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NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME

FULL PUBLIC REPORT

ISOPLAST 101 NATURAL ENGINEERING THERMOPLASTIC RESIN

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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) 9577 9464:

Street Address: 92 Parramatta Rd Camperdown, NSW 2050, AUSTRALIA
Postal Address: GPO Box 58, Sydney 2001, AUSTRALIA
Telephone: (61) (02) 9577-9466 **FAX (61) (02) 9577-9465**

Director
Chemicals Notification and Assessment

FULL PUBLIC REPORT

ISOPLAST 101 NATURAL ENGINEERING THERMOPLASTIC RESIN

1. APPLICANTS

Dow Chemical (Australia) Ltd of Kororoit Creek Rd ALTONA VIC 3018 and Hoechst Australia Limited of 606 St Kilda Rd MELBOURNE VIC 3004 have submitted a notification statement accompanying their application for assessment of a synthetic polymer of low concern **Isoplast 101 Natural Engineering Thermoplastic Resin**.

2. IDENTITY OF THE POLYMER

Trade name:	Isoplast 101 Natural Engineering Thermoplastic Resin
Number-average molecular weight:	> 1 000
Maximum percentage of low molecular weight species	
molecular weight < 1000:	0.1%
molecular weight < 500:	0.1%

Means of identification (List of spectral data available):

Infrared spectrum

3. PHYSICAL AND CHEMICAL PROPERTIES

Appearance at 20°C and 101.3 kPa:	clear to pale yellow pellets (approximately 3-5mm, octahedral and cylindrical)
Melting point:	110 - 140°C
Density:	1100 - 1200 kg/m^3
Water Solubility:	not determined
Hydrolysis as a function of pH:	not provided
Autoignition Temperature:	not determined but anticipated to be > 260°C
Explosive Properties:	none

Comments on Physico-Chemical Properties

The notifier has provided a result for water solubility testing of a related polymer , XUS 72514.00. In this test (details provided) pellets of the polymer are agitated at 40°C for 24 hours. This test method is similar to the guidelines being developed by the OECD for polymer solubility testing. Total extractable solubility was 140 ppm,

but as the polymer itself is non-polar in nature, it is anticipated that this figure represents low molecular weight species solubilities. At 20°C the solubility is expected to be less than 140 ppm. Although this figure is higher than allowed for polymers of low concern, due to the structure of the notified polymer, the data presented is considered sufficient to demonstrate the low expected solubility of the notified substance.

The polymer is reported to be stable under the conditions of use, contains no charged groups, will not be cationic or anionic in the typical pH range of use and does not contain functional groups that will readily hydrolyse or further react. While the polymer contains urethane linkages, these are not likely to hydrolyse under environmental conditions due to low water solubility. In addition, the reactive isocyanate group at the end of the polymer chain should crosslink under manufacturing process, and is not expected to be available for further reaction.

4. PURITY OF THE CHEMICAL

The notified polymer is approximately 99.6% pure. Each residual monomer is stated to be present at < 0.1%. Additives are present to inhibit oxidation and promote thermal stability.

5. USE VOLUME AND FORMULATION

The notified polymer is to be used in combination with other plastics for equipment parts, tool handles and objects used in a marine application. It will be imported at a rate of up to 1 000 tonnes per year in the first 5 years.

6. OCCUPATIONAL EXPOSURE

The notified polymer will be imported in 25 kg plastic bags (marine application) or in bulk containers.

In the case of the marine application the bags will be opened and the pellets poured into a hopper for drying prior to automatic transfer to the injection moulding machine. For the other applications drying occurs in the bulk containers prior to mixing with other plastics in the injection moulder. The notifier estimates that potential exposure to the polymer is 2 000 hours per year per worker. However, due to the automatic enclosed operation, actual exposure is estimated at 100 hours per year. Overalls and gloves are supplied as protection against hot surfaces and articles after moulding.

Fumes produced during the injection moulding process are generally dealt with by good general and local exhaust ventilation but use of a respirator may be required by dye setters and machine operators.

In all applications some granulation and recycling of waste may occur. Waste unsuitable for recycling is buried off-site in landfill.

7. PUBLIC EXPOSURE

The public will not normally be exposed to the notified polymer during its importation and processing into articles. The public may be exposed directly or indirectly to articles made from the notified polymer.

Public exposure to the notified polymer during accidents in storage, processing and transport is likely to be limited due to the physical characteristics of the product.

8. ENVIRONMENTAL EXPOSURE

. Release

The first notifier, Dow Chemical (Australia) Ltd has provided the following estimates of release to the environment of the polymer. The notified chemical is mixed with other thermoplastic polymers in moulding machinery. Although no specific customers have been identified, the notifier has based the estimates on experience with similar polymers. The polymer will be fed automatically into moulding machinery. Spills during feeding procedures are to be recycled, as are any polymer scraps. Off-specification polymer, dirty spilt material and rejected finished articles are to be deposited into municipal landfills. Overall, such waste streams are thought to be approximately 2% of the annual throughput.

Fume generation during start-up or purging procedures is expected to be a source of waste. As the material would undergo thermal degradation during these procedures, the startup material, and material present after purging cannot be recycled. The maximum amount of waste from this source could therefore total one tonne, which will also be disposed of in landfill.

Used articles containing the polymer will also eventually be disposed of in landfills. Overall, a maximum of 20 tonnes may be released to landfills as a result of manufacturing processes. The quantities placed in landfill as a result of disposal of used articles is not able to be determined.

Several forms of release are possible during the manufacturing of the articles envisaged by Hoechst Australia Ltd. Spills during the loading of injection moulding machinery may occur. Overheating of equipment may produce fumes (the notifier has estimated that such gas releases would be limited to 5 minutes per 500 kg of material, but does not specify how much gas would be released). Drilling of the moulded components is expected to generate dusts containing small particles of polymer. Up to one tonne of the material may be lost during article production (at full production/importation). All this waste is to be sent to landfill, with no recycling anticipated.

. Fate

In the case of accidental spillage, pellets of the polymer are expected to remain where they are deposited. Should a spill occur to water, the pellets should settle onto the bottom sediments, where they could be collected. Due to the anticipated low solubility of the polymer, leaching from landfill is highly unlikely, and no movement from the landfill site is expected. The use of the polymer as a component of articles to be used in the marine environment is not anticipated to result in any increased release, as the polymer will be mostly encapsulated with metal fabrications.

Any incineration of the polymer may produce aliphatic and aromatic compounds, carbon dioxide and hydrogen cyanide. Therefore, incineration should be avoided, and wastes should be deposited in tips that do not burn refuse.

The majority of the polymer is not expected to be released to the environment until it has been formulated into a solid product. Biodegradation is unlikely. The high molecular weight of the substance also means that bioaccumulation is not likely to occur.

Surface photodegradation of the finished product is expected with sunlight, but this is only likely to occur after the product has been disposed of to landfill, or discarded inappropriately.

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. However, due to the pelletised form of the polymer, the first notifier, Dow Chemical (Australia) Ltd states that mechanically caused adverse effects may occur should wildlife ingest the pellets. Spill procedures should reduce this possibility.

10. ASSESSMENT OF ENVIRONMENTAL HAZARD

Disposal of the notified polymer to landfill is unlikely to present a hazard to the environment as it will be in a pellet form or as a finished product. Bioconcentration and leaching are both considered unlikely to occur, due to the high molecular weight of the product and its insoluble nature. Biodegradation of the product is also considered unlikely.

The main environmental hazard would arise through spillage in transport accidents that may release quantities of the polymer to drains and waterways. However, the polymer is expected to sink to the sediments and remain immobile pending collection on the soil/sediment layer. The Material Safety Data Sheet (MSDS) provided by both notifiers contain adequate directions for dealing with a spill of the polymer.

The low environmental exposure of the polymer as a result of the proposed use, together with its expected low environmental toxicity, indicate that the overall environmental hazard should be negligible.

11. ASSESSMENT OF OCCUPATIONAL AND PUBLIC HEALTH AND SAFETY EFFECTS

Isoplast 101 Natural Engineering Thermoplastic Resin has been notified as a synthetic polymer of low concern under section 23 for the purposes of section 24A of the Act. The polymer meets the criteria for a synthetic polymer of low concern specified in regulation 4A of the Act and can, therefore, be considered to be of low hazard to human health.

Exposure during transport and handling is only expected to occur in the event of an accident.

Exposure of workers to the notified polymer during manufacture of plastic articles is expected to be minimal through the use of closed systems and limited handling. In the case of the marine application, drilling of the plastic articles takes place after manufacture which may create a nuisance dust problem.

The occupational and public health risk arising from transport, storage, use and disposal of the notified polymer is likely to be minimal.

12. RECOMMENDATIONS

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

- Good general and local exhaust ventilation should be employed to minimise exposure to fumes and dust; if engineering controls or work practices are unable to reduce such exposure to a safe level, respiratory devices conforming to Australian/ New Zealand (AS/NZS) standards - AS/NZS 1715 (1) and 1716 (2) should be worn;
- Spillage of the notified chemical should be avoided, spillages should be cleaned up promptly and should then be put into containers for disposal;
- Good personal hygiene should be practised to minimise the potential for ingestion;
- A copy of the relevant MSDS should be easily accessible to employees.

13. MATERIAL SAFETY DATA SHEET

The MSDS for the notified chemical and formulation containing it were provided in accordance with the *National Code of Practice for the Preparation of Material Safety Data Sheets* (3).

The MSDS were provided by the applicants as part of the notification statement. They are reproduced here as a matter of public record. The accuracy of this information remains the responsibility of the applicants.

14. REQUIREMENTS FOR SECONDARY NOTIFICATION

Under the Act, secondary notification of the notified chemical 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. Standards Australia, Standards New Zealand, 1994, *Australian/New Zealand Standard 1715 - 1994 Selection, Use and Maintenance of Respiratory Protective Devices*, Standards Association of Australia Publ., Sydney, Australia, Standards Association of New Zealand Publ., Wellington, New Zealand.

2. Standards Australia, Standards New Zealand,1991, *Australian/New Zealand Standard 1716 - 1991 Respiratory Protective Devices,* Standards Association of Australia Publ., Sydney, Australia, Standards Association of New Zealand Publ., Wellington, New Zealand.

3. National Occupational Health and Safety Commission 1994, *National Code of Practice for the Preparation of Material Safety Data Sheets [NOHSC:2011(1994)]*, AGPS, Canberra.