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**NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION
AND ASSESSMENT SCHEME**

FULL PUBLIC REPORT

Polymer in Acrocryl 06549

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.

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Director
Chemicals Notification and Assessment

FULL PUBLIC REPORT

FULL PUBLIC REPORT**Polymer in Acrocryl 06549****1. APPLICANT**

A C Hatrick Chemicals Pty Ltd of 49-61 Stephen Road, BOTANY NSW 2019 has applied for the following information relating to Polymer in Acrocryl 06549 to be exempt from publication in the Full Public and Summary Reports.

2. IDENTITY OF THE CHEMICAL

Polymer in Acrocryl 06549 is not considered to be hazardous based on the nature of the chemical and the data provided. Therefore the chemical name, CAS number, molecular and structural formulae, exact molecular weight, spectral data, details of the polymer composition and additives have been exempted from publication in the Full Public Report and the Summary Report.

Other Names: modified acrylic polymer

Trade Name: Acrocryl 06549 (polymer emulsion containing approximately 50% of the notified polymer)

**Number-Average
Molecular Weight (NAMW):** > 10 000

**Maximum Percentage of Low
Molecular Weight Species**

Molecular Weight < 500: 0%

Molecular Weight < 1 000: 0%

**Method of Detection
and Determination:** infrared (IR) spectroscopy and gel permeation chromatography (GPC)

3. PHYSICAL AND CHEMICAL PROPERTIES

The following physico-chemical properties were provided for the product Acrocryl 06549 containing the notified polymer unless otherwise stated

**Appearance at 20°C
and 101.3 kPa:** white milky liquid

Melting Point:	approximately 0°C
Specific Gravity:	approximately 1.050; 1.095 (polymer)
Vapour Pressure:	considered to be similar to water
Water Solubility:	not determined (see comments below)
Partition Co-efficient (n-octanol/water):	not determined (see comments below)
Hydrolysis as a Function of pH:	not determined (see comments below)
Adsorption/Desorption:	not determined (see comments below)
Dissociation Constant:	not determined (see comments below)
Flash Point:	not determined
Flammability Limits:	not determined
Autoignition Temperature:	not determined
Explosive Properties:	not determined

Comments on Physico-Chemical Properties

The notifier expects the polymer to be insoluble based on its molecular weight. It is noted that the notified polymer contains a small percentage of free carboxyl groups which could impart some solubility to the polymer. However, the notified polymer is not expected to have significant solubility in water.

Hydrolysis, Partition Coefficient, Adsorption/Desorption and Dissociation Constant have not been determined due to the low solubility of the polymer. This is acceptable for the following reasons:

- ester linkages in polymers are susceptible to hydrolysis only when the polymer is water soluble; the low water solubility of the notified polymer would mean that its hydrolysis potential under the range of environmental pH values would be low;
- given the expected low solubility in water it is anticipated that the partition coefficient for the polymer would be high;
- on the basis of the polymer's low water solubility it is likely to adsorb to, or be associated with, soil/sediment and organic matter and be immobile in soil;
- the polymer contains a small amount of free carboxylic acid functionalities, which would be expected to have typical acidity.

4. PURITY OF THE CHEMICAL

Degree of Purity: approximately 90%

Toxic or Hazardous Impurities: maximum content of residual monomers, 0.1%

Chemical name: sodium hydroxide

CAS No.: 1310-73-2

Weight percentage: 1.1%

Toxic properties: corrosive; hazardous at concentrations above 1.0% (1)

Non-hazardous Impurities (> 1% by weight): none

Maximum Content of Residual Monomers: nil

Additives/Adjuvants: surface active agents/initiators/biocide, approximately 10%

5. USE, VOLUME AND FORMULATION

The notified polymer is to be used as a component of a 2-pack ceramic tile adhesive. It will be manufactured as part of an aqueous emulsion (see Material Safety Data Sheet - MSDS - for Acrocryl 06549) containing approximately 50% polymer, a maximum of 7% surface active agents/initiators, a maximum of 0.7% sodium hydroxide and less than 0.1% biocide. The volume to be manufactured is expected to be 1 400 tonnes in the first year rising to 2 500 tonnes per year by the fifth year.

6. OCCUPATIONAL EXPOSURE

In manufacture of the notified polymer, two hazardous monomers are added by a computer controlled system to an enclosed reaction vessel from underground storage tanks. A third monomer, a minor component, is weighed out, dissolved in water, and added automatically from an addition tank. The other minor components are weighed out and added in a similar manner.

At the completion of the reaction and adjustments, the product is pumped into a blender or storage tank. After further adjustment, the product is pumped either to steel drums, palletcons or a bulk carrier. Exposure during transfer is likely to be dermal and may occur when connecting or disconnecting lines. Some minor exposure is possible during sampling for quality control purposes.

The finished product is delivered by road to the customers' sites. If delivered in bulk,

loading and unloading is by pumping and the product would be stored in large storage tanks. During loading, the product would be passed through an open sieve. If delivered in pallets or drums, these would be stored at the customer's facility until required. When required, the product would be pumped to a blending vessel where cement accelerators would be added. The blend would be distributed into containers to form one pack of the two pack system. The other pack consists of cement plus additives to improve application properties of the adhesive.

The end user of the tile adhesive blends the packs together and applies the adhesive with a trowel.

7. PUBLIC EXPOSURE

The notified polymer will enter the public domain through the use of the 2-pack ceramic tile adhesive which is mixed prior to application. The tile adhesive will be covered by the tile, minimising its potential for public contact.

Other than through end use, the public is only likely to be exposed to the polymer in the rare event of an accident during transport by road.

8. ENVIRONMENTAL EXPOSURE

Release

The polymer will be manufactured at the notifier's site. Manufacture will occur in a sealed reactor in 20 000 kg batches. Batches will be transferred to 45 cubic metre storage tanks. Washings from the reactor vessel, piping and storage tanks will be used in subsequent batches. Hence, no release of the notified polymer is anticipated during the normal manufacturing process.

The product containing the notified polymer will be transported to customer sites in one of three ways: (i) in bulk by sealed road tankers (stainless steel) with a capacity of approximately 20 cubic meters; (ii) in sealed "Pallets" with a polyethylene inner container of approximately 1 000 L capacity; or (iii) in steel drums with a polyethylene inner lining, capacity 200 L.

The notifier estimates that a maximum of 1% waste polymer will be generated in the manufacture of adhesives using the notified polymer. An additional 0.5% of the polymer will remain in used drums. This corresponds to a maximum of 19 tonnes of the polymer, at the maximum rate of manufacture. This waste will be recycled into the next batch, incinerated by a drum reconditioner or disposed of to approved landfill.

The 2 components of the adhesive will be mixed prior to application by trowel. Disposal of waste mixed adhesive containing the notified polymer will be via approved landfill or household garbage. The amount of polymer disposed of in this manner is difficult to estimate. A conservative estimate would be ~5%.

Fate

The fate of most of the polymer will share the fate of the tiles and building materials to which it is adhered. It will remain bound within the tiled surfaces until it is removed and disposed of with the building materials to which it is bound. Therefore, most of notified polymer manufactured will be incorporated in a polymer matrix, the majority of which will eventually be disposed of to landfill as builder's waste. Leaching from landfill sites is not expected as the notified polymer has low water solubility.

Waste generated during application is expected to eventually go to landfill or less likely to be incinerated. Any incineration of the notified polymer is expected to produce water and oxides of carbon.

9. EVALUATION OF TOXICOLOGICAL DATA

Toxicological data are not required for polymers with a NAMW of greater than 1 000 according to the Act and no data were available for the notified chemical

10. ASSESSMENT OF ENVIRONMENTAL EFFECTS

No ecotoxicology data were provided, which is acceptable for polymers of NAMW greater than 1000 according to the Act.

Biological membranes are not permeable to polymers of very large molecular size and therefore bioaccumulation of the notified polymer is not expected (2,3).

11. ASSESSMENT OF ENVIRONMENTAL HAZARD

The polymer is unlikely to present a hazard to the environment when it is used as specified.

The polymer is also unlikely to present a hazard to aquatic organisms due to its high molecular weight and low bioavailability.

The main environmental exposure arises from landfill disposal of waste polymer generated during formulation and use. Leaching of the polymer from landfill sites is not anticipated, since the polymer is inherently immobile because of its low water solubility and will be further immobilised in the adhesive matrix prior to disposal. The predicted environmental hazard is low.

12. ASSESSMENT OF PUBLIC AND OCCUPATIONAL HEALTH AND SAFETY EFFECTS

The notified polymer has a NAMW greater than 1 000 and should not be able to be absorbed across biological membranes to cause systemic effects. The levels of low molecular weight species (0%) and residual monomers (less than 0.1%) would not

render the polymer hazardous according to the Worksafe Australia's *Approved Criteria for Classifying Hazardous Substances* (4).

The notified polymer is manufactured in a sealed reactor vessel. Some minor exposure is possible during sampling and batch adjusting. At the completion of the reaction, the polymer emulsion is pumped into underground storage tanks and from there to bulk containers, steel drums or pallets for transport. Some possibility exists for exposure as a result of spillage during these operations but this is expected to be low.

At the sites of adhesive manufacture, the polymer emulsion is pumped from storage tanks or smaller vessels to a mixer for blending of one of the packs of the 2-pack product. After blending, testing and batch adjusting, the final blend is filtered and filled into containers. Some low exposure as a result of spillage is possible during these operations.

The end users will mainly be tradespersons, with up to 20% of the adhesive being used by the general public. In each case, the 2-pack adhesive is mixed and applied to a substrate with a trowel prior to placing ceramic tiles thereon. There is expected to be a high potential for dermal exposure at this point with exposure being long term since the adhesive could remain on skin for some time prior to removal.

The occupational and public health risk associated with manufacture, transport, storage, use and disposal of the notified polymer is expected to be low primarily as a result of the low predicted intrinsic hazard. It is only during end use of the adhesive that exposure could conceivably be high in which case gloves as outlined below should be worn.

13. RECOMMENDATIONS

To minimise occupational exposure to the notified polymer the following guidelines and precautions should be observed:

- Particularly during mixing and application of tile adhesive containing the polymer, impermeable gloves or mittens conforming to Australian Standard 2161 should be worn (5);
- Spillage of 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.

14. MATERIAL SAFETY DATA SHEET

The MSDS for the manufactured emulsion containing the notified polymer was provided in accordance with the *National Code of Practice for the Preparation of Material Safety Data Sheets* (6).

This MSDS was provided by the applicant as part of the notification statement. 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. National Occupational Health and Safety Commission 1994, *List of Designated Hazardous Substances [NOHSC:10005(1994)]*, Australian Government Publishing Service, Canberra.
2. Anliker R., Moser P. & Poppinger D. 1988, "Bioaccumulation of dyestuffs and organic pigments in fish. Relationships to hydrophobicity and steric factors". *Chemosphere*, vol. 17, no. 8, 1631-1644.
3. Gobas F.A.P.C., Opperhuizen A. & Hutzinger O. 1986, "Bioconcentration of hydrophobic chemicals in fish: relationship with membrane permeation". *Environmental Toxicology and Chemistry*, vol. 5, 637-646.
4. National Occupational Health and Safety Commission 1994, *Approved Criteria for Classifying Hazardous Substances [NOHSC:1008(1994)]*, Australian Government Publishing Service, Canberra.
5. Standards Australia 1978, *Australian Standard 2161-1978, Industrial Safety Gloves and Mittens (excluding Electrical and Medical Gloves)*, Standards Association of Australia Publ., Sydney.
6. National Occupational Health and Safety Commission 1994, *National Code of Practice for the Preparation of Material Safety Data Sheets [NOHSC:2011(1994)]*, AGPS, Canberra.