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

FULL PUBLIC REPORT

Polymer in TD-1355-HM

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**Director
Chemicals Notification and Assessment**

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FULL PUBLIC REPORT

Polymer in TD-1355-HM

1. APPLICANT AND NOTIFICATION DETAILS

APPLICANT(S)

Henkel Australia Pty Ltd (ABN 82 001 302 996)

135 – 141 Canterbury Rd

KILSYTH VIC 3137

NOTIFICATION CATEGORY

Limited: Polymer with NAMW ≥ 1000 (greater than 1 tonne per year).

EXEMPT INFORMATION (SECTION 75 OF THE ACT)

Data items and details claimed exempt from publication: chemical name, molecular and structural formulae, molecular weight, spectral data, import volume and polymer constituents.

VARIATION OF DATA REQUIREMENTS (SECTION 24 OF THE ACT)

No variation to the schedule of data requirements is claimed.

PREVIOUS NOTIFICATION IN AUSTRALIA BY APPLICANT(S)

None.

NOTIFICATION IN OTHER COUNTRIES

USA (TSCA).

2. IDENTITY OF CHEMICAL

MARKETING NAME(S)

TD-1355-HM (contains the notified polymer at less than 30%).

MOLECULAR WEIGHT

Number Average Molecular Weight (Mn) > 1000

Weight Average Molecular Weight (Mw) > 1000

% of Low MW Species < 1000 < 20

% of Low MW Species < 500 < 20

METHODS OF DETECTION AND DETERMINATION

ANALYTICAL Infrared (IR) spectroscopy

METHOD

Remarks A reference spectrum was provided.

3. COMPOSITION

DEGREE OF PURITY

High.

HAZARDOUS IMPURITIES/RESIDUAL MONOMERS

Chemical Name

Formaldehyde

CAS No.

50-00-0

Weight %

0.2

Hazardous Properties

- R40(3) - Possible risk of irreversible effects
- R23/24/25 - Toxic by inhalation, in contact with skin and if swallowed.
- R34 - Causes burns.
- R43 - May cause sensitisation by skin contact.

NON HAZARDOUS IMPURITIES/RESIDUAL MONOMERS (>1% by weight)
One of the polymer constituents is present at 2% in the final product.

ADDITIVES/ADJUVANTS

The polymer solution as imported contains < 30% notified polymer and propoxypropanol.

4. INTRODUCTION AND USE INFORMATION

MODE OF INTRODUCTION OF NOTIFIED CHEMICAL (100%) OVER NEXT 5 YEARS
In 200 L Mauser (ultrahigh molecular weight polyethylene) plastic containers.

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

<i>Year</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>
<i>Tonnes</i>	< 100	< 100	< 100	< 100	< 100

USE

Chromium-free pre-treatment for coil coating.

5. PROCESS AND RELEASE INFORMATION

5.1. Distribution, transport and storage

PORT OF ENTRY

Melbourne.

IDENTITY OF MANUFACTURER/RECIPIENTS

Notifier.

TRANSPORTATION AND PACKAGING

The imported notified polymer solution and the corrosion inhibitor solution into which it is reformulated are transported by road or rail. The corrosion inhibitor product is contained in 200 L steel drums or 1000 L IBCs and the concentrate in 200 L plastic Mauser containers.

5.2. Operation description

The plastic drums containing the imported polymer solution are connected to mixers via an automated transfer pump. Following mixing the product is filled into 200 L steel drums or IBCs for transport to the coil coating plant at which it is diluted to < 1% while being added to the coil coating equipment through a metering pump. The notified polymer is then dried in place.

5.3. Occupational exposure

Number and Category of Workers

<i>Category of Worker</i>	<i>Number</i>	<i>Exposure Duration</i>	<i>Exposure Frequency</i>
Transport and storage of imported polymer solution	10	4 hours/day	220 days/year
Manufacture of reformulated corrosion inhibitor solution:			
Makeup	2	2 hours/day	10 days/year
QC testing	1	1.25 hours/day	“

Filling into containers	2	2 hours/day	“
Coil Coating Application:			
Dilution, application and cleaning of equipment	30	4 hours/day	220 days/year

Exposure Details

During manufacture of the reformulated corrosion inhibitor solution the imported polymer solution is transferred to the mixer. Dermal exposure is possible from drips and spills during connection and disconnection of lines and from accidents during transport and storage. Inhalation exposure is controlled by local exhaust ventilation during transfer and filling operations.

Addition of the reformulated corrosion inhibitor solution to the coil coating machine through fixed pipes should only result in dermal exposure through minor drips and spills. Once added to the coil coater exposure should not occur.

5.4. Release

RELEASE OF CHEMICAL AT SITE

Environmental release of the notified chemical is unlikely during importation, storage and transportation, and accidental spills, leaks. Catastrophic mechanical failure during a transport accident is the most likely reason for environmental release. Engineering controls (eg. IBC and drum specifications) and emergency clean-up procedures (ie. spill response instructions on the Material Safety Data Sheet and label) will limit the impact on the environment of such incidents.

Containers holding the notified polymer will be transported directly from the Port facility to a formulation facility for storage prior to blending into the finished product. The finished product (containing < 10% notified polymer) will be packaged in 200 L steel drums or 1000 L IBCs for transport by road or rail to several coil application facilities.

Blending is undertaken using automated procedures and spillage is not expected as blending and packaging will be undertaken in an enclosed and fully bunded system. The notifier estimates that waste containing the notified polymer (<350 kg/annum) may be generated as a result of minor spills, cleaning of manufacturing equipment and reconditioning of emptied containers. Residues in emptied imported containers may comprise up to 350 kg/annum of the notified chemical. Drums are cleaned and the residue, along with wastewaters from equipment cleaning, is sent to the on-site wastewater treatment plant (WWTP) where it is treated and the effluent sent to sewer for further treatment. The notifier indicates that the notified polymer is expected to precipitate as a solid following the addition of a caustic agent and will partition with sludge, which is dried, collected and sent to landfill for disposal.

RELEASE OF CHEMICAL FROM USE

The notifier estimates that > 90% of the formulation containing the notified polymer is adsorbed onto the coil surface, with the remaining <10% in solution either sent to an on-site WWTP or evaporated in-situ and sent to landfill for disposal. In addition, coil coating lines have integral solvent recovery or incinerators. The solvent value is partially recovered in the form of energy and used for the plant's paint ovens. The notifier indicates that the pH is adjusted at the WWTP and the notified polymer is expected to flocculate and partition to sludge, which is subsequently dried and disposed of to landfill by a licensed waste contractor. As a worst case, the notifier estimates that <1% of the notified polymer may be sent to sewer via WWTP effluents. Any spilled material, estimated by the notifier at <350 kg/annum, will be collected and sent to landfill for disposal by a licensed waste contractor. Emptied containers are returned to the notifier's facility for reconditioning. After application to coils, the coating containing the notified polymer, present at a concentration of ~0.01%, will be heated and cured and very limited environmental release is expected from the cured coating matrix.

5.5. Disposal

The majority of the notified polymer (>90%) will be applied to coil surfaces and will be eventually disposed of by metal recycling at the end of the metal object's useful life, where the polymer is expected to be destroyed, or sent to landfill for disposal. The majority of the remaining 10%

(approximately) of the notified polymer will mostly be sent to landfill as a result of disposal of wastes resulting from formulation and use. Less than 1% of the notified polymer may potentially be sent to sewer for disposal in treated effluent a result of its use. A fraction of the notified polymer in solvent recovery waste may be incinerated.

5.6. Public exposure

Public exposure may occur as a result of a transport accident but is unlikely from manufacture of the reformulated corrosion inhibitor solution or as a result of coil coating operations either directly or due to environmental release. Once the notified polymer is applied to coils it is fixed in place and is not bioavailable.

6. PHYSICAL AND CHEMICAL PROPERTIES

The notified polymer is not isolated during its lifecycle and is always present as a polymer solution. Therefore, the physico-chemical properties relate to this solution.

Appearance at 20°C and 101.3 kPa	TD-1355-HM is a brown liquid.
Boiling Point	> 93.3°C
Density	1000 - 1100 kg/m ³ at 20°C
Vapour Pressure	Not determined
Remarks	The high molecular weight of the notified chemical suggests a low vapour pressure.
Water Solubility	Not determined.
Remarks	The notifier indicates that the notified polymer is probably completely soluble in water based on its structure and observations during manufacture. It is soluble in water during normal conditions of use.
Hydrolysis as a Function of pH	Not determined
Remarks	The notified polymer contains no hydrolysable groups.
Partition Coefficient (n-octanol/water)	Not determined
Remarks	Unlikely to have an affinity to octanol due to its expected high water solubility.
Adsorption/Desorption	Not determined
Remarks	From the solubility estimation, the notified polymer is likely to be mobile. However, its cationic nature will bind the negative charges in soils and sediments.
Dissociation Constant	Not determined
Remarks	The notified polymer contains both acidic and basic groups and is expected to be predominantly ionised in the environmental pH range of 4 – 9.
Flash Point	57°C
Remarks	Value for the polymer solution.
Flammability Limits	Not determined.
Remarks	Not expected to be flammable in aqueous solution.

Autoignition Temperature Not determined.

Remarks Not relevant for the polymer solution.

Explosive Properties Not determined.

Remarks Not expected to be explosive based on structure.

Reactivity Stable under normal environmental conditions.

7. TOXICOLOGICAL INVESTIGATIONS

No toxicological data were submitted.

8. ENVIRONMENT

8.1. Environmental fate

No environmental fate data were submitted.

8.1.2. Bioaccumulation

Remarks The high water solubility indicates that the notified polymer is unlikely to have a high affinity for lipids and the high molecular weight would indicate a limited potential for transfer across biological membranes.

8.2. Ecotoxicological investigations

No ecotoxicological data were submitted.

9. RISK ASSESSMENT

9.1. Environment

9.1.1. Environment – exposure assessment

The notified polymer is expected to be completely soluble in water and will partition to the aqueous phase due to the presence of ionised functional groups, however, in alkaline conditions, aqueous solubility should be reduced and partitioning to sludge and sediments is likely. The high water solubility indicates that the notified polymer is unlikely to have a high affinity for lipids and the high molecular weight would limit transfer across biological membranes and bioaccumulation. Exposure of the coating to sunlight may result in photolysis of the notified polymer over time.

The notified polymer is not expected to be released into waterways or sewer based on its proposed use in coil coating and its disposal pattern. Consequently, no environmental concentration in the aquatic environment can be predicted. If released to sewer, the notified polymer is expected to be removed or bound to dissolved organic matter or suspended particulate matter and to precipitate. Concentrations are expected to be very low in untreated sewage and much less in treated effluent. During metal recycling of coils, the notified polymer is likely to be destroyed resulting in the formation of oxides of carbon and nitrogen, and water.

9.1.2. Environment – effects assessment

Although no ecotoxicity data were available for the notified polymer, water soluble cationic polymers with relatively high charge density are known to produce adverse effects to aquatic organisms when tested in standard ecotoxicity tests using distilled water (Boethling and Nabholz, 1996). In fish, effects arise due to binding of the charged polymer to net negatively

charged fish gills resulting in limited oxygen transfer. However, ecotoxicity is considerably reduced in the presence of dissolved organic matter or suspended solids in wastewater or natural waters by forming neutral insoluble complexes (ie. floc) which settles out of the water column (Goodrich *et al.*, 1991; Boethling and Nabholz, 1997).

9.1.3. Environment – risk characterisation

Practically all of the notified polymer imported will eventually be disposed of to landfill. This includes wastes from spills, unused product, residues in emptied containers and coated products at the end of their useful life. Some coated products will be metal recycled, resulting in the destruction of the notified polymer to form oxides of carbon and nitrogen and water. In landfill, the notified polymer is bound and not expected to be mobile. It will eventually degrade to give water vapour and oxides of carbon and nitrogen.

It is not possible to determine a realistic PEC value in order to assess the risk to aquatic organisms, as the use pattern of the notified polymer will result in limited exposure to the aquatic environment. Due to the limited release to water, it is unlikely that the polymer would exist at levels which could pose a threat to aquatic organisms or to bioaccumulate. Based on the proposed use pattern, the release of the notified polymer to the sewer or aquatic environment is expected to be very low. Mitigation of aquatic toxicity, expressed by the ionic exchange capacity of the polymer, is expected in wastewater and natural waters due to the very low expected concentration and presence of dissolved organic carbon and suspended solids in these media. Abiotic or slow biotic processes are expected to be largely responsible for the eventual degradation of the notified polymer as it is not expected to be readily biodegradable.

9.2. Human health

9.2.1. Occupational health and safety – exposure assessment

Exposure to transport and storage workers should only occur in the event of an accident resulting in rupture of containers.

Inhalation exposure of workers involved in manufacture of the reformulated corrosion inhibitor solution should be precluded by the anticipated low vapour pressure given the high molecular weight of the notified polymer. Dermal exposure to the notified polymer could occur during transfer of the imported formulation to the blending plant but inspection of this plant suggests work practices and auxiliary equipment would limit exposure. Once blended the notified polymer is at < 10% and therefore dermal exposure during cleaning, maintenance and QC sampling and filling into drums or IBCs will be limited.

Dermal exposure to coil coating workers should also be limited by the notified polymer's low concentration in the reformulated corrosion inhibitor solution and limited opportunity for exposure while connecting and disconnecting containers to the coil coating machine. The coil coating machine is designed for continuous operation but there may be intermittent exposure from cleaning operations or maintenance.

9.2.2. Public health – exposure assessment

Public exposure from the industrial processes should not normally occur. There is potentially public exposure from a transport accident but these should occur infrequently.

9.2.3. Human health - effects assessment

No toxicity data were available. The high molecular weight of the notified polymer and its lack of moderate or high concern reactive functional groups suggest a low order of toxicity.

Based on the available data, the notified polymer is **not classified** as a hazardous substance in accordance with the NOHSC *Approved Criteria for Classifying Hazardous Substances* (NOHSC, 2002).

9.2.4. Occupational health and safety – risk characterisation

The imported formulation containing the notified polymer is unlikely to be hazardous because of the polymer content. However, it is classified as a skin sensitiser and irritating to eyes and skin

on the basis of the formaldehyde and solvent content. Therefore, there is a limited risk of these effects resulting from transfer operations involving blending to produce the reformulated corrosion inhibitor solution. However, the reformulated corrosion inhibitor solution is classified as harmful by inhalation, ingestion or in contact with skin and is corrosive. Therefore, work practices and PPE commensurate with the risk of these effects during drum filling and addition to the coil coating machines are expected to be employed. There will be no additional risk of adverse health effects due to the notified polymer.

9.2.5. Public health – risk characterisation

The risk to the public from importation of the notified polymer is likely to be minimal given its predicted low toxicity and limited exposure.

10. CONCLUSIONS – ASSESSMENT LEVEL OF CONCERN FOR THE ENVIRONMENT AND HUMANS

10.1. Hazard classification

Based on the available data the notified chemical is not classified as hazardous under the NOHSC *Approved Criteria for Classifying Hazardous Substances*.

10.2. Environmental risk assessment

The chemical is not considered to pose a risk to the environment based on its reported use pattern.

10.3. Human health risk assessment

10.3.1. Occupational health and safety

There is Low Concern to occupational health and safety under the conditions of the occupational settings described.

10.3.2. Public health

There is Negligible Concern to public health when used as described.

11. MATERIAL SAFETY DATA SHEET

11.1. Material Safety Data Sheet

The MSDS of the notified polymer [and products containing the notified polymer](#) provided by the notifier [were](#) in accordance with the NOHSC *National Code of Practice for the Preparation of Material Safety Data Sheets* (NOHSC, 2003). [They are](#) published here as a matter of public record. The accuracy of the information on the MSDS remains the responsibility of the applicant.

11.2. Label

The label for the notified polymer [and products containing the notified polymer](#) provided by the notifier [were](#) in accordance with the NOHSC *National Code of Practice for the Labelling of Workplace Substances* (NOHSC, 1994). The accuracy of the information on the label remains the responsibility of the applicant.

12. RECOMMENDATIONS

CONTROL MEASURES
Occupational Health and Safety

- A copy of the MSDS should be easily accessible to employees.

- If products and mixtures containing the notified polymer are classified as hazardous to health in accordance with the NOHSC *Approved Criteria for Classifying Hazardous Substances*, workplace practices and control procedures consistent with provisions of State and Territory hazardous substances legislation must be in operation. Particular note should be taken of the hazards of the polymer solution TD-1355-HM to be imported and the corrosion inhibitor product of which this solution is a component.

Environment

Emergency procedures

- Spills/release of the notified polymer should be handled by containing and collection in an inert absorbent material (eg. sand, earth, vermiculite). Transfer to sealable labelled containers for storage. Clean and flush areas in contact with spilled material with adequate water. Wash waters may contain residues that should be sent to sewer for treatment.
- Do not allow spills to enter drains or water courses.

Disposal

- The notified polymer should be disposed of to landfill or incinerator in accordance with local jurisdiction waste disposal regulations.
- Empty containers must be decontaminated. Use dilute solutions of soda ash or lime under controlled conditions. Normally neutralisation is required for landfill disposal. Discuss with local waste management authority. Emptied containers should be drained and triple rinsed with fresh water prior to return to the supplier or disposal to drum reconditioners or approved landfill site.

12.1. Secondary notification

The Director of Chemicals Notification and Assessment must be notified in writing within 28 days by the notifier, other importer or manufacturer:

(1) Under Section 64(2) of the Act:

- if any of the circumstances listed in the subsection arise.

The Director will then decide whether secondary notification is required.

No additional secondary notification conditions are stipulated.

13. BIBLIOGRAPHY

- Boethling, R S and Nabholz, J V (1997) Environmental Assessment of Polymers under the U.S. toxic Substances control Act. Chapter 10, pp: 187-234. In: Hamilton, J. D. and Sutcliffe, R. (eds). *Ecological Assessment of Polymers: Strategies for Product Stewardship and Regulatory Programs*. Van Nostrand Reinhold, NY.
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