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**NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME
(NICNAS)**

PUBLIC REPORT

Polymer in Joncryl® U 4190

This Assessment has been compiled in accordance with the provisions of the *Industrial Chemicals (Notification and Assessment) Act 1989* (the Act) and Regulations. This legislation is an Act of the Commonwealth of Australia. The National Industrial Chemicals Notification and Assessment Scheme (NICNAS) is administered by the Department of Health, and conducts the risk assessment for public health and occupational health and safety. The assessment of environmental risk is conducted by the Department of the Environment and Energy.

This Public Report is available for viewing and downloading from the NICNAS website or available on request, free of charge, by contacting NICNAS. For requests and enquiries please contact the NICNAS Administration Coordinator at:

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**Director
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SUMMARY

The following details will be published in the NICNAS *Chemical Gazette*:

ASSESSMENT REFERENCE	APPLICANT(S)	CHEMICAL OR TRADE NAME	HAZARDOUS CHEMICAL	INTRODUCTION VOLUME	USE
STD/1661	BASF Australia Ltd	Polymer in Joncryl® U 4190	ND*	< 70 tonnes per annum	Component of industrial metal and wood coatings and paints

*ND = not determined

CONCLUSIONS AND REGULATORY OBLIGATIONS

Hazard classification

As no toxicity data were provided, the notified polymer cannot be classified according to the *Globally Harmonised System of Classification and Labelling of Chemicals* (GHS), as adopted for industrial chemicals in Australia.

Human health risk assessment

Provided that the recommended controls are being adhered to, under the conditions of the occupational settings described, the notified polymer is not considered to pose an unreasonable risk to the health of workers.

When used in the proposed manner, the notified polymer is not considered to pose an unreasonable risk to public health.

Environmental risk assessment

Based on the low toxicity and the assessed use pattern, the notified polymer is not expected to pose an unreasonable risk to the environment.

Recommendations

CONTROL MEASURES

Occupational Health and Safety

- A person conducting a business or undertaking at a workplace should implement the following engineering controls to minimise occupational exposure to the notified polymer during reformulation:
 - Local exhaust ventilation
 - Enclosed, automated systems where possible
- A person conducting a business or undertaking at a workplace should implement the following engineering controls to minimise occupational exposure to the notified polymer during spray application:
 - conducting of spray operations in well-ventilated areas or spray booths
- A person conducting a business or undertaking at a workplace should implement the following safe work practices to minimise occupational exposure during handling of the notified polymer for reformulation and end-use:
 - Avoid skin and eye contact
 - Avoid inhalation of aerosols
- A person conducting a business or undertaking at a workplace should ensure that the following personal protective equipment is used by workers to minimise occupational exposure to the notified polymer during reformulation and end-use:
 - coveralls, impervious gloves, eye protection
 - organic vapour respirators during reformulation and spray application

Guidance in selection of personal protective equipment can be obtained from Australian, Australian/New Zealand or other approved standards.

- Spray applications should be carried out in accordance with the Safe Work Australia Code of Practice for *Spray Painting and Powder Coating* (SWA, 2015) or relevant State or Territory Code of Practice.
- A copy of the SDS should be easily accessible to employees.
- If products and mixtures containing the notified polymer are classified as hazardous to health in accordance with the *Globally Harmonised System of Classification and Labelling of Chemicals (GHS)* as adopted for industrial chemicals in Australia, workplace practices and control procedures consistent with provisions of State and Territory hazardous substances legislation should be in operation.

Disposal

- Where reuse or recycling is not appropriate, dispose of the notified polymer in an environmentally sound manner in accordance with relevant Commonwealth, state, territory and local government legislation.

Emergency procedures

- Spills or accidental release of the notified polymer should be handled by physical containment, collection and subsequent safe disposal.

Regulatory Obligations

Secondary Notification

This risk assessment is based on the information available at the time of notification. The Director may call for the reassessment of the chemical under secondary notification provisions based on changes in certain circumstances. Under Section 64 of the *Industrial Chemicals (Notification and Assessment) Act (1989)* the notifier, as well as any other importer or manufacturer of the notified chemical, have post-assessment regulatory obligations to notify NICNAS when any of these circumstances change. These obligations apply even when the notified polymer is listed on the Australian Inventory of Chemical Substances (AICS).

Therefore, the Director of NICNAS must be notified in writing within 28 days by the notifier, other importer or manufacturer:

- (1) Under Section 64(1) of the Act; if
 - The products containing the notified polymer will be available to the general publicor
- (2) Under Section 64(2) of the Act; if
 - the function or use of the polymer has changed from component of industrial metal and wood coatings, or is likely to change significantly;
 - the amount of polymer being introduced has increased, or is likely to increase, significantly;
 - the polymer has begun to be manufactured in Australia;
 - additional information has become available to the person as to an adverse effect of the polymer on occupational health and safety, public health, or the environment.

The Director will then decide whether a reassessment (i.e. a secondary notification and assessment) is required.

Safety Data Sheet

The SDS of the product containing the notified chemical provided by the notifier was reviewed by NICNAS. The accuracy of the information on the SDS remains the responsibility of the applicant.

ASSESSMENT DETAILS

1. APPLICANT AND NOTIFICATION DETAILS

APPLICANT(S)

BASF Australia Ltd (ABN: 62 008 437 867)
Level 12, 28 Freshwater Place
SOUTHBANK VIC 3006

NOTIFICATION CATEGORY

Standard: Synthetic polymer with Mn < 1,000 g/mol (more than 1 tonne per year)

EXEMPT INFORMATION (SECTION 75 OF THE ACT)

Data items and details claimed exempt from publication: chemical name, other names, CAS number, molecular and structural formulae, molecular weight, analytical data, degree of purity, polymer constituents, residual monomers, impurities, additives/adjuvants, use details, import volume, and identity of manufacturer.

VARIATION OF DATA REQUIREMENTS (SECTION 24 OF THE ACT)

Variation to the schedule of data requirements is claimed as follows: *all physico-chemical and toxicity endpoints except melting point, vapour pressure and water solubility.*

PREVIOUS NOTIFICATION IN AUSTRALIA BY APPLICANT(S)

None

NOTIFICATION IN OTHER COUNTRIES

Canada (2016), USA (2014), and Korea (2006)

2. IDENTITY OF CHEMICAL

MARKETING NAME(S)

Joncryl® U 4190 (product containing the notified polymer)

MOLECULAR WEIGHT

Number Average Molecular Weight (Mn) is 500 - 1,000 g/mol

ANALYTICAL DATA

Reference IR and SEC spectra were provided.

3. COMPOSITION

DEGREE OF PURITY

> 95%

LOSS OF MONOMERS, OTHER REACTANTS, ADDITIVES, IMPURITIES

The notified polymer is stable under the conditions of use. No losses by volatilisation, exudation or leaching are expected from the notified polymer.

DEGRADATION PRODUCTS

No degradation, decomposition or depolymerisation of the notified polymer is expected to occur under normal conditions of use. Thermal decomposition may release toxic fumes containing products of combustion such as carbon monoxide, carbon dioxide and oxides of nitrogen.

4. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE AT 20 °C AND 101.3 kPa: Milky white liquid with faint odour*

Property	Value	Data Source/Justification
Melting Point/Freezing Point	256 °C	Measured
Boiling Point	100 °C at 101.3 kPa	SDS*
Density	1030 kg/m ³ at 20 °C	SDS*

Vapour Pressure	< 1×10^{-6} hPa at 20, 25 or 50 °C	Measured
Water Solubility	29 mg/L at loading of 1 g/L and 316 mg/L at loading rate of 10 g/L at 20 °C	Measured
Hydrolysis as a Function of pH	Not determined	Contains hydrolysable functional groups and is expected to hydrolyse in the environmental pH of 4-9.
Partition Coefficient	Not determined	The notified polymer is not sufficiently soluble in water and in n-octanol.
Adsorption/Desorption	Not determined	Expected to adsorb to soil, sediment and sludge based on its high molecular weight and presence of potentially anionic and cationic functionality
Dissociation Constant	Not determined	Contains potential anionic and cationic functionality and is expected to dissociate in the environmental pH of 4-9.
Particle Size	Not determined	The notified chemical will be introduced in an aqueous solution
Flash Point	Not determined	The notified chemical will be introduced in an aqueous solution
Flammability	Not flammable	SDS*
Autoignition Temperature	Not determined	SDS*
Explosive Properties	Not determined	Contains no functional groups that would imply explosive properties.
Oxidising Properties	Not determined	Contains no functional groups that would imply oxidising properties.

* Properties of a product containing the notified polymer.

DISCUSSION OF PROPERTIES

For full details of tests on physical and chemical properties, refer to Appendix A.

Reactivity

The notified polymer is expected to be stable under normal conditions of use.

Physical hazard classification

Based on the submitted physico-chemical data depicted in the above table, the notified polymer is not recommended for physical hazard classification according to the *Globally Harmonised System of Classification and Labelling of Chemicals (GHS)*, as adopted for industrial chemicals in Australia.

5. INTRODUCTION AND USE INFORMATION

MODE OF INTRODUCTION OF NOTIFIED CHEMICAL (100%) OVER NEXT 5 YEARS

The notified polymer will not be manufactured in Australia. The notified polymer will be imported into Australia as a component of the formulation Joncryl® U 4190.

MAXIMUM INTRODUCTION VOLUME OF NOTIFIED CHEMICAL (100%) OVER NEXT 5 YEARS

Year	1	2	3	4	5
Tonnes	< 30	< 40	< 50	< 60	< 70

PORT OF ENTRY

Melbourne

TRANSPORTATION AND PACKAGING

The imported products containing the notified polymer (at < 40% concentration) will be packaged in 1000 kg intermediate bulk containers (IBCs), or 220 kg open head plastic drums. The reformulated coatings (< 2% notified polymer) will be packaged in lined steel 1L, 4L, 10L cans and 210 kg lined steel drums. Transportation will predominantly be by road.

USE

The notified polymer will be used in industrial metal and wood coating applications at a concentration of < 2%.

OPERATION DESCRIPTION

At the reformulation facilities, the introduced product containing the notified polymer will be transferred by gravity or through a low pressure pump into a mixing vessel containing a mixture of solvents, water and resins. Once the blending of the product is complete, samples will be taken for quality control (QC) testing and the final coating will be filled into lined steel containers also by gravity feed or low pressure pumps. Ventilation will be used during the reformulation processes. Reformulation equipment will be flushed with water for cleaning.

The reformulated coating products containing the notified polymer (at < 2% concentration) will be applied primarily by spray in engineered facilities with ventilation. Limited application by brush and roller is expected.

6. HUMAN HEALTH IMPLICATIONS**6.1. Exposure Assessment****6.1.1. Occupational Exposure****CATEGORY OF WORKERS**

<i>Category of Worker</i>	<i>Exposure Duration (hours/day)</i>	<i>Exposure Frequency (days/year)</i>
Transport and storage	1	4
Warehouse	1	4
Process operator	2.5	40
Quality control	0.5	40
Packaging	2	40

EXPOSURE DETAILS*Transport and Storage*

Transport and storage workers may come into contact with the notified polymer at < 40% concentration, only in the unlikely event of an accidental breach of the product packaging during unloading and transport to the customer sites or through spillage when the products are transferred from IBCs or drums to on-site tanks.

Reformulation

Dermal and ocular exposure to the notified polymer at < 40% concentration may occur when adding and transferring this product by gravity or using low pressure pumps, charging the blending vessels and when connecting or disconnecting transfer hoses, cleaning or maintaining equipment and testing for quality control. Inhalation exposure to the notified polymer may also occur if aerosols are formed. Exposure will be minimised through the use of enclosed and automated systems, local exhaust ventilation and personal protective equipment (PPE: eye protection, impervious gloves, coveralls and respirators) as stated by the notifier.

End use

Dermal, ocular and inhalation exposure to the notified polymer at < 2% concentration may occur during application of the finished coatings. Coating application will be primarily by spray, but potentially with brush and roller. As stated by the notifier, the potential for exposure will be minimised through the use of PPE (eye protection, impervious gloves, coveralls) by workers, including the use of respiratory protection during spray application. Inhalation exposure will be further mitigated through the use of exhaust ventilation and spray booths, where possible. After application and once dried, the notified polymer will be cured into an inert solid matrix and will not be available for exposure.

6.1.2. Public Exposure

Finished coatings containing the notified polymer at < 2% concentration are intended for use in industrial settings only. The public may come into contact with manufactured products upon which coatings containing the notified polymer have been applied. After application and once dried, the notified polymer will be cured into an inert solid matrix and will not be available for exposure.

6.2. Human Health Effects Assessment

No toxicity data on the notified polymer were submitted.

No data on toxicokinetics for the notified polymer was provided. For dermal absorption, molecular weights below 100 g/mol are favourable for absorption and molecular weights above 500 g/mol do not favour absorption (ECHA, 2017). Dermal uptake is likely to be low to moderate if the water solubility is between 1-100 mg/L and moderate to high if the water solubility is between 100-10,000 mg/L (ECHA, 2017). The notified polymer has a moderate molecular weight (500-1000 g/mol) and low to moderate water solubility (29 - 316 mg/L) and therefore absorption through the skin is expected to be low. However there are significant levels of low molecular weight species (< 500 g/mol) in the polymer and the possibility of absorption of the lower molecular weight portion cannot be ruled out.

The notified polymer contains a structural alert for irritation/corrosion (Hulzebos *et al.*, 2005). Due to the moderate molecular weight (500 – 1000 g/mol) and the relatively high function group equivalent weight (FGEW) of the structural alert (2500 – 5000), the notified polymer is not expected to be corrosive.

Health hazard classification

As no toxicity data were provided, the notified polymer cannot be classified according to the *Globally Harmonised System of Classification and Labelling of Chemicals (GHS)*, as adopted for industrial chemicals in Australia.

6.3. Human Health Risk Characterisation

6.3.1. Occupational Health and Safety

There was no toxicity data provided on the notified chemical. The physical properties of the notified polymer suggest that it is unlikely to be a corrosive and dermal absorption is expected to be low although the possibility for dermal absorption of the lower molecular weight portion cannot be ruled out. Systemic toxicity effects from absorption and sensitising effects of the notified polymer are unknown.

Workers may be exposed to the notified polymer at < 40% concentration during reformulation and at < 2% concentration during application of coatings containing it by brush, roller and spray. However, exposure is expected to be low given the proposed use of PPE by these workers including coveralls, impervious gloves, eye protection and organic vapour respirators, particularly during spray application, and the conducting of spray operations in well-ventilated areas or spray booths.

Although not considered in this risk assessment, NICNAS notes that the notified polymer contains residual monomers that are classified as hazardous according to the Globally Harmonised System of Classification and Labelling of Chemicals (GHS), as adopted for industrial chemicals in Australia. These are not present above the cut off concentrations for classification in the notified polymer as introduced.

Provided that the recommended controls are being adhered to, under the conditions of the occupational settings described, the notified polymer is not considered to pose an unreasonable risk to the health of workers.

6.3.2. Public Health

End use coatings containing the notified polymer at < 2% concentration will be used in industrial settings only and will not be made available to the public. Members of the public may come into contact with surfaces coated with products containing the notified polymer. However, after the coatings are cured, the notified polymer will be bound into an inert matrix and will not be available for exposure. Therefore, when used in the proposed manner, the risk to public health is not considered to be unreasonable.

7. ENVIRONMENTAL IMPLICATIONS

7.1. Environmental Exposure & Fate Assessment

7.1.1. Environmental Exposure

RELEASE OF CHEMICAL AT SITE

The notified polymer will be imported as components of finished coating products or as raw material for local reformulation in solvent based industrial and automotive paints. Any spills of the notified chemicals during transportation and storage are expected to be contained with absorbent material and be disposed of to landfill.

The notified polymer will be mixed with solvents and resins and reformulated into coating formulations in a closed system. Solvent used for equipment washing, containing residues of the notified polymer, is expected to be recycled for reuse on site or disposed of via accredited waste disposal contractors. Wastes and spills (1% of annual import volume) during reformulation activities are expected to be contained on-site and disposed of in accordance with local regulations. Residues in import containers are expected to be disposed of via the trade waste stream in accordance with local regulations.

RELEASE OF CHEMICAL FROM USE

Coatings containing the notified polymer may be applied by brush, roller or spray in industrial and protective paint application facilities. It is stated by the notifier that the paints containing the notified polymer will be applied in spray facilities. The main release of notified chemicals during industrial spray painting operations will come from overspray, accounting for up to 30% of the annual import volume. Overspray, accidental spills, application equipment washings (up to 5% of the annual import volume) and residues in empty paint containers (up to 1% of the annual import volume) are expected to be collected and disposed of to landfill in accordance with local, State and Federal regulations.

RELEASE OF CHEMICAL FROM DISPOSAL

The notified polymer in paints is expected to share the fate of articles to which it has been applied. The notified polymer is likely to be either thermally decomposed during metal reclamation processes or disposed of to landfill at the end of the useful life of the article to which it has been applied.

7.1.2. Environmental Fate

No environmental fate data were submitted for the notified polymer. The majority of the notified polymer is expected to be incorporated into an inert matrix of cured paints as part of its use pattern as a component in automotive and in industrial paints. The notified polymer is not expected to be bioavailable nor biodegradable in this form. The notified polymer will eventually degrade in landfill, or by thermal decomposition during metal reclamation processes, to form water and oxides of carbon and nitrogen.

7.1.3. Predicted Environmental Concentration (PEC)

The notified polymer is not expected to be present at significant concentrations in the aquatic environment because of the very low potential for direct release to surface waters when used in coatings. Therefore, the predicted environmental concentration (PEC) has not been calculated for the notified polymer.

7.2. Environmental Effects Assessment

The results from an ecotoxicological screening (limit test) conducted on the notified polymer is summarised in the table below. Details of this study can be found in Appendix C.

<i>Endpoint</i>	<i>Result</i>	<i>Assessment Conclusion</i>
Daphnia Toxicity	EC50 > 100 mg/L	Not harmful to aquatic invertebrates

The notified polymer is not expected to be acutely harmful to aquatic invertebrates. Therefore, the notified polymer is not formally classified for acute or long-term hazard under the Globally Harmonised System of Classification and Labelling of Chemicals (GHS) (United Nations, 2009).

7.2.1. Predicted No-Effect Concentration

Given the low water solubility and low potential for release of the notified polymer to the aquatic environment, the calculation of the PNEC is not considered necessary.

7.3. Environmental Risk Assessment

The risk quotients ($Q = PEC/PNEC$) for the notified polymer have not been calculated as PNEC was not calculated and release to the aquatic environment in ecotoxicologically significant concentrations is not expected based on its reported use pattern as a component in industrial and automotive paints. Moreover, after curing, the majority of the imported quantity of the notified polymer will be irreversibly incorporated into an inert matrix and it is not expected to be mobile, bioavailable or bioaccumulative. On the basis of the assessed use pattern, the notified polymer is not expected to pose an unreasonable risk to the environment.

APPENDIX A: PHYSICAL AND CHEMICAL PROPERTIES**Melting Point/Freezing Point** 256 °C

Method OECD TG 102 Melting Point/Melting Range
Remarks The melting point test was performed by the Differential Scanning Calorimetry method.
Test Facility BASF (2010)

Vapour Pressure < 1×10⁻⁶ hPa at 20, 25 or 50 °C

Method OECD TG 104 Vapour Pressure
Remarks The vapour pressure was determined by effusion method
Test Facility BASF (2010)

Water Solubility 29 - 316 mg/L at 20 °C

Method OECD TG 105 Water Solubility.
Remarks Flask Method. Concentrations of 29 to 316 mg/L were found at applied loading rates of 1 and 10 g/L of the notified polymer.
Test Facility BASF (2010)

APPENDIX C: ENVIRONMENTAL FATE AND ECOTOXICOLOGICAL INVESTIGATIONS

C.1. Ecotoxicological Investigations

C.2.1. Acute toxicity to aquatic invertebrates

TEST SUBSTANCE	Notified Polymer
METHOD	OECD TG 202 Daphnia sp. Acute Immobilisation Test and Reproduction Test - Static
Species	<i>Daphnia magna</i> Straus
Exposure Period	48 hours
Auxiliary Solvent	None
Water Hardness	Not reported
Analytical Monitoring	Not reported
Remarks - Method	A preliminary study of acute toxicity of the notified polymer to daphnia was conducted. The test substance (100 mg) was stirred in M4 medium for about 10 min at 20 ± 2 °C to make a stock solution. The test concentrations were prepared by diluting the stock solution.

RESULTS

<i>Concentration mg/L</i>	<i>Number of D. magna</i>	<i>Number Immobilised</i>
<i>Nominal</i>		<i>48 h</i>
Control	20	0
0.01	20	0
0.1	20	0
1	20	0
10	20	0
100	20	0

EC50 > 100 mg/L at 48 hours

Remarks - Results The stock solution was slightly turbid and homogeneous and a slight foam was also observed. The parameters for M4 medium were within the ranges required by the OECD 202 guidelines for testing of chemicals under the Acute Immobilization test. No information on whether the validity criteria were met was recorded, but as no adverse effects were observed in the control, the study is deemed to be suitably reliable as a preliminary study.

CONCLUSION The notified polymer is not harmful to aquatic invertebrates.

TEST FACILITY BASF (2007)

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