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**NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION
AND ASSESSMENT SCHEME**

FULL PUBLIC REPORT

**1,3-Benzenedicarboxylic acid, polymerpolymer with 1,4-
benzenedicarboxylic acid, 2,2-dimethyl-1,3-
propanediol, 1,2-ethane-diol and hexanedioic acid**

(Grilesta P7312)

This Assessment has been compiled in accordance with the provisions of the *Industrial Chemicals (Notification and Assessment) Act 1989*, as amended 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 Arts, Sport, the Environment and Territories and the assessment of public health is conducted by the Department of Health, Housing and Community Services.

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.

For Enquiries please contact Ms Tina Anderson at:

Street Address: 92 Parramatta Rd Camperdown, NSW 2050, AUSTRALIA
Postal Address: GPO Box 58, Sydney 2001, AUSTRALIA
Telephone: (61) (02) 565-9466 FAX (61) (02) 565-9465

Director
Chemicals Notification and Assessment

FULL PUBLIC REPORT

1,3-Benzenedicarboxylic acid, polymer with 1,4-benzene dicarboxylic acid, 2,2-dimethyl-1,3-propanediol, 1,2-ethane-diol and hexanedioic acid

1. APPLICANT

Hofmann & Co (Aust) Pty Ltd, 51 Shearson Crescent, Mentone VIC 3194

2. IDENTITY OF THE CHEMICAL

Based on the nature of the chemical and the data provided Grilesta P7312 is considered non-hazardous. Therefore the following have been exempted from publication: Spectral Data: Molecular Weight.

Chemical Name: 1,3-Benzenedicarboxylic acid, polymer with 1,4-benzenedicarboxylic acid, 2,2-dimethyl-1,3-propanediol, 1,2-ethane diol and hexanedioic acid.

Chemical Abstracts Service

(CAS) Registry No.: 40471-09-8

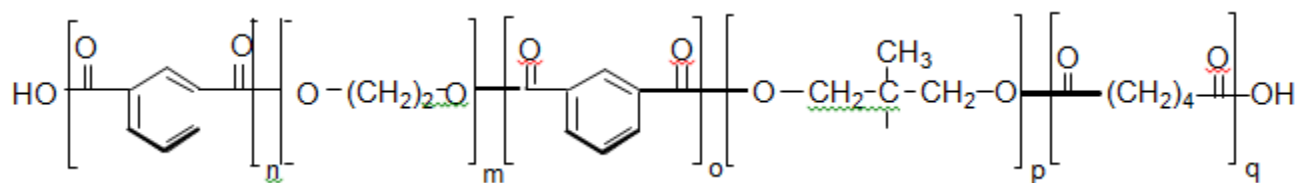
Other names: Adipic acid, polymer with ethylene glycol, isophthalic acid, terephthalic acid and neopentylglycol.

IPA-/TPA-/NPG-/EG-/AA-polymer

Trade Name: Grilesta P7312

Molecular Weight: > 1000

Structural Formula:



3. PHYSICAL AND CHEMICAL PROPERTIES

Appearance at 20°C and 101.3 kPa: white, solid flakes

Odour: odourless

Melting Point: 80°C

Density: 125⁰ kg/m³

Vapour Pressure: negligible

Water Solubility: less than 1 ppb in water

**Partition Co-efficient
(n-octanol/water) log Po/w:** not provided

Hydrolysis as a function of pH: not measurable due to water insolubility

Adsorption/Desorption: the substance is not expected to adsorb to or desorb from soils

Dissociation Constant: not provided

Flash Point: >400°C

Flammability Limits: non-flammable

Decomposition Temperature: >300°C

Decomposition products	water, carbon dioxide and Carbon monoxide.
Autoignition Temperature:	>400°C
Explosive Properties:	not explosive.
Reactivity/Stability:	not chemically unstable or reactive.
Particle size distribution:	range : 5-10mm

4. PURITY OF THE CHEMICAL

Degree of purity (of the notified chemical alone): >99%

Toxic or hazardous impurity/impurities: None

Maximum content of residual monomers: <.01%

Comments on Physico-Chemical Properties:

The lack of data on the polymer is due to the fact that the polymer is of high molecular weight, solid and inert which means many of the tests were not applicable to this product. No data were provided for vapour pressure on the grounds that by analogy with similar polymers, the polymer is not volatile.

The solubility result is an analytical detection limit. Polyesters are known to be insoluble and normal tests are inadequate for determining solubilities at these low levels.

No data were provided for partition coefficient on the grounds that the high molecular weight of the polymer is likely to prevent it from crossing biological membranes.

No data were provided for hydrolysis on the grounds of the low solubility precluding measurement. Hydrolysis is unlikely at environmentally relevant conditions.

No data were provided for adsorption/desorption on the grounds that the notified product is of low solubility and this group of polyester resins will be inert in contact with soils.

Except for the two terminal carboxylic acid groups there are no active hydrogens in the polymer.

5. INDUSTRIAL USE

Grilesta P7312 is mixed with stabilisers, pigments and cross-linking agents after which the blended ingredients are melted, cooled, chipped and ground to form a powder coating. The powder coating is electrostatically applied to steel products the heating of which causes the formation of a paint film. Grilesta P7312 will be imported in quantities of 100 tonnes/year.

6. OCCUPATIONAL EXPOSURE

Grilesta P7312 will be imported in 25 kg polyethylene bags. Powder coating formulations containing Grilesta P7312 will be supplied in plastic lined cardboard boxes. During storage and handling exposure will only occur in the event of an accidental spill.

Workers will be exposed to the chemical in the following way:

During formulation of the powder coating, factory operatives may be exposed to Grilesta P7312 in flake or powder form. These workers are involved in weighing the raw material, mixing the compounds, chipping and grinding the compounded material and packaging the powder.

Quality control workers will take samples of the powder coating mixture in flake or powder form and carry out test spraying. Most quality control work is carried out in spray booths with external exhausts and quality control workers wear powered air respirators or disposable dust masks when required.

Research and development workers handle dry, raw materials, homogenous melt mix or final product for the purposes of laboratory tests and investigations. Work is carried out in laboratories with air extraction and workers wear dust masks and safety glasses when required.

Maintenance workers are involved in repairing machinery/equipment that may have residues of the components of the powder coating product or residues of Grilesta P7312.

Applicators of the powder coating may be exposed during the preparation of spray booths for spraying and cleaning of equipment.

Administration workers may be incidentally exposed as they spend some time in the production area.

7. PUBLIC EXPOSURE

Grilesta P7312 and the powder formulations containing it are used only in specialised industrial applications. Once applied and cured, the powder coatings become an inert polymer film, with no potential for public exposure when using products coated with this film. The compound is not manufactured in Australia and release from the site of formulation into powder coatings will be minimal.

Grilesta P7312 will be supplied and transported in polyethylene bags packed on wooden pallets and enclosed by polyethylene shrink wraps. Significant risk from accidental spillage during transport is not anticipated. The dry solid flakes are easy to sweep up and and collect manually or mechanically. Lack of water solubility would prevent it being dispersed in water. If heated above 300°C, it breaks down to water, carbon dioxide and carbon monoxide which would present significant health hazards only in an enclosed space.

It is not expected to bioaccumulate in the foodchain because of the insolubility of the polymer. The potential for distribution of Grilesta P7312 by leaching or volatilisation is considered insignificant.

The potential for public exposure is minimal under correct handling procedures.

8. ENVIRONMENTAL EXPOSURE

. **Release**

The Company states that powder coating of which the notified chemical is a component is manufactured in a closed mixer. Release into the factory environment during resin and powder coating manufacture will be contained by on site bunding. Due to the non volatile nature of the resin there would be negligible release to the atmosphere. Powder coating manufacture processes and end product packaging are carried out in well ventilated areas where atmospheric concentrations of dusts are monitored and extracted from the exhaust air.

The release of polymer into the factory during powder coating manufacture may come from: accidental spillage during filling of the blender, batch testing, final grinding, bag filling and mill cleanup operations. Capture of airborne polymer dust and floor waste is estimated to be 1.85 kg/day-1 at peak production. This would be disposed of to a landfill according to local and state regulations.

Areas in the plant where spills may occur are adequately banded and cleanup materials are available on site.

The potential for release of notified chemical in the customer's application area occurs where the powder coating is first applied via an electro-static air spraying system to the metal substrate which is then heat cured. Powder coating application booths usually utilise air ducting system connected to collection devices (bags or cyclones) for control of particle emissions which are collected and reused. Randall (1) estimates that with proper recycling of powder coatings captured on filters, efficiency of use would be up to 99%. Good work practices are encouraged to minimise powder coating spills. Cleanup and floor sweepings from paint booths are disposed of in licensed landfill sites. An estimated 2000 kg minimum of the notified product would need disposal in this way.

. **Fate**

The manufacturer states that the polymer resin in the powder coating formulation when applied and heat cured is in a form that is not susceptible to breakdown in the environment. The use of the coated products would be subject to "wear and tear" in

everyday use but chips and dusts of the coating would be widely but diffusely dispersed in the environment and being inert would be of little concern. The products coated with the powder coating containing the notified polymer are either eventually disposed of in landfill or recycled by smelting resulting in substance incineration. The polymer has ester linkages which are theoretically liable to hydrolyse and metabolise. However the insoluble nature of the product will ensure that this occurs at an extremely low rate.

9. EVALUATION OF TOXICOLOGICAL DATA

Grilesta P7312 is a polymer of number average molecular weight (NAMW) >1000. Under the *Industrial Chemicals (Notification and Assessment)* Act 1989 no toxicity tests are required.

The toxicology data on the monomer components used in the manufacture of Grilesta P7312 were provided.

10. ASSESSMENT OF ENVIRONMENTAL EFFECTS

No ecotoxicological data were provided, which is acceptable for polymers of NAMW > 1000.

11. ASSESSMENT OF ENVIRONMENTAL HAZARD

The polymer is unlikely to present a hazard to the environment when it is incorporated into the powder coating and applied to the end use products.

The polymer is unlikely to present a hazard to the aquatic organisms due to the end use application and the polymer's neutral form and high molecular weight would ensure it does not cross or react with biological membranes.

The main environmental exposure arises from landfill disposal of approximately 1500 kg per annum of recovered waste resin. Five hundred kg from the formulation plant would be likely to go to one landfill site and the remainder from the various application sites across the country to their local landfill. However, since

the notified substance is inert and of high molecular weight, environmental hazard is expected to be low.

12. ASSESSMENT OF PUBLIC AND OCCUPATIONAL HEALTH AND SAFETY EFFECTS

Grilesta P7312 is imported in the form of solid flakes of 5-10 mm which minimises the likelihood of dust formation. The powder coating formulations containing Grilesta P7312 are in the form of fine dust and 90% of particles are less than 100µm. If a dust cloud is generated the dust may ignite or explode.

The notifier indicates that Grilesta P7312 has been in use in Europe since 1987 and no adverse effects have been observed in workers exposed to it. No epidemiological studies are available.

Exposure may be by skin or eye contact with the dust or flake or by inhalation of the dust. The dust may cause eye irritation and respiratory irritation if inhaled.

Under correct handling procedures, the potential for public exposure is minimal.

Significant risk from accidental spillage during transport is not anticipated; while it will be supplied and transported in polyethylene bags packed on wooden pallets and enclosed by polyethylene shrink wrap, the dry solid flakes are easy to sweep up and collect manually or mechanically. Its lack of water solubility would prevent it being dispersed in water. If heated above about 300°C (as may occur in a fire), it breaks down to water, carbon dioxide and carbon monoxide which would only present significant health hazards in an enclosed space.

13. RECOMMENDATIONS

To minimise occupational exposure (and public/environmental if recommendations have been made by these agencies) to Grilesta P7312 the following guidelines and precautions should be observed:

- . generation of a dust cloud should be avoided;
- . local exhaust ventilation should be used to control dust when formulating powder coatings;
- . if engineering controls and work practices do not sufficiently reduce exposure to a safe level then the following personal protective equipment should be used:
 - workers exposed to dust should wear a dust mask conforming to Australian standard AS 1715-1991 (2).
- . The MSDS for Grilesta P7312 should be available to all workers using the chemical.

14. MATERIAL SAFETY DATA SHEET

The Material Safety Data Sheet (MSDS) for Grilesta P7312 (Attachment 1) was provided in Worksafe Australia format (3). This MSDS was provided by Hofmann & Co (Aust) Pty Ltd as part of their notification statement. It is reproduced here as a matter of public record. The accuracy of this information remains the responsibility of Hofmann & Co (Aust) Pty Ltd.

15. REQUIREMENTS FOR SECONDARY NOTIFICATION

Under the *Industrial Chemicals (Notification and Assessment) Act* 1989 (the Act), secondary notification of Grilesta P7312 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) Randall P M 1992, Pollution Prevention Methods in the Surface Coating Industry, Journal of Hazardous Materials, 29, 275-295.
- (2) Australian Standard 1715- 1991. Selection, Use and Maintenance of Respiratory Protective s, Standards Association of Australia Publ, Sydney 1991.
- (3) Guidance Note for Completion of a Material Safety Data Sheet. [NOHSC : 3001 (1991)], 3rd Edition, October 1991.