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**NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION
AND ASSESSMENT SCHEME**

FULL PUBLIC REPORT

Polymer in Neorez XR-9603

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.

For Enquiries please contact Ms Tina Anderson at:

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 Neorez XR-9603****1. APPLICANT**

ICI Australia (Operations) Pty Ltd, 1 Nicholson Street, Melbourne
Vic 3001.

2. IDENTITY OF THE CHEMICAL

Based on the nature of the chemical and the data provided, the notified polymer is considered to be non-hazardous. Therefore, the chemical name, CAS number, molecular formula, structural formula, molecular weight, spectral data and monomer composition have been exempted from publication in the Full Public Report and the Summary Report.

Trade names: Neorez XR-9603 ~ (34% polymerR-9603 emulsion)

**Maximum percentage of low
molecular weight species
(molecular weight < 1000):** 0.2

Method of detection and determination: The identity of the polymer may be determined by infrared spectroscopy.

3. PHYSICAL AND CHEMICAL PROPERTIES

The notified polymer is never isolated as a defined entity but always exists as an emulsion in water. The following physico-chemical properties relate to the polymer emulsion.

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

Boiling Point: 100°C (water)

Specific Gravity:	1.05 g/cm ³ at 20°C (emulsion) 14 g/cm ³ (calculated for polymer)
Vapour Pressure:	0.16 kPa at 25°C (water)
Water Solubility:	dispersible but not soluble in water
Combustion Products:	carbon dioxide, nitrogen oxides and water
Explosive Properties:	the polymer will not detonate as a result of heat, shock or friction
Reactivity/Stability:	will react with strong oxidisers

Comments on physico-chemical data:

Water solubility data were not provided. By analogy with similar polymers, it is not expected to be soluble in water, as water insolubility is a functional requirement.

The partition co-efficient was not provided on the grounds that the polymer is not expected to cross biological membranes due to its high molecular weight.

Adsorption/desorption data were not provided. Upon drying, the polymer polymerises to form an insoluble clear solid.

The emulsion is not flammable due to the high water content, and therefore data on flash point, autoignition temperature and flammability limits are not applicable.

Although the polymer contains urethane linkages, significant hydrolysis is not expected under environmentally relevant conditions due to its water insolubility.

There are no readily dissociable groups in the polymer, thus the dissociation constant is not applicable.

4. PURITY OF THE CHEMICAL

The notified polymer contains no impurities at levels necessary to classify it as a hazardous chemical (1). Therefore, information on the purity of the polymer has been exempted from publication in the Full Public Report and the Summary Report.

Additives/Adjuvants:

Chemical name:	CAS No.:	% W/W:
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N-Methylpyrrolidone	872-50-4	10-29
Triethylamine	121-44-8	1-9
Catalysts/surfactants	-	1-9
Water	7732-18-5	>60
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5. INDUSTRIAL USE

The notified polymer will not be manufactured in Australia. It will be imported as a 34% emulsion for use as a film forming resin in industrial paints. The paints will be used to coat metal components. Approximately 1-10 tonnes will be used per annum in the first 5 years.

Neorez XR-9603 has been used in the USA, Japan and the UK for approximately 2 years.

6. OCCUPATIONAL EXPOSURE

The polymer emulsion, Neorez XR-9603 (containing 34% polymer in water), will be imported in 200 L epoxy lined drums and transported to the customer for reformulation into paint products. The finished paints will contain approximately 10% notified polymer. They will be stored in 200 L epoxy lined drums and distributed by road to various customers throughout Victoria and South Australia where they will be coated onto manufactured metal surfaces and heat cured. Worker exposure to either polymer emulsion or finished paints during transport and storage will result only in the event of accidental spills or mishandling.

Approximately 21 workers will be involved in paint manufacture.

Worker:	No.:	Nature of work done:	Exposure:
Paint plant operators	10	blend the paint and collect samples for quality control	8 hours/day, 35-45 days/year
Maintenance personnel	2	repair and clean the mixing vessel, transfer lines, pumps, mixers etc	1 hour/day, 5 days/year
Laboratory technicians/chemists	5	trouble shooting	2-4 hours/day, 10 days/year
Internal Transport and Storage personnel	4	transport and store finished product	none

The majority of handling procedures will be conducted in closed vessels and local exhaust ventilation will be in place during sampling, laboratory testing and drum filling. The internal transport and storage personnel will handle drummed polymer only and are not expected to be exposed during the normal course of their work.

At each paint applicator site a maximum of 18 workers will be involved in paint application.

Worker:	No.:	Nature of work done:	Exposure:
mixing room operators	5	fill and empty paint storage tanks	8 hours/day, 210 days/year
application/ curing operators	5	operate the paint application and curing process	8 hours/day, 210 days/year
maintenance up personnel days/year	2	repair and clean paint tanks, transfer lines, pumps, mixers etc	1-2 hours/day, to 14
laboratory technicians/ days/year chemists	2	quality control testing and trouble shooting	1 hour/day, 105
Internal Transport and Storage personnel	4	transport and store finished product	none

Paints will be applied by automated spray equipment in an enclosed water washed spray booth. The coated metal components will be cured in an enclosed baking oven which is vented to the atmosphere. Workers involved in internal transport and storage should not be exposed unless there is an accidental spill.

A further 10 workers, drum disposers/reconditioners, may be exposed to residual polymer in the drums (1-2 hours/day, 10-20 days/year).

Once the paint is cured there is no possibility for polymer exposure as it becomes an integral part of the paint film.

After heat curing the metal components will later be covered with another surface coating.

7. **PUBLIC EXPOSURE**

During product application the public is unlikely to be exposed to the polymer as aerosols generated will be prevented from release to the atmosphere by the use of enclosed water washed spray booths to capture the overspray.

The public will not be exposed to the polymer during the handling of the finished metal components as it will be under an overcoat layer. Public exposure to the polymer emulsion or paint may occur during transport in an event of accidental spills or mishandling.

8. ENVIRONMENTAL EXPOSURE

. Release

It has been indicated by the notifier that a maximum of about 50 kg per month of the polymer emulsion will be expected for disposal. This comprises 20 kg from spills or leaks, 5 kg from filter residues, 10 kg from drum residues and wash solvent residues of 100 kg containing 15 kg of the polymer emulsion. These wastes will be passed through interceptor pits, with the solid residues disposed of by landfill. The liquid waste from the interceptor pits will be disposed of as trade waste via the sewer.

The notifier states there is an estimated 400 kg per month of flocculated waste paint containing 230 kg of the polymer from the spray booths that will be disposed of by landfill. The amount of polymer to be disposed of is estimated from the volume of paint to be used, 100 tonnes per annum, transfer efficiency, 90% and 35% for electrostatically and air guns respectively, and the amount of polymer in the paint (10%). This is the worst case, using the information provided by the notifier. .

The notified polymer is only intended for use in paints to coat metal components. Release of the notified polymer to the environment, resulting from this application, is only expected in its cured form and will ultimately be consigned to landfill.

. Fate

As Neorez XR-9603 is a polymer with low water solubility leaching from landfill sites is not expected. Incineration of the notified substance is expected to produce water, and oxides of carbon and nitrogen.

Most of the notified polymer is not expected to be released to the environment until it has been fully cured into a solid polymer matrix. The resultant matrix structure should limit the

hydrolysis and biodegradation of the polymer. Bioaccumulation of the polymer is unlikely due to the high molecular weight of the polymer even before curing.

9. EVALUATION OF TOXICOLOGICAL DATA

No toxicity data were provided for the notified polymer, which is acceptable under the *Industrial Chemicals (Notification and Assessment) Act 1989* for a synthetic polymer with number-average molecular weight (NAMW) > 1000.

10. ASSESSMENT OF ENVIRONMENTAL EFFECTS

No aquatic toxicity data were provided, but none are required according to the *Industrial Chemicals (Notification and Assessment) Act 1989*, since the notified polymer has a number average molecular weight (NAMW) > 1000.

Due to its high NAMW the polymer is not expected to cross biological membranes.

11. ASSESSMENT OF ENVIRONMENTAL HAZARD

The polymer is unlikely to present a hazard to the environment at any stage of its use. Of the original quantity of polymer emulsion imported (<30 tonnes) it is expected that most will not be released from the processing/application sites until it has been cured. The ultimate fate of all cured polymer is not known but most likely the majority will be disposed of by landfill. Leaching of the cured polymer from landfill is not expected due to the chemical and physical bonding which occurs during the surface coating process.

Uncured polymer wastes are expected to be a maximum of 280 kg per month and will occur as an aqueous dispersion. Waste generated by formulation will be collected, treated by passage through interceptor pits, with the waste water to be discharged to the sewer as trade waste. The notifier states that the interceptor pits would trap most of the polymer. The waste generated from over spray will be collected, treated by flocculation before discharge to the sewer as trade waste. The flocculation should remove almost all of the polymer. In the event that a small amount of the notified polymer is released to the sewer, it will

be further treated at the municipal sewage treatment works before discharge to the aquatic environment. At the treatment works most of the polymer should be contained in the sludge, which will be incinerated or sent to landfill. Therefore the potential for release to the aquatic compartment is minimal and the associated environmental hazard negligible.

The low level environmental exposure of the polymer as a result of normal use, together with its expected lack of biological activity, indicate that the overall environmental hazard should be negligible.

12. ASSESSMENT OF PUBLIC AND OCCUPATIONAL HEALTH AND SAFETY EFFECTS

The notified polymer will be available in Australia as an emulsion only. The polymer has a NAMW > 1000 and is therefore unlikely to cross biological membranes and cause significant systemic effects. It contains <1% (w/w) low molecular weight (<1000) species and no residual monomers. The emulsion is stable at room temperature, not flammable, but may react with strong oxidisers.

Under normal use conditions, workers involved in reformulating the polymer, or applying paints containing the polymer, will be required to use appropriate engineering controls and personal protective equipment to minimise exposure to solvents or other hazardous components in the formulations. These measures will ensure minimal exposure to the polymer during these operations.

Under normal use conditions, any occupational risks associated with the polymer should be minimal.

Public exposure to the notified polymer is expected to be negligible since its application will be restricted to industry. Public exposure to the notified polymer will be limited to contact with finished metal components where it is under an overcoat layer. If public contact with the polymer does occur during accidental spillages, health hazards arising from acute exposure is anticipated to be low.

13. RECOMMENDATIONS

To minimise occupational exposure to the polymer in Neorez XR-9603 the following guidelines and precautions should be observed:

- . If engineering controls and work practices are insufficient to reduce exposure to a safe level, the following personal protective equipment should be used:
 - . chemical-type goggles conforming to Australian Standards 1336 (2) and 1337 (3);
 - . impervious gloves conforming to Australian Standard 2161 (4); and
 - . protective clothing conforming to Australian Standards 3765.1 (5) or 3765.2 (6).
- . Good work practices should be implemented to avoid splashing and spillages.
- . Spills should be cleaned up promptly.
- . Good personal hygiene practices, such as washing of hands prior to eating food, should be observed.
- . A copy of the MSDS for products containing the notified chemical should be easily accessible to all employees.

14. MATERIAL SAFETY DATA SHEET

The Material Safety Data Sheet (MSDS) for Neorez XR-9603 (Attachment 1) was provided in Worksafe Australia format (7). The MSDS was provided by ICI Australia (Operations) 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 ICI Australia (Operations) Pty Ltd.

15. REQUIREMENTS FOR SECONDARY NOTIFICATION

Under the *Industrial Chemicals (Notification and Assessment) Act 1989*, secondary notification of the new polymer in Neorez XR-9603 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, *Guidance Note for Determining and Classifying a Hazardous Substance*, Australian Government Publishing Service Publ., Canberra, 1991.
2. Australian Standard 1336-1982 *Eye protection in the Industrial Environment*, Standard Association of Australia Publ., Sydney, 1982.
3. Australian Standard 1337-1984 *Eye Protectors for Industrial Applications*, Standards Association of Australia Publ., Sydney, 1984.
4. Australian Standard 2161-1978 *Industrial Safety Gloves and Mittens (excluding Electrical and Medical Gloves)*, Standards Association of Australia Publ., Sydney, 1978.
5. 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, 1990.
6. Australian Standard 3765.2-1990 *Clothing for Protection against Hazardous Chemicals Part 2 Limited protection against specific chemicals*. Standards Association of Australia Publ., Sydney, 1990.
7. National Occupational Health and Safety Commission, *Guidance Note for Completion of a Material Safety Data Sheet*, 3rd Edition, Australian Government Publishing Service Publ., Canberra, 1991.