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NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME

FULL PUBLIC REPORT

Polymer in NCT D829 2K Primer Activator

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Director
Chemicals Notification and Assessment

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Polymer in NCT D829 2K Primer Activator

1. APPLICANT

PPG Industries Australia Pty Ltd of McNaughton Rd, CLAYTON, VIC 3169 has submitted a limited notification statement in support of their application for an assessment certificate for Polymer in NCT D829 2K Primer Activator.

2. IDENTITY OF THE CHEMICAL

The chemical name, CAS number, molecular and structural formulae, molecular weight, spectral data, details of the polymer composition, concentration of polymer in the commercial product and the nature of the reactive functional groups in the notified polymer have been exempted from publication in the Full Public Report and the Summary Report.

The notified polymer contains a high level of reactive functional groups.

Marketing Name:	NCT D829 2K Primer Activator
Method of Detection and Determination:	The polymer is characterised by GPC and identified by IR spectroscopy. A reference spectrum has been provided.

This chemical has previously been used in Australia, under Low Volume Chemical Permit No. 100, issued to PPG Industries Australia Pty Ltd in April 1996.

3. PHYSICAL AND CHEMICAL PROPERTIES

The polymer is manufactured as an approximately 60 % solution in n-butyl acetate and other solvents, and is never isolated. Almost no physico-chemical properties have been determined for the polymer, the polymer solution or the paint containing the notified polymer. The properties reported below are variously those of the imported polymer solution containing > 20 % notified polymer in n-butyl acetate, acetone and toluene, and of the notified polymer, as stated.

Appearance at 20°C and 101.3 kPa:	pale yellow viscous liquid
Boiling Point:	56 - 181°C for the solution; the polymer is not expected to be volatile

Specific Gravity:	1.00 for the solution; 1.18 (calculated) for the polymer
Vapour Pressure:	24.0 kPa at 20°C (for the solvent acetone)
Water Solubility:	hydrolysed on contact with water; products expected to be dispersible under alkaline conditions (see comments below)
Hydrolysis as a Function of pH:	functional groups hydrolysed on contact with water; no further hydrolysis expected
Partition Co-efficient (n-octanol/water):	not determined (see comments below)
Absorption/Desorption:	not determined (see comments below)
Dissociation Constant:	not determined (see comments below)
Particle Size:	not applicable as the polymer is not isolated from solution
Flash Point:	-17°C for the solution
Flammability Limits:	Upper Explosive Limit = 12 % Lower Explosive Limit = 1 % (for the solvents)
Autoignition Temperature:	536°C for the solution (similar to the solvent toluene)
Explosive Properties:	the polymer is not expected to be explosive
Reactivity/Stability:	the polymer is expected to be stable apart from hydrolysis of reactive functional groups

3.1 Comments on Physico-Chemical Properties

By analogy with similar polymers and due to its high molecular weight, the notified polymer is not considered to be volatile. The paint product is expected to boil in the range of 56-181°C (solvents).

There is no water solubility data for the polymer as it is never isolated from the polymer solution in which it is manufactured. Once cured the polymer will be incorporated into an inert coating that will be insoluble in water. However, the uncured polymer contains functionalities that will readily undergo hydrolysis in water and will likely be dispersible under alkaline conditions in the aquatic environment.

Partition Co-efficient was not determined due to the tendency of the polymer to hydrolyse. However, the notifier predicts that the polymer would be expected to partition to the n-octanol phase rather than the water phase on theoretical grounds due to low solubility in

water.

Adsorption/desorption was not determined. However, the polymer and paint is expected to bind readily to, or be associated with, soil or sediments.

Dissociation constant was not determined but the hydrolysed polymer is expected to be anionic under alkaline conditions.

The polymer would be expected to be combustible, however, the polymer solution is flammable due to the solvent content, and is classified as a Class 3 dangerous good.

4. PURITY OF THE CHEMICAL

Degree of Purity: > 99 %

Maximum Content of Residual Monomers: All residual monomers are present at 0.3 % (or less), and all are present at below the cutoff levels for classification of the polymer as hazardous.

Toxic or Hazardous Impurities: none

Additives/Adjuvants:

Chemical name:	n-butyl acetate
Weight percentage:	> 30 % in polymer resin solution
CAS No.:	123-86-4
Regulatory Controls:	NOHSC exposure standard 150 ppm TWA, 200 ppm STEL (NOHSC, 1995)
Toxic properties:	eye and mucous membrane irritant (American Conference of Government Industrial Hygienists, 1998)

The notified polymer will be imported in pre-prepared paints, and will have a number of adjuvants including additional solvents.

5. USE, VOLUME AND FORMULATION

The notified polymer will be imported as a component an automotive refinish primer catalyst (980-D0829) at > 20 % (w/w). It will be imported at a volume of < 10 tonne of polymer per annum in the first five years.

6. OCCUPATIONAL EXPOSURE

Pre-prepared paints containing the notified polymer will be imported in 1 L steel cans, packed in cartons on pallets, and overwrapped with plastic film and cardboard. Individual cans will be dispatched by road to the customer sites. The individual product containers are

not expected to be opened before arrival at the end use site and the likelihood of a spill is low.

Handling of the pre-prepared paint will involve 2 – 5 waterside workers, 2 – 5 transport drivers and 4 – 8 storemen, each for up to 3 hours per day, up to 50 days per year.

Waterfront, transport and warehouse workers are not expected to be exposed to the notified polymer except in the case of an accident involving spillage of the paint.

End Use
The notifier estimates that as many as 1000 spray painters in up to 1000 establishments across Australia could be exposed to the notified polymer. The exposure is estimated to be for up to 4 hours per day, for up to 200 days per year. The paint product containing the notified polymer comprise approximately 20 % of the final paint mixture. Mixing will be carried out by hand, using a measuring/mixing stick. In general, only small quantities (up to 1 L) will be mixed at a time.

The spray painters who will be exposed to the notified chemical will be fully TAFE trained. Typically the spray painter will measure the appropriate amounts of the different components required in a particular formulation into an open container and pour this mixture into a spray gun. The spraying of the automobile will be carried out in a laminar flow downdraft spray booth which is designed to rapidly remove aerosol particles and solvent vapour from the atmosphere. Several possible booth designs may be used. In a dry floor booth, the overspray will be collected in filters contained in the floor of the booth; any unremoved particulates will reach the exhaust stack with the solvent vapours. In a wet floor booth, overspray will collect in a pool of water below the grill floor or in a wet scrubber in the exhaust and will be removed with a filter. The residual solids will be disposed of to secure landfill. The spray booths are subject to AS/NZS/4114.1:1995 *Spray Painting Booths – Design, Construction and Testing* (Standards Australia/Standards New Zealand, 1995a) and AS/NZS/4114.1:1995 *Spray Painting Booths – Selection, Installation and Maintenance* (Standards Australia/Standards New Zealand, 1995b). After application of the paint, the automobile may be heated to cure the coating.

Residual paint mixture will be washed from the equipment manually, using recycled paint solvent, and the washings will be disposed of by solvent recyclers.

Once residual final paint mixture has dried, the notified polymer will be irreversibly bound within the cured matrix and not separately available for either exposure to workers, or for dermal absorption.

Spray painters will wear appropriate personal protective equipment at all times; impervious gloves, eye protection, anti-static footwear and anti-static flame retardant overalls while mixing the paint, and, in addition, a full face shield and respirator conforming to AS/NZS1715 and AS/1716 while inside the spray booth.

7. PUBLIC EXPOSURE

There is little potential for public exposure to the notified polymer arising from transport, occupational use and disposal. Public exposure to the notified polymer in the form of cured

paint films on automobiles will be high, but this paint film will contain the polymer in a crosslinked unreactive form which will not be bioavailable. In addition, the primer layer containing the notified polymer will be covered by topcoat layers.

8. ENVIRONMENTAL EXPOSURE

8.1 Release

Prior to delivery to the customer, should spills occur, the product will be contained within the plant through bunding and wastes collected by a licensed waste contractor. The notifier has stated that established procedures and good work practices will minimise the risk of spillage.

There is potential for release during mixing, transfer and application of the primer, during cleaning of spray paint and mixing equipment, and as residues remaining in empty primer cans.

Release as a result of mixing and transfer (spillage) is expected to be in the vicinity of 0.1 %. Based on the maximum import level of 10 tonnes, this equates to approximately 10 kg per annum. This waste will be treated by a process known as the Dusol treatment process at PPG and collected by licensed contractors for disposal to landfill.

During spray application, overspray of approximately 70 % will occur. This will occur in spray shops throughout Australia and equates to a maximum of 7000 kg of waste polymer being released per annum. Overspray is captured in spray booth filtering systems. Dry non-leachable solid polymer is disposed of to landfill.

The company anticipates approximately 1 – 2 % (< 200 kg) of waste will be generated during cleaning of spray and mixing equipment. The notifier indicates that paint and solvent residues removed from spray equipment would be collected and disposed of to landfill by licensed contractors.

Waste generated as a result of cleaning activities will be collected by licensed waste contractors and either disposed to landfill or incinerated.

Residues will also remain in the ‘empty’ containers after use. It is estimated that up to 2 % (200 kg) of the notified polymer will remain as residue in the containers which will be disposed of to landfill as a dry solid.

Further release of the polymer may occur in the form of either inert flakes of crosslinked paint or on objects painted with the new polymer when panels are consigned to metal reclamation or landfill.

8.2 Fate

Once applied to the metal panels of vehicles the notified polymer will be incorporated in a hard, durable, inert film and would not present a significant hazard. Any fragments, chips and flakes of the lacquer will be of little concern as they are expected to be inert. The metal panels coated with the polymer are likely to be either recycled for steel reclamation or be placed into landfill at the end of their useful life. When recycled the polymer would be

destroyed in the blast furnaces and converted to water vapour and oxides of carbon and nitrogen.

The solid waste generated in the manufacturing, formulation and application of the coating will be disposed to landfill (although incineration is an option). Presumably the polymer is recovered as an insoluble solid from the wastewater used for cleaning and also disposed to landfill. The containers and their residue will also be disposed of in this manner. Leaching of the polymer from landfill from these sites is unlikely, given the low solubility of the substance. Polymer disposed of in this way could be expected to degrade slowly.

The polymer is not expected to cross biological membranes due to its high molecular weight and low solubility, therefore should not bioaccumulate (Connell, 1990).

9. EVALUATION OF TOXICOLOGICAL DATA

No toxicology data were submitted. The polymer is stable with low volatility. Polymers of high molecular weight and low water solubility do not readily cross biological membranes.

The notifier has indicated that the notified polymer will be classified as a skin and eye irritant, although no toxicological testing has been carried out. The notified polymer contains a high level of a high concern functional group. This reactive functional group commonly has health effects including skin, eye and mucosal irritation, and also respiratory sensitisation.

10. ASSESSMENT OF ENVIRONMENTAL EFFECTS

No ecotoxicological data were provided.

11. ASSESSMENT OF ENVIRONMENTAL HAZARD

The polymer cross-links with other paint components to form a very high molecular weight and stable film. The polymer, as part of this surface coating, will therefore share the fate of the vehicle panel. The paint is expected to slowly deteriorate under UV light, but this is likely to be negligible over the life of the motor vehicle. When the vehicle panel is recycled, the polymer would be destroyed through incineration producing oxides of nitrogen and carbon.

The majority of notified polymer associated with waste from the application of the coating to the automotive surface should not enter the environment until it is disposed of to landfill. It is possible that up to 7.4 tonnes per annum of the new polymer could be released as a consequence of primer application, cleaning of equipment, and container residues. Most of the material would be land-filled encapsulated in a cured polymer matrix and is expected to be insoluble and inert. Movement of the polymer by leaching from landfill sites is not expected due to its anticipated high binding affinity to soil or cross-linking in the cured coating. Polymer disposed of to landfill is expected to degrade slowly as a result of biotic and abiotic processes.

In the event of accidental spillage of the polymer solution into waterways, the polymer may be expected to disperse into the aquatic compartment but once hydrolysed it will have a high

affinity for calcium and magnesium ions present in water. This will effectively neutralise the polymer and it would then be expected to become associated with the sediment and gradually settle to bottom of the waterways. If the polymer is spilt on land, either during usage or transport, it is expected that the polymer would become immobilised in the soil layer. Contaminated soil can then be collected and disposed to landfill.

Given the above, environmental exposure and the overall environmental hazard is expected to be low.

12. ASSESSMENT OF PUBLIC AND OCCUPATIONAL HEALTH AND SAFETY EFFECTS

No toxicological information has been provided for the notified polymer and therefore the substance cannot be assessed against the NOHSC *Approved Criteria for Classifying Hazardous Substances* (NOHSC, 1999b). However, the notified polymer is classified as a skin and eye irritant due to the known toxicological properties of the functional groups present. The polymer is likely to be an irritant to eyes, skin and mucous membranes, although respiratory sensitisation is not likely due to the high molecular weight of the polymer and correspondingly low likelihood of absorption across biological membranes.

The imported product, 980-D0829 NCT D829 2K Primer Activator is also a hazardous substance and Schedule 5 poison because of the high concentration of toluene. It is also classed as a Class 3 dangerous good (flammable liquid) because of the solvent content. The MSDS for the product containing the notified polymer, 980-D0829 NCT D829 2K Primer Activator, lists a number of potential health effects, including headaches, dizziness, nausea, vomiting, skin, eye and respiratory irritation, irritant contact dermatitis and central nervous system depression, which relate mainly to the solvents, toluene, acetone and n-butyl acetate, rather than the notified polymer. The MSDS also lists skin, eye, mucous membrane and respiratory irritation, which are potential health effects of exposure to the notified polymer itself.

Occupational Health and Safety
There is little potential for significant occupational exposure to the notified polymer in the transport and storage of the paint components containing this polymer. There will be exposure during the use and disposal of the paints.

The paint containing the notified polymer will be applied by spraying. The spraying procedure produces a dense aerosol of paint particles which would potentially lead to a high level of exposure to the notified polymer by the dermal, ocular and inhalation routes. Due to the potential irritant effects of the notified polymer on skin, eyes, and the respiratory system, a high level of precautions needs to be taken to ensure that exposure of workers applying the paint is prevented. The final paint mix, including the pre-prepared paint containing the notified polymer, could also contain a wide variety of additional ingredients once fully mixed. It is also probable that professionals involved in the spray painting industry will use a number of different paint formulations.

For these reasons, the notified polymer must be assessed for the contribution it makes to the hazards associated with use of the spray paints. The presence of many potential and actual hazardous substances in the formulations requires the use of stringent engineering controls,

such as a correctly constructed and maintained spray booth, and of a high level of personal protective equipment, such as impermeable overalls and gloves and a full face shield and respirator. The use of the paint containing the notified polymer should be in accordance with the NOHSC *National Guidance Material for Spray Painting* (NOHSC, 1999c). The notified polymer will be one of the more hazardous components of the paint mixture, and the safe use of this product will require compliance with all of the recommended safety procedures for spray painting.

Once the applied final paint mix has hardened, the reactive groups will be neutralised and the polymer will not be separately available for exposure or absorption.

There are NOHSC exposure standards for toluene, acetone and n-butyl acetate, identified as ingredients in the product 980-D0829 NCT D829 2K Primer Activator. The employer is responsible for ensuring that these exposure standards, and exposure standards pertaining to other final paint mix additives, are not exceeded in the workplace.

The paint components containing the notified polymer are flammable due to their solvent content. Precautions must be taken to avoid sources of ignition, e.g. use of earthing leads. Operators should wear antistatic overalls and footwear.

Similar considerations apply in the disposal of the polymer. The wastes containing the notified polymer may be hazardous substances on the basis of the solvent and notified polymer content, and a high level of precautions should be taken to avoid exposure to the notified polymer. However, much of the polymer will be crosslinked, hardened and immobilised by the time of disposal.

Public Health
Automotive primer coats containing the notified polymer are over-coated by topcoats on automobile panels. During heat curing, the polymer reacts with other components in the paint formulation to form an inert, very high molecular weight film. These factors render the notified polymer biologically unavailable. Consequently, the potential for public exposure to the notified polymer throughout all of the phases of its life cycle is considered to be low. Based on its use pattern and physico-chemical characteristics, the notified polymer will not pose a significant hazard to public health.

13. RECOMMENDATIONS

To minimise occupational exposure to Polymer in NCT D829 2K Primer Activator the following guidelines and precautions should be observed:

- Use of the paint containing the notified polymer should be in accordance with the NOHSC *National Guidance Material for Spray Painting* (NOHSC, 1999c);
- Employers should ensure that NOHSC exposure standards for all of the components of the final paint mix are not exceeded in the workplace;
- Safety goggles, chemical resistant industrial clothing and footwear and impermeable gloves should be used while handling the product containing the notified polymer;

where engineering controls and work practices do not reduce vapour and particulate exposure to safe levels, an air fed respirator should also be used;

- Spillage of the notified chemical should be avoided. Spillages should be cleaned up promptly with absorbents which should then be 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.

If products containing the notified chemical are hazardous to health in accordance with the NOHSC *Approved Criteria for Classifying Hazardous Substances* (NOHSC, 1999b), workplace practices and control procedures consistent with State and territory hazardous substances regulations must be in operation.

Guidance in selection of goggles may be obtained from Australian Standard (AS) 1336 (Standards Australia, 1994) and Australian/New Zealand Standard (AS/NZS) 1337 (Standards Australia/Standards New Zealand, 1992); for industrial clothing, guidance may be found in AS 2919 (Standards Australia, 1987) and AS 3765.2 (Standards Australia, 1990); for impermeable gloves or mittens, in AS 2161 (Standards Australia/ Standards New Zealand, 1998); for occupational footwear, in AS/NZS 2210 (Standards Australia/ Standards New Zealand, 1994a); for respirators, in AS/NZS 1715 (Standards Australia/ Standards New Zealand, 1994b) and AS/NZS 1716 (Standards Australia/ Standards New Zealand, 1994c).

14. MATERIAL SAFETY DATA SHEET

The MSDS for the solution of the notified polymer was provided in accordance with the *National Code of Practice for the Preparation of Material Safety Data Sheets* (NOHSC, 1994).

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.

15. REQUIREMENTS FOR SECONDARY NOTIFICATION

Under the Act, the director must be informed if any of the circumstances stipulated under subsection 64(2) of the Act arise, and secondary notification of the notified chemical may be required. No other specific conditions are prescribed.

16. REFERENCES

American Conference of Government Industrial Hygienists (1998). TLVs and Other Occupational Exposure Values.

Connell D. W. (1990) General characteristics of organic compounds which exhibit bioaccumulation. In Connell D. W., (Ed) Bioaccumulation of Xenobiotic Compounds. CRC Press, Boca Raton, USA.

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.

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.

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

National Occupational Health and Safety Commission (1999b) Approved Criteria for Classifying Hazardous Substances [NOHSC:1008(1994)]. Australian Government Publishing Service, Canberra.

National Occupational Health and Safety Commission (1999c) National Guidance Material for Spray Painting. Australian Government Publishing Service, Canberra.

Sax NI & Lewis RJ (1996) Dangerous Properties of Industrial Materials. Van Nostrand Reinhold, New York.

Standards Australia (1987) Australian Standard 2919-1987, Industrial Clothing. Standards Association of Australia, Sydney.

Standards Australia (1990) Australian Standard 3765.2-1990, Clothing for Protection against Hazardous Chemicals Part 2 Limited protection against specific chemicals. Standards Association of Australia.

Standards Australia (1994) Australian Standard 1336-1994, Eye protection in the Industrial Environment. Standards Association of Australia.

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.

Standards Australia/Standards New Zealand (1994a) Australian/New Zealand Standard 2210-1994, Occupational Protective Footwear. Standards Association of Australia/Standards Association of New Zealand.

Standards Australia/Standards New Zealand (1994b) Australian/New Zealand Standard 1715-1994, Use and Maintenance of Respiratory Protective Devices. Standards Association of Australia/Standards Association of New Zealand.

Standards Australia/Standards New Zealand (1994c) Australian/New Zealand Standard 1716-1994, Respiratory Protective Devices. Standards Association of Australia/Standards Association of New Zealand.

Standards Australia/Standards New Zealand (1995a). Australian/New Zealand Standard 4114.1-1995, Spray painting booths - Design, construction and testing. Standards Association of Australia/Standards Association of New Zealand.

Standards Australia/Standards New Zealand (1995b). Australian/New Zealand Standard 4114.2-1995, Spray painting booths - Selection, installation and maintenance. Standards Association of Australia/Standards Association of New Zealand.

Standards Australia/Standards New Zealand (1998) Australian/New Zealand Standard 2161.2-1998, Occupational protective gloves, Part 2: General requirements. Standards Association of Australia/Standards Association of New Zealand.