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**NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION
AND ASSESSMENT SCHEME**

FULL PUBLIC REPORT

POLYMER IN M760

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 Commonwealth Environment Protection Agency and the assessment of public health is conducted by the Department of Health, Housing, Local Government and Community 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.

Under subsection 34(2) of the Act the Director of Chemicals Notification and Assessment is to publish this Report in the Chemical Gazette on .

Enquiries contact Chemical Assessment on (02) 565 9464:

Street Address: 92 Parramatta Rd Camperdown, NSW 2050, AUSTRALIA

Postal Address: GPO Box 58, Sydney 2001, AUSTRALIA

Telephone: (61) (02) 565-9466 FAX (61) (02) 565-9465

Director
Chemicals Notification and Assessment

FULL PUBLIC REPORT**POLYMER IN M760****1. APPLICANT**

Paint Industries (Aust) Pty Ltd, 1-19 Bennett St, Mortlake, NSW 2173.

2. IDENTITY OF THE POLYMER

Marketing name: M760 (M760 is a 45% (w/w) dispersion of the notified polymer in water)

Number-average molecular weight: 6432

Weight-average molecular weight: 128250

Maximum percentage of low molecular weight species (polymers and oligomers)

- **(molecular weight < 1000):** 3%
- **(molecular weight < 500):** 0.5%

Means of identification (List of spectral data available):

Infrared spectroscopy

3. PHYSICAL AND CHEMICAL PROPERTIES

The notified polymer is manufactured as a 45%(w/w) dispersion in water and is never isolated. Therefore, the properties listed below refer to this aqueous dispersion.

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

Boiling Point: close to that of water

Density: 1060 kg/m³

Water Solubility: the notified polymer could not be separated to perform the test but is expected to be water insoluble based on the chemical structure and high molecular weight

Flammability Limits: non-flammable

Autoignition Temperature: not applicable

Explosive Properties: not explosive

Reactivity:

stable under normal conditions

Comments on the physico-chemical properties

Due to the nature of the end use, the notified polymer is required to be resistant to hydrolysis and thermal and photo-degradation. Reactive functional groups present in the polymer are present to increase substrate adhesion and are not known to be reactive under normal conditions. The polymer does not contain any positively charged groups and is not polycationic. Negative charges are present due to the carboxylic acid group present in the polymeric chain. The equivalent weight of the charged negative group, however, is high (2400) and the charge is almost negligible. There is no possibility of the polymer existing as anions between pH 4 and 9. Attempts to use OECD TG 112 to measure dissociation constant were unsuccessful. Also, it is noted that the polymer contains a number of acid and ester groups so that hydrolysis is possible but unlikely under environmentally relevant conditions due to the low water solubility.

4. PURITY OF THE CHEMICAL

The estimated maximum weight percentage of residual monomers and other reactants is 0.1% each.

5. INDUSTRIAL USE

The notified polymer will be used inhouse to manufacture decorative and protective surface coatings. It is estimated that approximately 100 tonnes per year will be manufactured.

6. OCCUPATIONAL EXPOSURE

It is estimated that 26 personnel will be involved in polymer manufacture. Tasks and numbers of workers are as follows: batch processing and chemical plant operation (12), storepersons (4), truck deliveries(2), QC testing (4) and supervision (4).

The polymer dispersion will be manufactured in an enclosed heated reaction vessel. All of the monomers are liquids and are pumped directly from the drums into the reactor under negative pressure. The polymer dispersion is filtered through a Cuno filter into 200 L drums on a pallet. All charging and vent lines are connected to a vapour extraction system which is discharged to atmosphere through an exhaust vent incinerator.

Transfers to and from the reactor involve the use of enclosed lines.

The polymer dispersion is mixed with pigments and other components on-site to produce finished paint products which will be sold to end-users in 20 - 200 L containers.

7. PUBLIC EXPOSURE

The public is unlikely to be exposed to the polymer during its importation, formulation or application in a paint. The paint will not be sold to the public.

8. ENVIRONMENTAL EXPOSURE

. Release

Water would be the main vapour emission from M760 during paint formulation, packaging and in the final application process. Residual solvent emission would be less than 0.1%.

Waste resin produced in the paint mixing and packing process is polymerised and becomes solid waste. Solid waste from mixing and packaging will consist mainly of rags which have been used to clean equipment and wipe up resin spills. The waste from this source will not be more than 3 kg/day for a 100 tonne per year production volume. This waste will be disposed of in the solid waste system and will go to an approved land fill.

Industry end users will use curtain coaters and high efficiency spray guns to apply the coatings which will result in very low waste levels as excess paint or spills will be collected and recycled. Curtain coating consists of the rapid horizontal movement of the object through a vertical falling curtain of liquid coating material (1). Waste from such an application is likely to be minimal.

It is stated that there is no intention of marketing the notified polymer in any uncompounded form. Therefore, it can be concluded that the coatings based on the polymer will not be used as household paint or with conventional spray guns. None of the coatings formulated with the notified polymer to date are intended to be sold for application with conventional spray guns, which could result in a much higher proportion of wastage.

. Fate

The polymer is a component of protective and decorative coatings applied industrially to metal substrates and should have limited environmental exposure.

Waste polymer disposed to landfill is likely to remain at the site of deposition and is unlikely to biodegrade or leach due to its physico-chemical properties. The polymer is unlikely to bioaccumulate due to its high molecular weight (NAMW > 1000). Incineration of the polymer is expected to produce oxides of carbon.

9. ASSESSMENT OF ENVIRONMENTAL EFFECTS

No ecotoxicological data were supplied, which is acceptable for polymers of low concern. Due to its high NAMW the polymer is not expected to cross biological membranes.

10. ASSESSMENT OF ENVIRONMENTAL HAZARD

The polymer is unlikely to present a hazard to the environment when it is incorporated into the paint and applied to metal substrates.

The main environmental exposure arises from the landfill disposal of paint containing the polymer from the formulation site and end-use applications. However, since it is stable and immobile in soil, environmental hazard is expected to be low.

11. ASSESSMENT OF OCCUPATIONAL AND PUBLIC HEALTH AND SAFETY EFFECTS

Polymer in M760 has been notified as a synthetic polymer of low concern under section 23 for the purposes of section 24A of the *Industrial Chemicals (Notification and Assessment) Act, 1989*. The polymer meets the criteria for a synthetic polymer of low concern specified in regulation 4A of the *Act* and can, therefore, be considered of low hazard to human health.

The notified polymer has a number-average molecular weight > 1000 which should preclude transmission across biological membranes and limit adverse health effects. In addition, the polymer contains low levels of residual monomers and low molecular weight species.

Exposure to the notified polymer during manufacture and drumming off is expected to be low through the use of engineering controls necessary to limit exposure to hazardous monomer constituents. Exposure to the notified polymer during paint manufacture is also expected to be low through the use of enclosed systems. It is stated in the submission that end users will mainly employ highly efficient curtain coaters and spray guns during application that limit waste and should, therefore, also limit exposure to the notified polymer.

It can be concluded that there is virtually no risk of adverse health effects during manufacture of the notified polymer, paint products containing it or during application of those products.

Public exposure to the polymer during importation, formulation or use is unlikely. The polymer is resistant to hydrolysis and thermal and photo-degradation when used in protective coatings, thereby minimising public exposure.

12. RECOMMENDATIONS

To minimise occupational exposure to Polymer in M760 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 (AS) for eye protection (AS 1336, AS 1337) (2,3), impermeable gloves (AS 2161) (4) and overalls should be worn;
- . good personal hygiene should be practised;
- . work practices should be implemented to avoid spills which should be cleaned up promptly and disposed of in accordance with the recommendations contained in the Material Safety Data Sheet (MSDS);
- . a copy of the MSDS should be easily accessible to employees.

13. MATERIAL SAFETY DATA SHEET

The attached MSDS for Polymer in M760 was provided in Worksafe Australia format (5).

This MSDS was provided by Paint Industries (Aust) Pty Ltd as part of their notification statement. It is reproduced here as a matter of public record. The accuracy of this information remains the responsibility of Paint Industries (Aust) Pty Ltd.

14. REQUIREMENTS FOR SECONDARY NOTIFICATION

Under the *Industrial Chemicals (Notification and Assessment) Act 1989*, secondary notification of Polymer in M760 shall 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. Oil and Colours Chemist' Association of Australia, *Surface Coatings. Volume2 - Paints and Their Applications*, 2nd edition, 1987.
2. Standards Australia, 1982, Australian Standard 1336-1982 'Recommended Practices for Eye Protection in the Industrial Environment', Standards Association of Australia Publ., Sydney, Australia.
3. Standards Australia, 1984, Australian Standard 1337-1984 'Eye Protectors for Industrial Applications', Standards Association of Australia Publ., Sydney, Australia.
4. Standards Australia, 1978, Australian Standard 2161-1978, 'Industrial Safety Gloves and Mittens (excluding Electrical and Medical Gloves)', Standards Association of Australia Publ., Sydney, Australia.
5. National Occupational Health and Safety Commission, 1990. , 'Guidance Note for the Completion of a Material Safety Data Sheet', 2nd. edition, AGPS, Canberra , Australia.¹

¹ This Guidance Note, to which an MSDS must conform in accordance with the *Act*, has been superseded by Worksafe Australia's National Code of Practice for the Preparation of Material Safety Data Sheets (March 1994) published by the Australian Government Publishing Service.