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**NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION
AND ASSESSMENT SCHEME**

FULL PUBLIC REPORT

RETARDAN P

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.

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Director
Chemicals Notification and Assessment

FULL PUBLIC REPORT**RETARDAN P****1. APPLICANT**

Boral Australian Gypsum Limited of 676 Lorimer Street, Port Melbourne VIC 3207 have submitted a Limited Notification for the assessment of Retardan P.

2. IDENTITY OF THE CHEMICAL

Based on the nature of the chemical and the data provided, Retardan P is considered to be non-hazardous. Therefore, the chemical identity, specific use and site identification have been exempted from publication in the Full Public Report and the Summary Report.

Trade names: Retardan P

Gel Permeation Chromatography (GPC) analysis to determine Number Average Molecular Weight (NAMW) was attempted but found to be difficult to interpret as there was no standard chemical available to compare retention rates. However, estimates could be made of both the NAMW and the component with NAMW of <1000.

Maximum percentage of low molecular weight species (molecular weight < 1000): Approximately 29%

Method of detection and determination: Retardan P can be detected by Infrared Spectroscopy and its molecular weight by Gel Permeation Chromatography.

3. PHYSICAL AND CHEMICAL PROPERTIES

Appearance at 20°C and 101.3 kPa: Light brown powder.

Melting Point: > 200°C

Bulk Density: 290 kg/m³

Vapour Pressure: Not determined but likely to be low for a high molecular weight solid.

Water Solubility: Not determined, but expected to be highly water soluble.

Partition Co-efficient (n-octanol/water) log P_{OW}: Not determined due to the high water solubility of the polymer.

Hydrolysis as a function of pH: Not determined. The polymer contains no hydrolysable functionalities. Hydrolytic stability is a needed function for the intended use of the polymer.

Adsorption/Desorption:	Not determined as there is no method available for the measurement in polymers. The polymer has chemical properties that would make it likely to exhibit some environmental mobility.				
Dissociation Constant:	Not determined, but there are no dissociable groups.				
Flash Point:	Not determined.				
Flammability Limits:	Not flammable.				
Combustion Products:	Oxides of carbon and hydrogen.				
Decomposition Temperature:	> 270°C				
Decomposition Products:	Combustible low temperature carbonisation gases.				
Autoignition Temperature:	Not determined.				
Explosive Properties:	Explosive (like other fine dusts) if it forms a dust cloud. There are no known incompatible materials or chemicals.				
Reactivity/Stability:	Stable under ambient conditions. At elevated temperatures (>270°C) the polymer will thermally degrade and may yield combustible carbonisation gases. There are no known incompatible materials. The polymer is stable under conditions of use and is not expected to degrade or release monomers once set in plaster.				
Particle size distribution:	<table> <tr> <td>< 100 µm:</td><td>100%</td></tr> <tr> <td>< 10 µm</td><td>approximately 17%</td></tr> </table>	< 100 µm:	100%	< 10 µm	approximately 17%
< 100 µm:	100%				
< 10 µm	approximately 17%				

4. PURITY OF THE CHEMICAL

Degree of purity: > 91%

5. INDUSTRIAL USE

Retardan P will be used as an additive in plaster products. The final plaster products will contain 0.0015 - 0.099% of the Retardan P and will be used for repairs, jointing plasterglass sheets, and adhering cornices and decorative ceiling roses to plasterboard. The notified chemical will not be manufactured in Australia.

There are no reported cases of injuries or diseases related to the use of Retardan P in Europe or United States since 1968 and 1990 respectively.

6. OCCUPATIONAL EXPOSURE

Retardan P will be imported in 20 kg valve bags with a 4 ply liner of polythene. It will be blended with plaster in a mixer fitted with a dust collector for 20 minutes, and then bagged off. This product will be known as Blended Retardan P and will contain < 10 % of Retardan P polymer.

Blended Retardan P will then be added in various quantities to plaster products in batch powder mixers and typically mixed for 20 minutes prior to being dumped into a holding hopper and automatically bagged. The bagged product will be shrink wrapped and stored before being despatched by road and

rail to approximately 500 distributors and warehouses. It will be sold to numerous trade and domestic users. Typically, Retardan P will be present at 0.0015 - 0.099% in the plaster formulations. Blended Retardan P may also be sold to 5 - 10 plaster manufacturers.

Transport and storage workers are unlikely to be exposed to the polymer except in the case of an accident. A small number of workers may be exposed to Retardan P during reformulation into Blended Retardan P for several minutes on a dozen occasions per year. During manufacture of the final plaster products exposure is possible for about 1 hour per week. Mixer operators may be exposed to the notified polymer in the form of a dust (approximately 90% purity), or as Blended Retardan P comprising 10% of the notified chemical.

Conditions at other plaster manufacturers are unknown but assumed to be similar to those used at Boral.

End use of the plaster involves the addition of water to the plaster products followed by blending using a knife or drill. Application will be with a trowel. Skin contact is probable, but the proportion of Retardan P in the plasters will be very low ($< 0.1\%$).

7. PUBLIC EXPOSURE

The public may be exposed to Retardan P during its application in plasters. These plaster products will typically contain 0.0015 - 0.099% of the polymer and be used by approximately 15, 900 end-users, many of whom will be members of the public.

8. ENVIRONMENTAL EXPOSURE

. Release

Release to the environment of the high concentration form of the polymer (as imported) could occur during transport, storage and the blending process. The notified substance as imported is contained in 20 kg multiwall bags and transported from the wharf to the storage and processing site by truck.

Processing of the notified substance involves an initial mixing with the dry plaster formulation in a blending drum. The initial blend is bagged off as Blended Retardan P and later added in the correct proportions to the several grades of plaster mix marketed by the notifier. Blending and packaging is carried out in controlled conditions with the use of a dust collector to capture fines. The retail mixes are bagged in multiwall paper, stacked on pallets and distributed to retailers throughout Australia by road or rail. The notifier expects at worst 20 kg per year of the notified polymer will be released at the blending site. This release is as spillage usually from the blender loading operation and will usually be collected and reused, or reformulated if out of specification. Empty paper bags from the process and dust collected in the filters are disposed of to approved landfill under appropriate State regulations.

The changes in concentration of the notified product from start to final product are as follows:

Retardan P $> 91\%$,

Blended Retardan P $< 10\%$ and

final plaster products (0.0015-0.099%)

End users who would consist of contract builders and home renovators would mix the required quantity of plaster containing the notified substance with water on an as needed basis (usually in a 10 L bucket). The bucket and application equipment would usually be scraped clean and then washed with copious quantities of water at completion of the job. The scrapings would be allowed to dry and consigned to landfill.

Disposal of mixing waste and unused plaster mixture is usually consigned to landfill where no movement of the notified substance is expected as the polymer would be tightly bound in the plaster matrix. Estimates by the notifier are that in excess of 100 tonnes of plaster containing 20 kg of Retardan P are to be disposed of in this manner. In the building the dry plaster matrix the polymer is bonded and not subject to environmental exposure or potential release from the finished or repaired plaster board.

. **Fate**

Manufacturing spillages, filter dust and residues of Retardan P in empty paper bags are likely to be disposed of in landfill, where the polymer can be expected to remain stable to hydrolysis or biodegradation.

Waste from the use of plaster products containing the notified substance will be in the reacted form where it is encapsulated within the plaster matrix and unavailable to the environment.

9. EVALUATION OF TOXICOLOGICAL DATA

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

10. ASSESSMENT OF ENVIRONMENTAL EFFECTS

No ecotoxicological data were provided, which is acceptable for polymers of NAMW > 1000 according to the *Act*.

11. ASSESSMENT OF ENVIRONMENTAL HAZARD

The polymer is unlikely to present a hazard to the environment when it is used as specified. Adequate warnings exist on Material Safety Data Sheets that accompany loads in transit to alert cleanup crews to the need to sweep up dry polymer and to block release to drains and waterways.

Spillages from blending plants and used packaging would be unlikely to cause a hazard when disposed of to licensed landfill as the quantities are low.

The main environmental exposure would be from landfill disposal of waste plaster and demolished building structures. However, since the polymer is encapsulated in the plaster matrix, the predicted environmental hazard is minimal.

12. ASSESSMENT OF PUBLIC AND OCCUPATIONAL HEALTH AND SAFETY EFFECTS

Retardan P is a polymer with a Number Average Molecular Weight of > 1000 but a high proportion of species (29%) below 1000. Therefore, nearly one third of the polymer species of unknown toxicity may be capable of crossing biological membranes to enter the body. Its high water solubility suggest that it is unlikely to accumulate in biological tissue. Approximately 17% of particles are < 10 µm and therefore respirable and capable of causing irritation to the lungs.

The impurity formaldehyde is hazardous at concentrations > 1 %, according to the Worksafe *List of Designated Hazardous Substances* (2). It has a time weighted average exposure standard of 1.2 mg/m³ (3). However, formaldehyde as an impurity is not expected to be present at > 1%. Further, the constituents are not likely to be released during use of the plaster product as the polymer is stable and degradation is not expected.

In conclusion, due to the unknown toxicity of the low molecular weight species, Retardan P is a chemical of unknown hazard.

Exposure to dust is possible during the formulation process. Work procedures and air exhaust facilities are expected to reduce the generation and subsequent inhalation of dust. Respiratory protection will be utilised whenever dust is generated, and reformulation workers will wear eye protection and impervious gloves. Contact via dermal absorption to end users will be very low due to the small quantities of polymer present in the final plaster mix.

In light of the intended precautions against exposure to the dust associated with it, there is a low risk to workers and the public who come into contact with Retardan P.

13. RECOMMENDATIONS

To minimise occupational exposure to Retardan P the following guidelines and precautions should be observed:

- . If engineering controls are insufficient to reduce exposure to a safe level during manufacture or use, the following personal protection equipment should be worn :
 - . Respiratory protection conforming to Australian Standards AS 1715 (5) and AS 1716 (6); (Class P respirator if dust generation exceeds exposure standard).
 - . Goggles conforming to Australian Standards AS 1336 (7) and AS 1337 (8);
 - . Chemically resistant gloves conforming to Australian Standard AS 2161 (9); and
 - . Protective overalls
- . Good work practices should be implemented to avoid spillages or splashings.
- . Any spillages should be promptly cleaned up and disposed of according to Local or State regulations.
- . Good personal hygiene practices should be practised.
- . A copy of the Material Safety Data Sheet (MSDS) for Retardan P and other products containing the notified polymer should be easily accessible to workers.

14. MATERIAL SAFETY DATA SHEET

The attached MSDS for Retardan P was provided in Worksafe Australia format (10).

This MSDS was provided by Boral Australian Gypsum Limited as part of their notification statement. The accuracy of this information remains the responsibility of Boral Australian Gypsum Limited.

15. REQUIREMENTS FOR SECONDARY NOTIFICATION

Under the *Industrial Chemicals (Notification and Assessment) Act 1989*, secondary notification of Retardan P 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. Sax, N. I. and Lewis, R.J. 1989, *Dangerous Properties of Industrial Materials*, 7th Ed van Nostrand Reinhold, New York.
2. National Occupational Health and Safety Commission 1994, *List of Designated Hazardous Substances*[NOHSC:10005(1994)], Australian Government Publishing Service, Canberra, Australia.
3. National Occupational Health and Safety Commission 1991, *Exposure Standards for Atmospheric Contaminants in the Occupational Environment*, [NOHSC:1003(1991)] 2nd Edition, Australian Government Publishing Service, Canberra, Australia.
4. National Occupational Health and Safety Commission 1994, *Approved Criteria for Classifying Hazardous Substances* [NOHSC:1008(1994)] Australian Government Publishing Service, Canberra, Australia.
5. Standards Australia 1991, Australian Standard 1715- 1991 *Selection, use and maintenance of Respiratory Protective Devices*, Standards Association of Australia Publ., Sydney, Australia.
6. Standards Australia 1991, Australian Standard 1716-1991 *Respiratory Protective Devices*, Standards Association of Australia Publ., Sydney.
7. Standards Australia 1982, Australian Standard 1336-1982 *Eye protection in the Industrial Environment*, Standard Association of Australia Publ., Sydney, Australia.
8. Standards Australia 1984, Australian Standard 1337-1984 *Eye Protectors for Industrial Applications*, Standards Association of Australia Publ., Sydney, Australia.
9. Standards Australia 1978, Australian Standard 2161-1978 *Industrial Safety Gloves and Mittens (excluding Electrical and Medical Gloves)*, Standards Association of Australia Publ., Sydney, Australia.
10. National Occupational Health and Safety Commission 1991, *Guidance Note for Completion of a Material Safety Data Sheet*, [NOHSC:2011(1994)], 3rd Edition, Australian Government Publishing Service, Canberra, Australia.