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**NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION
AND ASSESSMENT SCHEME**

FULL PUBLIC REPORT

Polymer in Setal 1161 SS-54

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 the National Occupational Health and Safety Commission which also conducts the occupational health & safety assessment. The assessment of environmental hazard is conducted by the Department of the Environment and the assessment of public health is conducted by the Department of Health and Aged Care.

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FULL PUBLIC REPORT**Polymer in Setal 1161 SS-54****1. APPLICANT**

Akzo Nobel Pty Ltd of 115 Hyde Rd Yeronga QLD 4104 (ABN 59 000 119 424) has submitted a notification statement in support of their application for an assessment certificate for the synthetic polymer of low concern (PLC) Polymer in Setal 1161 SS-54.

2. IDENTITY OF THE CHEMICAL

The chemical name, CAS number, molecular and structural formulae, molecular weight, spectral data and details of the polymer composition have been exempted from publication in the Full Public Report.

Marketing names: Setal 1161 SS-54
Autocryl Plus

3. POLYMER COMPOSITION AND PURITY

Details of the polymer composition have been exempted from publication in the Full Public Report.

Several of the residual acrylic monomers (at a total level of 0.6 % based on notified polymer) are classified as skin sensitisers, and a cutoff of 1 % applies for the notified polymer to be classified as a hazardous substance.

4. PLC JUSTIFICATION

The notified polymer meets the PLC criteria.

5. PHYSICAL AND CHEMICAL PROPERTIES

The notified polymer is produced as a solution (> 50 % notified polymer) in mixed organic solvents and is never isolated. The following physical and chemical properties relate to the solution rather than the pure notified polymer.

Property	Result	Comments
Appearance	almost colourless viscous liquid	
Boiling point	127°C	
Density	1000 kg/m ³	
Water solubility	< 1 mg/L	
Particle size	not applicable	
Flash Point	26°C	
Autoignition temperature	370°C	
Explosive properties	not explosive	
Stability/reactivity	stable under normal environmental conditions	
Hydrolysis as function of pH	not determined	hydrolysis of ester groups is unlikely in the environmental pH range
Partition coefficient	not determined	
Adsorption/desorption	not determined	
Dissociation constant	not determined	the notified polymer contains a small proportion of carboxylic acid functional group

5.1 Comments on physical and chemical properties

No test reports were provided for the determination of physical and chemical properties.

The partition coefficient of the notified polymer was not determined, but it is expected to partition into the organic phase and associate with soils, sediments and sludges.

The adsorption/desorption behaviour of the notified polymer was not determined, but it is expected to be relatively immobile in soils and not leach within landfill.

6. USE, VOLUME AND FORMULATION

Use:

The notified polymer will be used as a component of a two pack automotive refinish paint for spot repairs or whole body resprays.

Manufacture/Import volume:

The notified polymer will not be manufactured in Australia. The notifier estimates that 3 tonnes per annum of notified polymer will be imported during the first five years of use.

Formulation details:

The notified polymer will only be imported as a component of finished paint components. The finished paints will contain < 40 % notified polymer in mixed organic solvents. The paint components will be imported in 1 L or 3.75 L metal cans. The paint containing the notified polymer will be applied by spray gun. Prior to spray application, the component containing the notified polymer will be mixed with an isocyanate resin hardener and a thinner.

7. OCCUPATIONAL EXPOSURE

Exposure route	Exposure details	Controls indicated by notifier
End use		
<i>Paint Applicators (100 workers, 4 hr/day, daily)</i>		
dermal, ocular, inhalation; up to 40 % solution	mixing will be performed in a dedicated paint mixing room; mixed paint will be transferred to spray guns and applied in a combination spray booth/oven	spray booths will conform with Australian standards; spray paint use will be in accordance with NOHSC <i>National Guidance Material for Spray Painting</i> (NOHSC, 1999c) respiratory protection, goggles or face shield, gloves and overalls
Transport and storage		
<i>Waterside and Transport (6 – 8 workers, 2 hr/day, 10 days/year)</i>		
none	no exposure expected except in event of an accident	safety overalls and shoes
<i>Warehouse (4 – 6 workers, 2 hr/day, 50 days/year)</i>		
none	no exposure expected except in event of an accident	safety overalls and shoes
Disposal		
<i>Disposal of hardened overspray (no exposure details provided)</i>		
dermal	the notified polymer will be in the form of a crosslinked and hardened matrix and will not be separately available for exposure	not stated

8. PUBLIC EXPOSURE

The paint will be applied to vehicles by professional automotive spray painters in auto repair workshops only, and will not be available to the public. Once applied to vehicle surfaces, the notified polymer will become trapped within a film and unavailable for release. Therefore, there will be no direct exposure of the public to the notified polymer through contact with dried paint surfaces of motor vehicles. Exposure of the general public to the notified polymer is only likely to occur in the event of an accidental spill during transportation.

9. ENVIRONMENTAL EXPOSURE

9.1. Release

The major release to the environment will likely occur during spray application of the polyester-acrylic enamel. The notified polymer comprises < 40 % of the final paint product. Once applied, the enamel coating is dried either in air or oven baked at 60°C. This removes the solvent, forming a continuous film on the surface of the metal and the notified polymer is immobilised within the coating and unavailable to the environment.

Wastage due to spillage is expected to be limited. It is estimated that 2.5 % (75 kg per annum) of the polymer would remain in the can as residue and this will be air-cured before being disposed to commercial waste by licensed waste disposal contractors.

The major wastage is likely to occur through overspray, the degree of which is dependent on the substrate, the type of spray gun used, and operator expertise. The loss through overspray is unlikely to be > 30 %, or 900 kg of the notified polymer per annum. This will be collected either by a water curtain or dry filter medium. The hardened overspray will be disposed to commercial waste and end up in landfill.

Overall, up to 975 kg per annum of the notified polymer may be disposed of to landfill from residual polymer in cans and overspray waste.

9.2. Fate

Once applied to the metal panels of heavy vehicles the notified polymer will be incorporated in a hard, durable, inert film and will not present a significant hazard. Any fragments, chips and flakes of the enamel will be of little concern as they are expected to be inert. The metal panels coated with the polymer are likely to be either recycled for steel reclamation or be placed into landfill at the end of their useful life. During metal recycling, the polymer would be incinerated in the blast furnaces and converted to water vapour and oxides of carbon.

The solid waste generated in the formulation and application of the coating will be disposed of to landfill or incinerated. The product when sprayed will be catalysed with an isocyanate activator, resulting in all overspray being crosslinked and becoming inert due to the high molecular weight. The containers and their residue will also be disposed of to landfill, after air drying. Leaching of the notified chemical from landfill sites is unlikely, given the expected low solubility of the notified polymer and its high molecular weight. In landfill the waste

would be very slowly degraded to carbon dioxide gas through the agency of abiotic and bacteriological processes.

Mixing containers and spray equipment will be washed with solvent that is collected and sent to solvent recycling. The resulting dried solid residues will be also disposed of to landfill.

The notified chemical is not expected to cross biological membranes, due to the low water solubility, high molecular weight and strong adsorption to soil, and should not bioaccumulate (Connell, 1990).

10. EVALUATION OF HEALTH EFFECTS DATA

No toxicological data were submitted.

The health hazards of the constituents and additives and adjuvants are tabulated below.

Chemical	Health hazards	Regulatory controls
Constituents		
residual acrylic monomers (0.6 %)	R43: "May cause sensitisation by skin contact" at ≥ 1 %	
Additives/adjuvants		
butyl acetate	eye and mucous membrane irritant (American Conference of Government Industrial Hygienists, 1998)	NOHSC exposure standard 150 ppm
xylene (mixed isomers)	R20/21 Harmful by inhalation and in contact with skin R38 Irritating to skin (NOHSC, 1999a)	NOHSC exposure standard 80 ppm
ethylbenzene	R20 Harmful by inhalation (NOHSC, 1999a)	NOHSC exposure standard 100 ppm
light aromatic hydrocarbon	R65 May cause lung damage if swallowed (NOHSC, 1999a)	

11. EVALUATION OF ENVIRONMENTAL EFFECTS DATA

No ecotoxicological data were submitted.

12. ENVIRONMENTAL RISK ASSESSMENT

The notified polymer crosslinks with other paint components to form a very high molecular weight and stable film that adheres firmly to the primer layer to which it is applied. The notified polymer, as part of this surface coating, will share the fate of the vehicle panel. The paint will slowly deteriorate under the action of UV light, but this is not expected to release the polymer over the useful life of vehicle surfaces.

No repackaging of the notified polymer occurs in Australia and the paints will only be supplied to automotive repair shops. Overspray will be captured and disposed of to landfill or incinerated, as will paint residues in empty cans. The notifier estimates that a maximum of approximately 975 kg per annum of the notified polymer will be released to the environment due to the application process and the disposal of residual polymer in cans.

The paint film on vehicles will contain the notified polymer as part of a crosslinked polymer matrix. The ultimate fate of the notified polymer will be the same as that of the vehicle, and either sent to landfill or for recycling where the polymer will be incinerated to form water vapour and oxides of carbon.

In the event of accidental spillage into waterways, the polymer is not expected to disperse into the water, but settle out onto sediments. If the polymer is spilt on land, either during usage or transport, it is expected to immobilise in the soil layer. Contaminated soil can then be collected and disposed of to landfill. The small container sizes would also limit any hazard in the event of a spill.

Given the above, environmental exposure and the overall environmental hazard is expected to be low.

13. HEALTH AND SAFETY RISK ASSESSMENT

13.1. Hazard assessment

No toxicological information has been provided for the notified polymer. Therefore, the substance cannot be assessed against the NOHSC *Approved Criteria for Classifying Hazardous Substances* (NOHSC, 1999b). The polymer solution Setal 1161 SS-54 is a hazardous substance due to the content of aromatic solvents. It is classed as a Class 3 dangerous good (flammable liquid) because of the solvent content. The paint component being imported, Autocryl Plus MM, is also classified as a hazardous substance and Class 3 dangerous good due to its solvent content.

The MSDS for the polymer solution Setal 1161 SS-54 lists a number of potential health effects, namely headache and eye and respiratory irritation, and coughing, dizziness, sickness, drowsiness, vomiting and central nervous system effects. Skin irritation or dermatitis may also occur on repeated exposure. The symptoms relate mainly to the solvents, xylene,

ethylbenzene, light aromatic hydrocarbon and butyl acetate, rather than the notified polymer. For the paint product, Autocryl Plus MM, a number of potential health effects, namely eye, mucous membrane and respiratory irritation, and kidney, liver and central nervous system effects, are identified. Symptoms including headache, dizziness, fatigue, muscular weakness, drowsiness or loss of consciousness may be seen. Skin defatting may also occur on repeated exposure. Again, these symptoms relate mainly to the solvents present (as above; also 1,2,4-trimethylbenzene).

The polymer solution may be expected to be a potential skin sensitiser as the combined concentration of skin sensitising residual acrylate monomers is close to the cutoff for the polymer itself to be classified as a skin sensitiser according to the Approved Criteria. Care should be taken to protect against dermal contact with the concentrated solutions of the notified polymer to avoid skin sensitisation.

The polymer itself is not reactive and non-volatile, and because of the high molecular weight is not expected to cross biological membranes. The notifier states that there have been no reported incidences of adverse effects on the occupational health of workers using the notified polymer overseas.

13.2. Occupational health and safety

There is little potential for occupational exposure to the notified polymer in the transport and storage of the imported polymer solution. The greatest exposure is in the mixing and use of the paints. Mixing of the paints must take place in a well ventilated area.

The final paint mix including the pre-prepared paint component containing the notified polymer could contain a wide variety of additional ingredients. This is likely to introduce human health hazards because, apart from a range of potentially toxic solvents, there may be components containing resins with pendant isocyanate groups. The spraying procedure also produces a dense aerosol which could adversely affect human health even in the absence of additional hazardous components. It is also probable that professionals involved in the spray painting industry will use a number of different paint formulations.

For these reasons, the notified polymer must be assessed for the contribution it makes to the hazards associated with spray application of the paint. The presence of many potential and actual hazardous substances in the formulations requires the use of stringent engineering controls, such as a correctly constructed and maintained spray booth, and of a high level of personal protective equipment, such as impermeable overalls and gloves and a full face shield and respirator. The use of the paint containing the notified polymer should be in accordance with the NOHSC *National Guidance Material for Spray Painting* (NOHSC, 1999c). The level of protection from exposure afforded by the standard protective measures will provide adequate protection from the notified polymer, which is likely to be less intrinsically toxic than most of the solvents and pigments and also some other paint resins.

Once the applied final paint mix has hardened, the polymer will not be separately available for exposure or absorption.

There are NOHSC exposure standards for xylene, ethylbenzene, 1,2,4-trimethylbenzene and butyl acetate, identified as ingredients in the pre-prepared paint Autocryl Plus MM. The

employer is responsible for ensuring that these exposure standards, and exposure standards pertaining to other final paint mix additives, are not exceeded in the workplace.

The solutions containing the notified polymer are flammable due to their solvent content. Precautions must be taken to avoid sources of ignition, e.g. use of earthing leads. Operators should wear antistatic overalls and footwear.

Similar considerations apply in the cleaning of spray equipment and disposal of the polymer. The wastes containing the notified polymer may be hazardous materials on the basis of the solvent and other resin content, and the precautions used for the additional materials should be adequate for protection from the notified polymer. In addition, much of the polymer will be crosslinked and hardened, and therefore immobile, by the time of disposal.

The notified polymer itself is of low hazard, and apart from the controls already in place to prevent exposure to other paint components and to the notified polymer in particulate form during spraying, no additional controls are required.

13.3. Public health

The notified polymer is intended for use by professional automotive spray painters in auto repair workshops only, and will not be sold to the public. Following application, the notified polymer will become trapped within a film and will not be bioavailable. Therefore, the risk to the public of exposure to the notified polymer is considered low.

14. MSDS AND LABEL ASSESSMENT

14.1. MSDS

The MSDS of the products containing the notified polymer provided by the notifier were in accordance with the NOHSC *National Code of Practice for the Preparation of Material Safety Data Sheets* (NOHSC, 1994a). They are published here as part of the assessment report. The accuracy of the information on the MSDS remains the responsibility of the applicant.

14.2. Label

The label for the products containing the notified polymer provided by the notifier were in accordance with the NOHSC *National Code of Practice for the Labelling of Workplace Substances* (NOHSC, 1994b). The accuracy of the information on the label remains the responsibility of the applicant.

15. RECOMMENDATIONS

Control Measures

Occupational Health and Safety

- Employers should implement the following safe work practices to minimise occupational exposure during handling of the notified polymer in spray paint products:
 - Use of the paint containing the notified polymer should be in accordance with the NOHSC *National Guidance Material for Spray Painting*;
 - Employers should ensure that NOHSC exposure standards for all of the components of the final paint mix are not exceeded in the workplace.
- Employers should ensure that the following personal protective equipment is used by workers to minimise occupational exposure to the notified polymer in spray paint products:
 - Protective eyewear, chemical resistant industrial clothing and footwear and impermeable gloves; where engineering controls and work practices do not reduce vapour and particulate exposure to safe levels, an air fed respirator should also be used.

Guidance in selection of personal protective equipment can be obtained from Australian, Australian/New Zealand or other approved standards.

- A copy of the MSDS should be easily accessible to employees.
- If products and mixtures containing the notified polymer are classified as hazardous to health in accordance with the NOHSC *Approved Criteria for Classifying Hazardous Substances*, workplace practices and control procedures consistent with provisions of State and Territory hazardous substances legislation must be in operation.

15.1 Secondary notification

The Director of Chemicals Notification and Assessment must be notified in writing within 28 days by the notifier, other importer or manufacturer:

- (1) Under Section 64(1) of the Act; if
 - the notified polymer is introduced in a chemical form that does not meet the PLC criteria.

or

- (2) Under Section 64(2) of the Act:
 - if any of the circumstances listed in the subsection arise.

The Director will then decide whether secondary notification is required.

16. REFERENCES

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