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**NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION
AND ASSESSMENT SCHEME**

FULL PUBLIC REPORT

**2-PROPENAMIDE, POLYMER WITH CHLOROETHENE
AND ETHENE**

This Assessment has been compiled in accordance with the provisions of *the Industrial Chemicals (Notification and Assessment) Act 1989*, 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 Human Services and Health.

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**2-PROPENAMIDE, POLYMER WITH CHLOROETHENE AND ETHENE****1. APPLICANT**

Harcros Chemicals Pty Ltd, 8 Abbott Rd, Seven Hills, NSW, 2147

2. IDENTITY OF THE CHEMICAL

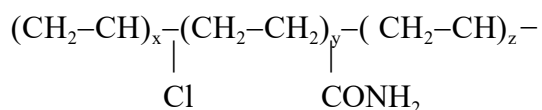
Chemical name: 2-Propenamide, polymer with chloroethene and ethene

Chemical Abstracts**Service (CAS)**

Registry No.: 26376-17-0

Trade names: Airflex 4500
Airflex 4530
(these names refer to 50% water emulsions of the notified polymer)

Molecular formula: $(C_3H_5NO.C_2H_4.C_2H_3Cl)_x$

Structural formula:

Number-average molecular weight: 15,060

Weight-average molecular weight: 111,660

Maximum percentage of low molecular weight species (molecular weight < 1000): 0.4%

Monomers:

- Chemical name:** 2-Propenamide
Synonym: Acrylamide
CAS No.: 79-06-1
Weight percentage: 2.3%
- Chemical name:** Ethene
Synonym: Ethylene
CAS No.: 74-85-1
Weight percentage: 14.1%
- Chemical name:** Chloroethene
Synonym: Vinyl chloride
CAS No.: 75-01-4
Weight percentage: 83.6%

Methods of detection and determination:

Infrared spectroscopy

Spectral data:

IR spectrum (AgCl plate): Major characteristic peaks were observed at 1030, 1380 and 2950 cm^{-1}

3. PHYSICAL AND CHEMICAL PROPERTIES

The notified polymer is to be imported as the 50% water emulsions Airflex 4500 and Airflex 4530 and is never isolated. The physico-chemical properties listed below are those of the emulsions except where indicated.

Appearance at

20°C and 101.3 kPa: white, mobile liquid

Odour: sweet

Boiling Point: 100°C (water)

Density: 1100 kg/m^3 (emulsion)

Decomposition

Products: carbon dioxide and carbon monoxide on combustion; acetic acid; irritating and toxic fumes at elevated temperatures (notified polymer)

Reactivity/

Stability: stable; incompatible with mineral acids and alkalis

Comments on Physico-Chemical Properties

The lack of data on the notified chemical is due to the fact that the polymer is never isolated, but rather imported and stored as a dispersion in water until used.

No data were provided for vapour pressure on the grounds that "by analogy with similar polymers, this polymer is not volatile. For the polymer suspension the vapour pressure would be that of the dispersant water".

No data were provided for water solubility or partition coefficient on the grounds that "the polymer is insoluble in water". A polymer of this kind with limited functionality would be expected to be of very low solubility.

No useful data were provided for adsorption/desorption. However, the polymer has chemical properties that would make it unlikely to exhibit significant environmental mobility.

No data were provided for dissociation constant on the grounds that it is considered inapplicable due to the nature of the polymer and its water insolubility.

The justifications provided in place of data are acceptable.

Properties such as flash point, flammability limits, autoignition temperature and explosion properties are not relevant to the notified polymer.

4. PURITY OF THE CHEMICAL

Degree of purity: 99.6%

Toxic or hazardous impurities (> 0.1% by weight):

- Chemical name:** Acetic acid, ethenyl ester
Synonym: Vinyl acetate
CAS No.: 108-05-4
Weight percentage: 0.13%
Toxic properties: Vapour is a primary irritant to the upper respiratory tract and eyes and the liquid may irritate the skin to the point of vesiculation (1). Worksafe exposure standard is 10 ppm (2).

Non-hazardous impurities (> 1% by weight): None

Maximum content of residual monomers: < 0.1%

Additives/Adjuvants: None

5. INDUSTRIAL USE

Airflex 4500 will be used to manufacture an aqueous flame retardant adhesive for industrial use in laminating foil and film. Airflex 4530 will be used in industrial applications as an adhesive for laminating paper to foil in the manufacture of insulation material for use in the building industry.

6. OCCUPATIONAL EXPOSURE

The notified polymer will be imported in 200 L drums as a 50% water emulsion at a rate of up to 100 tonnes per year for the first five years.

Airflex 4500 is expected to be used at one site. It will be pumped through enclosed lines into open head mixing vessels by one person who is also responsible for taking 1/4 L samples for testing and packing the finished product into 200 L drums again by pumping through enclosed lines. The total time involved will be 4 hours per batch, 40 times per year. A quality assurance chemist will test each batch, the duration of testing being 1/2 an hour. The working area is equipped with local exhaust ventilation. The compounded adhesive will then be sold for use in laminating foil and film.

Airflex 4530 is also expected to be used at one site where adhesive compounding will occur for a maximum of 12 days per year. Laboratory staff will test small amounts of the finished products. Airflex 4530 will be poured into the mixing vat and pumped out through enclosed lines. For prevention of worker exposure, protective clothing, gloves and goggles are relied upon. The compounded adhesive will be onsold to manufacturers of sarking i.e. paper laminated to foil used as building insulation.

7. PUBLIC EXPOSURE

There is low potential for public exposure to the notified chemical during its storage and distribution.

Public exposure to the polymer in Airflex 4530 is anticipated to be minimal since the polymer will be bound to the inner surface of the laminate and the laminate will be available to the public only once the adhesive is cured. The end use of the adhesive containing Airflex 4500 appears to be similar to that containing Airflex 4530.

Disposal of the polymer is expected to relate in minimal public exposure.

8. ENVIRONMENTAL EXPOSURE

. Release

The potential for release of polymer to the environment occurs through spillage in the storage and application areas or during transport to and from storage. This release would be in the form of a liquid which can be treated by containment and adsorption in sand or similar material which can then be disposed of in compliance with local, state or federal disposal regulations, probably to landfill.

Manufacturing plant wash water during use of Airflex 4530 will be collected and reused in following batches. For Airflex 4500 wash water containing the notified polymer will be collected and treated prior to release to the waste stream. Spillages and container residues are likely to be disposed of in landfill, where the polymer may persist but is expected to remain immobile.

Losses to the environment of the adhesive containing the polymer in the fabrication of the end use product are expected to be low. Closed system application technology is utilised to protect the integrity of the adhesive until applied and allowed to set.

Release may also be expected via disposal of articles fabricated using the adhesive, probably to landfill or by incineration. Both applications are long lifetime products with disposal on demolition of the building in which the products were integrated.

. Fate

The main environmental exposure to notified chemical will occur via disposal of waste polymer to landfill, where it is expected to remain immobile. Articles fabricated using adhesive containing the polymer are expected to be incinerated or be consigned to landfill at the end of their useful life.

The polymer exhibits characteristics that render it non-reactive and non (or only slowly)-biodegradable when exposed to the environment. In landfill the polymer would likely remain undegraded and if as part of a finished article, attached to the substrate to which it is adhered.

9. ASSESSMENT OF ENVIRONMENTAL EFFECTS

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

10. 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. However, since the polymer is inherently immobile and will be further immobilised (either in the substrate to which it is adhered as the end use adhesive or, if spilled, attached to the material used to adsorb the polymer in the clean up procedure) prior to disposal. The predicted environmental hazard is minimal.

11. ASSESSMENT OF PUBLIC AND OCCUPATIONAL HEALTH AND SAFETY EFFECTS

The notified polymer is not expected to be a health hazard as the high number average molecular weight (> 1000) should preclude transmission of molecules across biological membranes. Levels of residual monomers are very low and should not render the polymer a health hazard. There is one notable hazardous impurity - vinyl acetate. However, the level (0.13%) is not sufficient to render the polymer hazardous.

Exposure to the notified polymer during compounding of adhesives is expected to be low through the use of containment. Nevertheless, since adhesives can remain in contact with the skin for a long period of time, the use of protective clothing, gloves and goggles is indicated.

Airflex 4530 will be used in the manufacture of sarking, ie foil-based insulation material for the building industry. It is expected that Airflex 4500 would have a similar use pattern given that it is stated to be used to combine paper, films and foils. The notifier states that manufacture of sarking is likely to be an automated process, in which case exposure is expected to be low.

Given the low intrinsic health hazard of the notified polymer together with expected low exposure, the occupational and public health risk arising from transport, storage, and use is expected to be minimal.

12. RECOMMENDATIONS

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

- . if engineering controls and work practices are insufficient to reduce exposure to a safe level, then personal protective devices which conform to and are used in accordance with Australian Standards eye protection (AS 1336, AS 1337) (3,4), impermeable gloves (AS 2161) (5) and overalls should be worn;
- . good work practices should be implemented to avoid spillages and splashing;
- . good personal hygiene should be observed;
- . a copy of the Material Safety Data Sheet should be easily accessible to employees.

13. MATERIAL SAFETY DATA SHEET

The attached Material Safety Data Sheets (MSDS) for Airflex 4500, an adhesive containing it and for Airflex 4530 were provided in Worksafe Australia format (6).

These MSDS were provided by Harcros Chemicals Pty Ltd as part of their notification statement. The accuracy of this information remains the responsibility of Harcros Chemicals Pty Ltd.

14. REQUIREMENTS FOR SECONDARY NOTIFICATION

Under the *Industrial Chemicals (Notification and Assessment) Act 1989*, secondary notification of 2-propenamide, polymer with chloroethene and ethene shall be required if any of the circumstances stipulated under subsection 64(2) of the Act arise. In particular, should the use pattern change from lamination of paper, films and foils, secondary notification shall be required. No other specific conditions are prescribed.

15. REFERENCES

1. Handbook of Toxic and Hazardous Chemicals and Carcinogens, p. 916-917, Ed. M Sittig, Noyes Publications, New Jersey, USA, 1985.
2. National Occupational Health and Safety Commission, *Exposure Standards for Atmospheric Contaminants in the Occupational Environment*, Australian Government Publishing Service Publ., Canberra, 1991.
3. Australian Standard 1336-1982, *Recommended Practices for Eye Protection in the Industrial Environment*, Standards Association of Australia Publ., Sydney, 1982.
4. Australian Standard 1337-1984, *Eye Protectors for Industrial Applications*, Standards Association of Australia Publ., Sydney, 1984.
5. Australian Standard 2161-1978, *Industrial Safety Gloves and Mittens (excluding Electrical and Medical Gloves)*, Standards Association of Australia Publ., Sydney, 1978.
6. National Occupational Health and Safety Commission, *Guidance Note for the Completion of a Material Safety Data Sheet*, 2nd. edition, AGPS, Canberra, 1990.