side groups, together with the polydispersity of the polymer indicate no well defined melting point. It is probable the polymer would decompose before melting.

The propensity of hydrophobic side groups, relatively low content of water soluble monomers and relatively high NAMW (> 1 000) indicates little affinity for water and hence low water solubility.

Adhesive properties of the polymer are promoted by the presence of a monomer which constitutes less than 10% of the polymer. The side groups of this monomer could be regarded as potentially reactive, although they are not particularly susceptible to hydrolysis or quarternisation.

Although the polymer contains many potentially hydrolysable ester and amide linkages in the pendant chains, under normal environmental conditions the low water solubility will preclude significant hydrolysis.

No dissociation constant data was provided, however the polymer contains some potential anionic functionality associated with the relatively small acrylic acid component, which is expected to exhibit typical acidity.

No partition coefficient or adsorption data were provided by the notifier as these are not required for polymers of low concern. However the essentially hydrophobic nature of the majority of the side groups indicates that the material is unlikely to be mobile, and would tend to be assimilated by the organic components of soils and sediments.

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

The notified polymer will not be manufactured in Australia. It will be imported as a component of DURO-TAK 373-0037, at a concentration of approximately 50%, in organic solvents (ethyl acetate, heptane, propan-2-ol and ethanol). This

resin/solvent blend will be used as an adhesive in the production of double-sided tape.

The notifiers anticipate that less than five tonnes of the notified polymer will be imported each year for each of the first five years.

## **6. OCCUPATIONAL EXPOSURE**

The polymer will be imported into Australia as a solution in an organic solvent in 205 L drums. Waterside, warehouse and transport workers are unlikely to be exposed to the notified polymer, except in the unlikely event of an accident or leaking packaging.

The notifier states that the imported resin/solvent blend will be used by customers in the manufacture of double-sided tape. This tape will be used in the production of workbenches, as well as noise control panels in automotive applications.

During tape manufacture, the imported product will be coated onto silicon release paper and dried using forced ventilation. A film of tissue paper is then applied to the dried resin, and another layer of adhesive and silicone release paper applied to complete the double sided tape. The tape is then cut and rolled up for distribution.

Minimal detail was provided by the notifier regarding the tape manufacture process, however it is expected that it will be largely automated. Process workers may be dermally exposed to the notified polymer while transferring the resin/solvent blend from the 205 L drums to the equipment used to manufacture the tape. Accidental ocular contact may also occur. Inhalation exposure is unlikely to occur, given the high molecular weight of the notified polymer, and the expected low vapour pressure. Some exposure to the notified polymer may also occur during cleaning and maintenance of equipment and quality control procedures.

Inhalation and dermal exposure to solvent components of DURO-TAK 373-0037 may also occur during tape manufacture.

End users of the double sided tape may be dermally exposed to the notified polymer when the silicon release paper is removed prior to application.

## **7. PUBLIC EXPOSURE**

There is little potential for public exposure to the notified polymer during import, storage, transport or use of the end product. Minor public exposure to the notified polymer may result from accidental spillage during transport, but such exposure should be minimised by the containment and disposal procedures set out in the Material Safety Data Sheet (MSDS). Once the double sided tape containing the notified polymer becomes part of an automotive noise control panel, there will be little potential exposure of the public, as the tape will be adherent to other surfaces.

Disposal of these panels in waste disposal facilities when the vehicle is finally disposed of is unlikely to involve any significant public health hazard.

## **8. ENVIRONMENTAL EXPOSURE**

### **. Release**

No reformulation of the polymer is undertaken in Australia, and the material is used directly in the production of double sided tape. The notifier anticipates no release of the polymer during production of the tape, except in the event of abnormal plant failure. In this case the polymer solution would be absorbed into non reactive material and disposed of as hazardous waste in an approved manner.

The majority of the adhesive tape containing the polymer will be used in affixing interior fittings (upholstery etc.) to motor vehicles, although some may be used in the manufacture of work benches. In either case, given that the polymer will be exclusively used in the industrial sector, little release of the material to the environment through wastage is expected. The small offcuts of tape would constitute trade waste and presumably be deposited into landfill.

The small quantities of residue remaining in the drums after adhesive tape production (estimated at around 5% of the imported weight, or about 230 kg per year) will be removed by licensed waste removal contractors and be disposed of either through incineration or placement into landfill.

### **. Fate**

In the long term the ultimate fate of most of the polymer will be that of the vehicles or other products in which it is used as an adhesive. It is possible that the material would be either incinerated (with formation of carbon dioxide, water and small quantities of nitrogen oxides), or more likely sent to landfill. If sent to landfill the high molecular weight and low water solubility preclude high mobility, and it is unlikely that large quantities of the polymer would enter the wider environment.

The essentially hydrophobic nature of the material and high molecular weight indicate that it would adsorb onto soil and sediment particles and have little tendency for bioaccumulation.

## **9. ASSESSMENT OF ENVIRONMENTAL EFFECTS**

No ecotoxicological data were provided which is acceptable for polymers of low concern with a NAMW greater than 1 000 according to the Act.

## **10. ASSESSMENT OF ENVIRONMENTAL HAZARD**

The notifier claims no adverse health or environmental effects have resulted from use of this polymer overseas.

Losses during tape manufacture will result in minimal environmental release, mainly from the small quantities of residue remaining in the drums. These residues will be either incinerated or placed into landfill.

Other releases of the polymer may occur on disposal of the manufactured articles containing the adhesive. However the expected low mobility of the polymer together with its hydrophobic nature indicate that if released from the solid adhesive matrix, it is likely to be adsorbed onto soil or sediment particles and consequently have small impact on the environment.

The polymer is expected to have low mobility and even if released through spillage or other pathways could be expected to absorb onto soil and/or sediments, and have little tendency for bioaccumulation.

The considerations above lead to the conclusion that the compound poses only a low hazard to the environment.

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

Submission of toxicological data is not required for polymers of low concern, according to the Act. As the notified polymer meets the criteria for notification under this category, it is unlikely to pose a toxicological hazard, based on the molecular weight, levels of low molecular weight species, and concentrations of residual monomers.

The occupational health risk posed to waterside, warehouse and transport workers is negligible, as exposure is not expected to occur under normal circumstances, and the polymer should not represent a toxicological hazard for the reasons outlined above. It should be noted, however, that the imported product, DURO-TAK 373-0037, is classified as a dangerous good according to the *Australian Code for the Transport of Dangerous Goods by Road and Rail*, (3) and appropriate precautions should be taken during transport, storage and handling (see notifier's MSDS).

There may be potential for dermal exposure to the polymer, particularly if the tape manufacturing process is not fully automated. Given the low toxicological hazard of the notified polymer, however, the occupational health risk to workers involved in double sided tape manufacture is low.

Similarly, the occupational health risk to workers involved in applying the adhesive tape to automobiles or work benches is low, as exposure is expected to be minimal.

The end use product is classified as hazardous according to Worksafe Criteria (1, 2) and worker exposure to potentially hazardous solvent components of DURO-TAK 373-0037 may occur. Exposure to these components should be minimised, and appropriate exposure standards should be observed (4) (see Recommendations section). Workers should also be aware of the flammable nature of some of these components.

There is negligible potential for public exposure to the notified polymer arising from importation, storage, transportation and application. Based on the above information, it is unlikely that the notified polymer will pose a significant hazard to public health when used in the proposed manner.

## **12. RECOMMENDATIONS**

To minimise occupational exposure to Acrylic Polymer in DURO-TAK 373-0037 the following guidelines and precautions should be observed:

- It is good work practice to wear industrial clothing which conforms to the specifications detailed in Australian Standard (AS) 2919 (5) and occupational footwear which conforms to Australian and New Zealand Standard (AS/NZS) 2210 (6) to minimise exposure when handling any industrial chemical;
- Spillage of the product containing the notified polymer 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.

In addition, the Worksafe Australia document *Exposure Standards for Atmospheric Contaminants in the Occupational Environment: Guidance Note and National Exposure Standards* (4) should be used as a guide in the control of workplace exposure to other potentially hazardous components of the end use product, DURO-TAK 373-0037. Appropriate personal protective equipment should be worn where necessary to minimise exposure to these chemicals (see notifier's MSDS) and workplace monitoring for these components should be carried out on a regular basis. Workers should also be aware of the flammable nature of some of these components.

## **13. MATERIAL SAFETY DATA SHEET**

The MSDS for a product containing the notified polymer was provided in accordance with the *National Code of Practice for the Preparation of Material Safety Data Sheets* (7).

This MSDS was provided by the notifier 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 notifier.

## **14. REQUIREMENTS FOR SECONDARY NOTIFICATION**

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

## 15. REFERENCES

1. National Occupational Health and Safety Commission 1994, *Approved Criteria for Classifying Hazardous Substances [NOHSC:1008(1994)]*, Australian Government Publishing Service, Canberra.
2. National Occupational Health and Safety Commission 1994, *List of Designated Hazardous Substances [NOHSC:10005(1994)]*, Australian Government Publishing Service, Canberra.
3. Federal Office of Road Safety 1992, *Australian Code for the Transport of Dangerous Goods by Road and Rail*, 5th edn, Australian Government Publishing Service, Canberra.
4. National Occupational Health and Safety Commission 1995, 'Adopted National Exposure Standards for Atmospheric Contaminants in the Occupational Environment, [NOHSC:1003(1995)]', in *Exposure Standards for Atmospheric Contaminants in the Occupational Environment: Guidance Note and National Exposure Standards*, Australian Government Publishing Service, Canberra.
5. Standards Australia 1987, *Australian Standard 2919-1987, Industrial Clothing*, Standards Association of Australia, Sydney.
6. Standards Australia/Standards New Zealand 1994, *Australian/New Zealand Standard 2210-1994, Occupational Protective Footwear*, Standards Association of Australia/Standards Association of New Zealand, Sydney/Wellington.
7. 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.