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NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME

FULL PUBLIC REPORT

PRATHERM EC-20

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Director
Chemicals Notification and Assessment

FULL PUBLIC REPORT

PRATHERM EC-20

1. APPLICANT

D.I.C Australia Pty Ltd of 21 McDonalds Lane MULGRAVE VIC 3150 and General Electric Plastics (Australia) Pty Ltd of 175 Hammond Road DANDENONG VIC 3175 have submitted a joint limited notification statement in support of their application for an assessment certificate for PRATHERM EC-20

2. IDENTITY OF THE CHEMICAL

PRATHERM EC-20 is not considered to be hazardous based on the nature of the chemical and the data provided. Therefore the chemical name, CAS number, molecular and structural formulae, molecular weight, spectral data, details of the polymer composition and details of exact import volume and customers have been exempted from publication in the Full Public Report and the Summary Report.

Trade Name:	PRATHERM EC-20
Number-Average Molecular Weight (NAMW):	> 1 000
Weight-Average Molecular Weight:	> 1 000

3. PHYSICAL AND CHEMICAL PROPERTIES

Appearance at 20°C and 101.3 kPa:	pale yellow powder
Melting Point:	116°C (softening point)
Specific Density:	2.0 kg/m^3
Vapour Pressure:	no data provided
Water Solubility:	no data provided

Partition Co-efficient (n-octanol/water):	no data provided
Hydrolysis as a Function of pH:	no data provided
Adsorption/Desorption:	no data provided
Dissociation Constant:	not applicable
Particle size:	average 150μm
Flash Point:	no data provided
Flammability Limits:	no data provided
Autoignition Temperature:	no data provided
Explosive Properties:	no data provided
Reactivity/Stability:	no data provided

Comments on Physico-Chemical Properties

Although no data was provided the component molecules of the notified material are expected to have low water solubility. The low water solubility together with the general chemical structure of the molecules also indicate very low susceptibility to hydrolytic degradation.

The components of the notified material are inherently hydrophobic and hence would be expected to partition into the oil phase.

The same properties indicate that the material would adsorb onto, or become associated with the organic components of soils and sediments.

The notified material contains no acidic or basic functionalities and cannot therefore become charged through gain or loss of protons.

3. PURITY OF THE CHEMICAL

Degree of Purity: > 90%

4. USE, VOLUME AND FORMULATION

The notified polymer will not be manufactured in Australia but will be imported for use as a flame retardant additive for thermoplastic casting resins. Import volumes for the notified polymer are anticipated to greater than 1 000 kg per annum over the next five years.

The notified polymer will be blended at one customer site into an homogeneous mixture with other thermoplastic polymer resins. This “master batch” material produced in the form of beads will be sold to approximately 10 customers around Australia who will use the material as a moulding resin for production of fire retardant housings for consumer electrical appliances.

5. OCCUPATIONAL EXPOSURE

The notified polymer will be imported in 25 kg sealed bags. Therefore transport and warehouse workers are unlikely to be exposed to it under normal working conditions.

At the customer site there will be four categories of workers with the potential for exposure to the notified polymer. These include, laboratory development workers, transport and warehouse staff and those involved in compound manufacture. Those workers involved in transporting, storage and laboratory development of the notified polymer are unlikely to come into contact with it under normal working conditions. In the event of an accident, contact with the skin or inhalation of dusts are the most likely routes of exposure to the notified polymer.

During manufacture the notified polymer will be loaded manually into a sealed , rotating blending unit. During this process there is the potential for dermal exposure to it and inhalational exposure if dusts are generated during the pouring procedure.

In all processes where workers are handling the unblended polymer they should be aware that accidental ocular exposure could lead to irritation effects caused by the physical nature of the chemical.

The blending process results in a homogenous mixture of the notified polymer and thermoplastic resin. This mixture is then gravity fed into an extruder. The heated barrel of the extruder turns the mixture into a molten homogeneous mass, which is extruded into cooling water and the strands of extrudate are cut into beads of approximately 3 mm in length, containing less than 30% of the notified polymer. Although the blending process is conducted in closed systems there is the potential for exposure to dusts generated during the process. Once this process has been completed the notified polymer will be fully encapsulated in thermoplastic resin thus minimising exposure to the notified polymer.

The finished product containing the encapsulated notified polymer, at concentrations less than 20%, will be added by customers to a moulding machine for production of fire retardant housings for consumer electrical appliances. As the notified polymer is encapsulated during this process worker exposure is considered to be negligible.

6. PUBLIC EXPOSURE

Unfabricated notified polymer will not be available to the public directly. Plastic blends will be used for the manufacture of consumer electrical appliances, consequently there will be wide public exposure to appliances containing the notified polymer. However, as the notified polymer is incorporated into the matrix of the

plastic actual public exposure to the notified polymer will be negligible.

7. ENVIRONMENTAL EXPOSURE

Release

There is some potential for release of the notified substance through production of dust during the blending operation. However, the blending and extrusion equipment is fitted with exhaust ventilation which allows for capture of the dust, and consequently release to the environment from this operation is expected to be very small.

After the extrusion operation, the notified polymer is incorporated within solid plastic resin beads from which no release to the environment would be expected.

Similarly the dust removed from the filters in the vacuum exhaust systems is added into a concrete mix, and after setting is placed into a landfill.

The residual material left in the paper bags is expected to be small and would be placed into industrial landfill with the empty bags.

These beads of extrudate (the “master batch”) are sold to around 10 manufacturing concerns where it is remelted for moulding into the housings for electrical appliances. There is no potential for gross release of the notified polymer during these operations, and the waste material from these procedures would be collected and disposed of into landfill.

Fate

In the extrudate “master blend” the notified polymer is a component of a solid thermoplastic matrix and hence, when placed into landfill any release will be very slow. The fate of any polymer which is released is likely to be very slow abiotic or biological degradation, with the eventual formation of smaller brominated organic compounds and bromide salts.

Most of the notified polymer will be used in production of housings for electrical consumer products, and at the end of service these products would be disposed of either to landfill or possibly incinerated.

If the old products are placed into landfill, then the fate of the notified material would be as indicated above.

Incineration and other pyrolytic methods for destruction of polybrominated phenolic compounds may lead to production of dioxins and related hazardous compounds (1). However, the notifier has provided data indicating that pyrolysis of compounds with the general structure of the notified material produce very small quantities of brominated dioxins and furans. This attribute is responsible for the use of the notified polymer and similar compounds as replacements for earlier generation brominated fire retardant resins.

8. EVALUATION OF TOXICOLOGICAL DATA

Although toxicological data are not required for polymers of NAMW greater than 1 000 according to the Act, the notifier provided statements of toxicological hazard quoted from summary reports. The original toxicology reports were not available to the notifier and therefore could not be cited. However, the notifier states the notified polymer has an oral LD_{50} and dermal LD_{50} values of greater than 2 7000 mg/kg in animal studies and it is a possible skin irritant with prolonged contact. The notified polymer was not mutagenic in a bacterial mutation assay.

9. ASSESSMENT OF ENVIRONMENTAL HAZARD

No ecotoxicology data were provided, which is acceptable for polymers of NAMW greater than 1 000 according to the Act.

10. ASSESSMENT OF PUBLIC AND OCCUPATIONAL HEALTH AND SAFETY EFFECTS

Although toxicological studies were not available to the notifier, summary reports cited by the notifier suggest the notified polymer is of low toxicological hazard.

The notified polymer was considered likely to be a potential skin irritant following prolonged contact. However, given its high molecular weight it is unlikely to be transported across biological membranes, it is not water soluble and on the basis of reported particle size is not substantially respirable. There are no hazardous impurities and no residual monomers with a molecular weight below 500.
On the basis of this limited information the notified polymer in unlikely to be of significant toxicological concern.

The occupational health risk is likely to be negligible for those transporting the notified polymer and warehouse and laboratory workers on the basis of expected low exposure and the low intrinsic hazard of the chemical.

When the notified polymer is added to the blender there is the potential for dermal exposure and inhalational exposure to dusts generated during the pouring process. Similar potential exposure exists during the extrusion process. However, the notifier states that the blenders and extruders are fitted with exhaust ventilation to capture dusts at source and therefore there is considered to be low occupational risk to workers under these conditions of use. Recommendations are also made in the Material Safety Data Sheet (MSDS) for adherence to occupational exposure limits from Worksafe Australia's *Exposure Standards for Atmospheric Contaminants in the Occupational Environment* (2).

Although products derived from the notified polymer will be readily available to the public the notified polymer will be fully encapsulated and incorporated into thermoplastic resin and therefore exposure will be minimal and bioavailability negligible. As the compounds inherent toxicological hazards are low, when used in

the manner described by the notifier, the notified polymer is not expected to pose a public health hazard.

11. RECOMMENDATIONS

To minimise occupational exposure to PRATHERM EC-20 the following guidelines and precautions should be observed:

- It is good work practice to wear industrial clothing which conforms to the specifications detailed in Australian Standard (AS) 2919 (3) and occupational footwear which conforms to Australian and New Zealand Standard (AS/NZS) (4) to minimise exposure when handling any industrial chemical;
- Spillage of the notified chemical should be avoided, spillages should be cleaned up promptly and then put into containers for disposal;
- Good personal hygiene should be practised to minimise the potential for ingestion;
- A copy of the MSDS should be easily accessible to employees.

In addition, as the notified polymer has the potential to cause eye irritation due to its physical nature, safety goggles should be selected and fitted in accordance with Australian Standard (AS) 1336 (5) to comply with Australian/New Zealand Standard (AS/NZS) 1337 (6).

12. MATERIAL SAFETY DATA SHEET

The MSDS for the notified polymer was provided in accordance with the *National Code of Practice for the Preparation of Material Safety Data Sheets* (7).

This MSDS was provided by the applicant as part of the notification statement. It is reproduced here as a matter of public record. The accuracy of this information remains the responsibility of the applicant.

13. 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.

14. REFERENCES

1. Organisation for Economic Co-operation and Development 1994, *OECD Risk Reduction Monograph No. 3 Selected Brominated Flame Retardants*, Paris.

2. National Occupational Health and Safety Commission 1995, 'Adopted National Exposure Standards for Atmospheric Contaminants in the Occupational Environment, [NOHSC:1003(1995)]', in *Exposure Standards for Atmospheric Contaminants in the Occupational Environment: Guidance Note and National Exposure Standards*, Australian Government Publishing Service, Canberra.

3. Standards Australia 1987, *Australian Standard 2919-1987, Industrial Clothing*, Standards Association of Australia, Sydney.

4. Standards Australia/Standards New Zealand 1994, *Australian/New Zealand Standard 2210-1994, Occupational Protective Footwear*, Standards Association of Australia/Standards Association of New Zealand, Sydney/Wellington.

5. Standards Australia 1994, *Australian Standard 1336-1994, Eye protection in the Industrial Environment*, Standards Association of Australia, Sydney.

6. Standards Australia/Standards New Zealand 1992, *Australian/New Zealand Standard 1337-1992, Eye Protectors for Industrial Applications*, Standards Association of Australia/Standards Association of New Zealand, Sydney/Wellington.

7. National Occupational Health and Safety Commission 1994, *National Code of Practice for the Preparation of Material Safety Data Sheets [NOHSC:2011(1994)]*, Australian Government Publishing Service, Canberra.