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**NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME
(NICNAS)**

FULL PUBLIC REPORT

Polymer in Witcobond W-240

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FULL PUBLIC REPORT

Polymer in Witcobond W-240

1. APPLICANT

Crompton Specialties Pty Ltd (ABN 18 005 225 507) of Unit 2/13 Stanton Road Seven Hills NSW 2147 has submitted a notification statement in support of their application for an assessment certificate for the synthetic polymer of low concern (PLC), Polymer in Witcobond W-240.

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: Polymer in Witcobond W-240 (30% notified polymer).
Polymer in Aqualok 8001 (<30% notified polymer).

3. POLYMER COMPOSITION AND PURITY

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

4. PLC JUSTIFICATION

The notified polymer meets the PLC criteria.

5. PHYSICAL AND CHEMICAL PROPERTIES

<i>Property</i>	<i>Result</i>	<i>Comments</i>
Appearance	Not provided for the polymer.	Witcobond W-240 is a translucent viscous liquid with a mild amine odour.
Boiling point	Not determined.	Boiling point of the 30% emulsion is 100°C.
Density	Not determined.	Density of the 30% emulsion is 1050 kg/m ³ .
Water solubility	Not determined.	The notifier indicates the notified polymer is not water-soluble, but is dispersible forming emulsion with water. It has a high NAMW and high proportion of hydrophobic aromatic and aliphatic groups, although it does contain one component which is likely to increase water solubility.
Adsorption/desorption	Not determined.	In its emulsified form and as a consequence of its hydrophobicity, the notified polymer is expected to associate with the soil matrix and sediments, and hence it will be immobile in soil.
Dissociation constant	Not determined.	Hydrophilic groups of the notified polymer may have a pKa of 4.

Particle size	Not determined.	The notified polymer will be imported only as an aqueous emulsion, not in a technical grade.
Flammability	Not determined.	
Autoignition temperature	Not determined.	
Explosive properties	Not determined.	
Stability/reactivity	Stable.	Under normal conditions of use and storage, the notified polymer is not expected to undergo degradation. Hazardous polymerisation will not occur. Exposed to extreme temperatures, hazardous combustion products may be generated: carbon monoxide, carbon dioxide and oxides of nitrogen.

6. USE, VOLUME AND FORMULATION

Use:

A component of a water based acrylic urethane top-coating for finishing metals, rigid metals and woods.

Import volume and duration:

3-10 tones per year in the first five years.

Formulation details:

Witcobond W-240 is an emulsion containing 30% notified polymer in water and 1-methyl-2-pyrrolidone. It will be imported in 205 L steel drums for use in formulation of a surface coating product, Aqualok 8001. This final product will be packaged in 20 L plastic containers and sent by road to an end user, typically a specialist car manufacturer.

7. OCCUPATIONAL EXPOSURE

Number and Category of Workers

<i>Category of Worker</i>	<i>Number</i>	<i>Exposure Duration</i>	<i>Exposure Frequency</i>
Transport and storage workers	6-8	30 min	15 days/year
Formulation operators	10	4 h	15 days/year
Applicators – spray painting	10	2 h	60 days/year

Exposure Details

The imported product containing 30% notified polymer will be shipped in 205 L steel drums directly from the docks to Crompton Specialties warehouse for storage. It will be then taken to a customer site in Revesby NSW for formulation prior to distribution to a car manufacturer for use. Transport and storage workers will wear overalls, protective gloves and safety shoes, and would only be exposed to the notified polymer in the event of an accident. Spills will also be absorbed and disposed of in accordance with government regulations.

Formulation operators will pour the 30% emulsion into 500 kg steel mixing vats using a forklift, together with other components and water. After mixing, the final protective coating product containing <30% notified polymer will be decanted into 20 L plastic containers. At the end user site, painting applicators will apply the final product into 100 mL sputter guns by gravity feed. The guns operate with a low pressure and have a large orifice to prevent atomisation. Car surfaces are sprayed in a spray booth and the coatings are dried in a specially designed oven. Potential exposure of these workers would be predominantly via inhalation and skin contact, some ocular exposure may also occur due to splashes and spillages.

During formulation and spray painting workers wear protective clothing, PVC or rubber gloves, eye protection and respirators complying with Australian/New Zealand Standards. Areas of use and spray booths are equipped with local and general ventilation.

8. PUBLIC EXPOSURE

The notified polymer will be imported in a 30% emulsion in 205 L steel drums. Public exposure will occur only as a result of rupture of the container in an accident. In the event of a spill the MSDS advises that the polymer should be contained and collected by absorption with sand, earth or vermiculite and disposal of in accordance with regulations. Public exposure will thus be negligible during importation and transportation.

The emulsion will be reformulated into the final product containing <30% notified polymer and packaged into 20 L plastic containers. The product will not be available to the public. There is likely to be significant dermal exposure to the finished surfaces. However, once dried the polymer is bound to the paint film and not bioavailable.

9. ENVIRONMENTAL EXPOSURE

9.1. Release

During formulation of a coating, the notifier estimates that up to 100 kg per annum of waste containing the notified polymer will be generated from cleaning of minor spills and equipment. Up to another 100 kg per annum will be released as residue in import drums, and 100 kg per annum during coating application. The notifier indicates that the waste generated from the coating application will be in the order of 1% because it is a water based operation designed to minimize waste generation and over-spray will be collected and recycled.

9.2. Fate

No environmental fate data were submitted. However, it is expected that the majority of the notified polymer once incorporated into the coating will become immobile in the environment due to its high molecular weight and hydrophobicity. Any fragments, chips and flakes of the coating are also expected to be inert. The automotive components coated with the polymer are likely to be either recycled (eg. steel reclamation) or be placed into landfill at the end of their useful life. When recycled the polymer would be destroyed in furnaces and converted to water vapour and oxides of carbon and nitrogen.

Liquid wastes from spills, equipment cleaning and spray booths containing the notified polymer are expected to be collected by licensed waste disposal contractors. Presumably these wastes will be treated by flocculation. The resulting solid including the notified polymer will be dried followed by disposal into landfill while the water will be treated prior to release into the sewer.

10. EVALUATION OF HEALTH EFFECTS DATA

10.1. Summary of Toxicological Investigations

<i>Endpoint & Result</i>	<i>Assessment Conclusion</i>
Rat, acute oral LD50 >5000 mg/kg bw	low toxicity
Rabbit, eye irritation	slightly irritating
Rabbit, skin irritation	slightly irritating

10.2. Acute Oral Toxicity

TEST SUBSTANCE	Witcobond W-240
METHOD	In-house method, similar to the OECD 401 Acute Oral Toxicity test.
Species/Strain	Rat/Sprague-Dawley
Vehicle	Test substance used as supplied in a translucent off-white liquid without dilution.
Remarks - Method	The animals were fasted for at least 16 h prior to treatment. The test substance was administered by oral intubation using an appropriately-sized syringe and stainless steel ball-tipped intubation needle. Food and water were freely available during the study period, including immediately after treatment.

RESULTS

<i>Group</i>	<i>Number & Sex of Animals</i>	<i>Dose mg/kg bw</i>	<i>Mortality</i>
I	5/female	5010	0
II	5/male	5010	0

LD50 >5000 mg/kg bw
Remarks - Results There were no observable abnormalities in any of the animals upon gross necropsy. No mortalities were found.

CONCLUSION The notified polymer is of low toxicity via the oral route.

TEST FACILITY Stillmeadow Inc, Texas (1982a)

10.3. Eye Irritation

TEST SUBSTANCE Witcobond W-240

METHOD In-house method, similar to the OECD 405 Acute Eye Irritation/Corrosion test.
Species/Strain Rabbit/New Zealand White
Number of Animals 3 females and 3 males
Observation Period 7 days
Remarks - Method No observation was made at 1 h post treatment.

RESULTS

<i>Lesion</i>	<i>Mean Score*</i>	<i>Maximum Value</i>	<i>Maximum Duration of Any Effect</i>	<i>Maximum Value at End of Observation Period</i>
CONJUNCTIVA: REDNESS	0.4	1	72 h	0
<i>Conjunctiva: chemosis</i>	<0.1	1	24 h	0
<i>Conjunctiva: discharge</i>	0	0	0	0
<i>Corneal opacity</i>	0	0	0	0
<i>Iridial inflammation</i>	0	0	0	0

*Calculated on the basis of the scores at 24, 48, & 72 hours for ALL animals.

Remarks - Results Conjunctival irritation reversible within 7 days. Positive fluorescein staining did not occur in any of the non-washed eyes.

CONCLUSION The notified polymer is slightly irritating to the eye.

TEST FACILITY Stillmeadow Inc, Texas (1982b)

10.4. Skin Irritation

TEST SUBSTANCE Witcobond W-240

METHOD In-house method, similar to the OECD 404 Acute Dermal Irritation/Corrosion test.
Species/Strain Rabbit/New Zealand White
Number of Animals 3 females and 3 males
Observation Period 72 hours
Vehicle Test substance used as supplied in a translucent off-white liquid without dilution.
Type of Dressing Occlusive
Remarks - Method No observation was made at 1 h and 48 h post treatment.

RESULTS

<i>Lesion</i>	<i>Mean Score*</i>	<i>Maximum Value</i>	<i>Maximum Duration of Any Effect</i>	<i>Maximum Value at End of Observation Period</i>
<i>Erythema/Eschar</i>	0.83	2	72 h	2
<i>Oedema</i>	1.33	3	72 h	2

*Calculated on the basis of the scores at 24 & 72 hours for ALL animals.

Remarks - Results	There were no apparent signs of ulceration, necrosis or other dermal defects present at any of the test sites.
CONCLUSION	The notified polymer is slightly irritating to skin.
TEST FACILITY	Stillmeadow Inc, Texas (1982c)

The health hazards of the residual monomer are tabulated below.

<i>Chemical</i>	<i>Health hazards</i>	<i>Regulatory controls</i>
Formaldehyde	<p><i>At Concentrations equal to or more than 25%:</i> Toxic (T): R40 - Possible risk of irreversible effects, R23/24/25 - Toxic by inhalation, in contact with skin and if swallowed, R34 - Causes burns, R43 - May cause sensitisation by skin contact.</p> <p><i>At Concentrations equal to or more than 5% and less than 25%:</i> Harmful (Xn): R40 - Possible risk of irreversible effects, R20/21/22 - Harmful by inhalation, in contact with skin and if swallowed, R36/37/38 - Irritating to eyes, respiratory system and skin, R43 - May cause sensitisation by skin contact.</p> <p><i>At Concentrations equal to or more than 1% and less than 5%:</i> Harmful (Xn): R40 - Possible risk of irreversible effects, R43 - May cause sensitisation by skin contact.</p> <p><i>At Concentrations equal to or more than 0.2% and less than 1%:</i> Harmful (Xi): R43 - May cause sensitisation by skin contact (NOHSC, 1999a).</p>	<p><i>NOHSC exposure standards:</i> 1 ppm or 1.2 mg/m³ (TWA) and 2 ppm or 2.5 mg/m³ (STEL) (NOHSC, 1995).</p>

11. EVALUATION OF ENVIRONMENTAL EFFECTS DATA

No ecotoxicological data were provided.

12. ENVIRONMENTAL RISK ASSESSMENT

The majority of the notified polymer will be combined with other coating components where heat induces reaction to form a very high molecular weight and stable coating. Therefore, once incorporated into the coating formulation, the notified polymer is expected to be immobile and pose a minimal risk to the environment. The coating degrades over time, however, any fragments, chips and flakes of the coating will be of little concern as they are expected to be inert. The automotive components coated with the polymer will be either recycled (eg. steel reclamation) or placed into landfill at the end of their useful life. When recycled the polymer would be destroyed in furnaces and converted to water vapour and oxides of carbon and nitrogen.

Liquid wastes from spills, equipment cleaning and spray booths will be treated by flocculation. The resulting solid containing the notified polymer will be disposed of in landfill while the water will undergo treatment prior to release into the sewer.

As a consequence of its hydrophobic nature, the notified polymer is expected to associate with the soil matrix and sediments and not be mobile in landfill where it will slowly degrade. The notified polymer is not expected to cross biological membranes due to its very high molecular weight and is therefore not expected to bioaccumulate (Connell 1990).

Overall, the notified polymer is not likely to pose a significant risk to the environment when it is stored, transported and used in the proposed manner.

13. HEALTH AND SAFETY RISK ASSESSMENT

13.1. Hazard assessment

The notified polymer is of low acute oral toxicity in rat (LD50 >5000 mg/kg bw). It is a slightly skin and eye irritant. With a high NAMW and insignificant percentage of low molecular weight species, the polymer is unlikely to penetrate biological membranes. The water solubility of the polymer is expected to be low, although the hydrophilic groups would increase its water solubility.

Based on the available data the notified polymer is not classified as hazardous under the NOHSC *Approved Criteria for Classifying Hazardous Substances*.

13.2. Occupational health and safety

Transport and storage workers who will be involved in handling the emulsions of the notified polymer in steel drums and plastic containers are not expected to come into contact with it. They will wear overalls, protective gloves and safety shoes. In the event of an accident, spills will be absorbed using sand, earth or vermiculite and be disposal in accordance with regulations. Therefore, there would be no occupational health risk posed by the polymer during transportation and storage.

Formulation operators and spray painting workers will be potentially exposed to the notified polymer when preparing the final emulsions and applying this using sputter guns for spraying car components. Exposure of these workers would be predominantly via inhalation and skin contact, some ocular exposure may also occur due to splashes and spillages. However, on the basis that the workers will observe safe work practices, including wearing appropriate industrial standard personal protective equipment (PPE) and employers will provide appropriate engineering controls such as adequate ventilation in all work areas and non-atomised low pressure spray guns, exposure would be minimised. Therefore, the health risk to these workers is considered to be low.

Taking all into consideration, 'Polymer in Witcobond W240' is of low concern to human health and safety under the proposed occupational settings.

13.3. Public health

Significant public exposure can be expected through dermal contact with painted surfaces. However, once cured the polymer is bound to the paint film and not bioavailable. On the basis of the information available, it is considered that the notified polymer will not pose a significant risk to public health when used in the proposed manner.

14. MSDS AND LABEL ASSESSMENT

14.1. MSDS

The MSDS for the imported and end-use products, Witcobond W-240 and Aqualok 8001 containing the notified polymer at $\leq 30\%$, provided by the notifier were in accordance with the NOHSC *National Code of Practice for the Preparation of Material Safety Data Sheets* (NOHSC, 1994a). The MSDS for Witcobond W-240 is 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 imported product and end-use products, Witcobond W-240 and Aqualok 8001, 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

No specific precautions are required for the notified polymer per se. However, due to the presence of potentially hazardous components in the paint products:

- Employers should implement the following engineering controls to minimise occupational exposure to the products:
 - Adequate local and general ventilation in areas of formulation and application of paints, including the spray booth
 - Non-atomised low pressure guns for spraying.
- Employers should implement the following safe work practices to minimise occupational exposure during handling of the product:
 - Adequate training for staff in handling paint products, including compliance with the National Guidance Material for Spray Painting (NOHSC, 1999b).
- Employers should ensure that the following personal protective equipment is used by workers to minimise occupational exposure to the notified polymer in surface coating emulsions:
 - Protective clothing, chemical resistant gloves, eye protection and respirators during formulation and spray painting.

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.

Disposal

- The notified polymer should be disposed of in landfill.

Emergency procedures

- Spills/release of the notified polymer should be contained as described in the MSDS (i.e. contained with inert material such as sand, earth, or vermiculite and transferred to a sealable waste containers) and the resulting waste should be disposed of in landfill.

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.and
- (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

Connell DW (1990) General characteristics of organic compounds which exhibit bioaccumulation. In: Connell DW ed. Bioaccumulation of xenobiotic compounds. Boca Raton, USA, CRC Press, pp 47-57.

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NOHSC (1994b) National Code of Practice for the Labelling of Workplace Substances [NOHSC:2012(1994)]. National Occupational Health and Safety Commission, Canberra, Australian Government Publishing Service.

NOHSC (1995) Exposure Standards for Atmospheric Contaminants in the Occupational Environment [NOHSC:3008(1995)] & [NOHSC:1003(1995)]. National Occupational Health and Safety Commission, Canberra, Australian Government Publishing Service.

NOHSC (1999a) List of Designated Hazardous Substances [NOHSC:10005(1999)]. National Occupational Health and Safety Commission, Canberra, AusInfo.

NOHSC (1999b) National Guidance Material for Spray Painting. National Occupational Health and Safety Commission, Canberra, AusInfo.

Stillmeadow Inc. (1982a) Rat acute oral toxicity (Project no. 2600-82). Houston, Texas, Biological Testing Laboratory (unpublished report submitted by Crompton Specialites).

Stillmeadow Inc. (1982b) Rabbit eye irritation (Project no. 2601-82). Houston, Texas, Biological Testing Laboratory (unpublished report submitted by Crompton Specialites).

Stillmeadow Inc. (1982c) Rabbit skin irritation (Project no. 2602-82). Houston, Texas, Biological Testing Laboratory (unpublished report submitted by Crompton Specialites).