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NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME

FULL PUBLIC REPORT

Polyurethane Prepolymer in Sika Tack Plus

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Director
Chemicals Notification and Assessment

FULL PUBLIC REPORT

Polyurethane Prepolymer in Sika Tack Plus

1. APPLICANT

Sika Australia Pty Limited of 55 Elizabeth St WETHERILL PARK NSW 2164 has submitted a limited notification statement in support of their application for an assessment certificate for Polyurethane Prepolymer in Sika Tack Plus.

2. IDENTITY OF THE CHEMICAL

For commercial reasons, the identity of the notified chemical has been granted exemption from publication in the Full Public Report and the Summary Report.

Trade names:	MS22M2 MS-22/-V2 Sika Tack Plus (product containing the notified polymer)

3. PHYSICAL AND CHEMICAL PROPERTIES

Appearance at 20°C and 101.3 kPa:	the notified polymer is a clear to hazy yellow liquid
Boiling point:	not determined; polymer will decompose before boiling.
Specific gravity:	1.1 - 1.2
Vapour pressure:	not determined; the polymer is not expected to have a significant vapour pressure
Water solubility:	the polymer has been designed to cross-link in the presence of moisture; water solubility would be difficult to determine
Partition co-efficient (n-octanol/water):	not determined
Hydrolysis as a function of pH:	not determined
Adsorption/desorption:	not determined

Dissociation constant:	not determined
Flash point:	> 100°C
Flammability limits:	non-flammable
Autoignition temperature:	> 450 °C
Explosive properties:	not explosive
Reactivity/stability:	the notified polymer will slowly cross-link on contact with moisture; the polymer is not compatible with oxidising or reducing agents, acid or alkaline materials

Comments on Physico-Chemical Properties

The notifier has stated that the polymer has been designed to cross-link in the presence of moisture. Therefore water solubility is difficult to determine but is expected to be low.

The polymer contains carbamate functional groups which may hydrolyse under extreme acid or base conditions, but this is unlikely in the environmental pH range. Partition coefficient data is not applicable as a polymer of this molecular size (number-average molecular weight (NAMW) >1000) and low solubility is not expected to cross biological membranes. It would be difficult to measure.

No measurement of adsorption/desorption was made. The polymer is not expected to dissociate under environmental conditions. The latter two properties would not be able to be determined for a polymer that is insoluble in water. The large, complex molecular structure also makes the measurement of such properties difficult.

4. PURITY OF THE CHEMICAL

Degree of purity:	88%
Maximum content of residual monomers:	2.16%
Additives/Adjuvants:	none

Toxic or hazardous impurities:

Chemical name:	methylene bisphenyl isocyanate
Synonyms:	MDI 1,1'-methylene bis[4-isocyanate benzene]
CAS No.:	101-68-8
Weight percentage:	2.16%
Toxic properties:	harmful by inhalation; irritating to eyes, respiratory system and skin at and above concentrations of 20%; may cause sensitisation by inhalation at and above concentrations of 1% (1)

5. USE, VOLUME AND FORMULATION

No formulation of the notified polymer will take place in Australia. The notified polymer will be imported as a component of Sika Tack Plus, which will be used as a sealant and adhesive for fitting motor vehicle windscreens.

The annual import volume of the notified polymer is expected to be < 1000 kg for each of the first 5 years.

6. OCCUPATIONAL EXPOSURE

The finished product, Sika Tack Plus, will be imported in sealed 310 mL aluminium cartridges which fit into a manual application gun. These cartridges will be shipped in cartons, each carton containing 12 cartridges. The cartons will be stored in multiwall fibreboard boxes, which will then be palletised and wrapped in plastic.

It is likely that waterside and warehouse workers will be exposed to the notified polymer in a diluted form, but only in the event of accident or damage to the aluminium cartridges. Waterside workers will unload pallets of cartridges, and load them onto trucks for road transport to a warehouse facility. The product will then be stored locally or transported by road to other warehouses. Warehouse workers will unload cartons for storage, and the cartons will be distributed to customer sites.

Applicators will use Sika Tack Plus, containing the notified polymer, in automotive repair shops for an estimated half an hour per day, 200 days per year. Cartridges of Sika Tack Plus will be loaded into an application gun, and the adhesive, which will be at a temperature of approximately 80°C, applied to the motor vehicle frame before the windscreen is fitted. Application of the product at 80°C is not expected to increase exposure to the notified polymer significantly. The isocyanate impurities in the polymer are also not volatile, therefore the application temperature is not expected to increase the inhalational exposure to these components. Excess material will be removed using a metal spatula. The exposure to the applied or

excess material is expected to be minimal. Sika Tack Plus cures within 2-4 hours to form a rubber-like substance.

7. PUBLIC EXPOSURE

Sika Tack Plus will not be available for use by the public, and will be used in automotive repair shops. Minimal public exposure may occur if the automobile windscreen sealant is accidentally exposed due to vehicle damage.

Minor public exposure may also result from disposal of unused sealant/adhesive, or accidental spillage during transport and storage. However, adequate measures are described by the notifier to minimise the risk of public exposure during exposure, or in the event of accidental spillage.

8. ENVIRONMENTAL EXPOSURE

Release

The notifier states that in a worst case scenario, approximately 30 kg/y of the notified polymer will be released to the environment through: application (20 kg/y); leaking cartridges (5 kg/y); and disposal of residual product remaining in cartridge (5 kg/y).

Residual material in the cartridges will cure and solidify. The cartridge containing the solid residual is expected to be disposed of by a licensed waste contractor.
There is no reformulation or further treatment of the polymer within Australia. As a component of Sika Tack Plus, the notified polymer will be transported in boxes of 12 sealed 310 mL aluminium cartridges where the risk of environmental exposure is limited to incidents involving accident or leaking cartridges.

Fate

Sika Tack Plus is expected to be used as a sealant/adhesive for automotive windscreens and remain with the jointed surfaces until it is removed or disposed of with the articles to which it is bound. Therefore most of notified polymer manufactured will be incorporated in a polymer matrix, most of which will eventually be disposed of by landfill.

A small amount of waste is generated during application, the fate of this waste was not given by the applicant, however, it is expected to eventually go to landfill or be incinerated.

The majority of the notified polymer is not expected to be released to the environment until it has fully cured into a solid polymer matrix. The resultant matrix structure should limit the hydrolysis or biodegradation of the polymer. Bioaccumulation of the polymer is unlikely due to the high NAMW of the polymer even before curing (2). Leaching from landfill sites is not expected as the notified polymer is a polymer with low water solubility. Upon drying, the polymer will become a rubber-like solid.

9. EVALUATION OF TOXICOLOGICAL DATA

According to the Act, toxicological data are not required for polymers with NAMW > 1000 and no data were submitted.

10. ASSESSMENT OF ENVIRONMENTAL EFFECTS

According to the Act, environmental effects testing is not required for polymers with NAMW > 1000 and no data were submitted by the notifier.

11. ASSESSMENT OF ENVIRONMENTAL HAZARD

On account of the low import volume of the notified polymer, the environmental exposure during transport will be very limited.

Use of the product Sika Tack Plus is not expected to cause any significant release of the notified polymer to the environment, due to the nature of the product and method of application. On exposure to ambient conditions, Sika Tack Plus is expected to cure to an inert solid. The polymer is no longer present in its original form but is extensively cross-linked. This will prevent any release of the notified polymer to the environment. Due to use and type of packaging, insignificant amounts will be disposed of with the packaging as the cured inert solid.

Incineration of the notified polymer will generate oxides of carbon and nitrogen as well as water. In landfill the notified polymer is not expected to leach. The environmental hazard from the disposal of vehicles which contain Sika Tack Plus by landfill or incineration is rated as negligible.

The overall environmental hazard can be rated as negligible.

12. ASSESSMENT OF PUBLIC AND OCCUPATIONAL HEALTH AND SAFETY EFFECTS

The notified polymer has a NAMW > 1000, and so is not expected to be absorbed across biological membranes to cause systemic effects. The levels of low molecular weight species (MW < 1000, 2.8%; MW < 500, 0.8%) are not expected to cause adverse health effects. Based on this information, Polyurethane Prepolymer in Sika Tack Plus is not expected to be hazardous according to Worksafe Criteria (1,4).

The notified polymer contains 2.16% of the residual monomer MDI, which is a hazardous substance. According to Worksafe criteria (1,4), MDI may cause sensitisation by inhalation at concentrations above 1%. Therefore formulations containing the notified polymer which have more than 1% MDI as an impurity would be classified as hazardous.

Waterside, warehouse and transport workers will be exposed to the notified chemical in a diluted form, but only in the event of an accident or damage to the aluminium

cartridges. The occupational health risk to these workers, particularly considering the low import volume, is negligible.

The main occupational health risk of applicators working with the notified polymer is possible sensitisation to MDI if it is inhaled. However, due to the fact that the notified polymer makes up less than one half of the final formulation, the concentration of MDI will be less than 1%. This is below the limit at which sensitisation by inhalation is likely to occur, and so the risk of sensitisation by inhalation when using the notified polymer in the product Sika Tack Plus is low. Based on the MDI content, Sika Tack Plus would not be classified as hazardous according to Worksafe Criteria (1,3).

While MDI can also cause skin and eye irritation, the risk of the notified polymer causing skin and eye irritation is low, as the concentration of MDI is well below the 20% cutoff for skin and eye irritation by Worksafe criteria (1,3). There may be a small risk of skin sensitisation in susceptible workers. If Sika Tack Plus comes into contact with the skin, prolonged dermal exposure to the notified polymer may occur, due to the adhesive properties of the product. Exposure of the skin and eyes is expected to be limited to drips and spills under the described conditions of use.

Sika Tack Plus, the product containing the notified polymer, will not be available to the general public. Minimal public exposure may result following accidental damage to the motor vehicle. However, the polymer will be immobilised in the sealant/adhesive and as such will pose a negligible public risk. The potential for minor public exposure exists during transport and disposal of the polymer if accidentally spilt. This is minimised by the recommended practices during storage and transportation.

13. RECOMMENDATIONS

To minimise occupational exposure to Polyurethane Prepolymer in Sika Tack Plus the following guidelines and precautions should be observed:

- 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 Material Safety Data Sheet (MSDS) should be easily accessible to employees.

Potentially hazardous levels of MDI are present as an impurity in the notified polymer. Therefore, to minimise occupational exposure to residual MDI the following guidelines and precautions should be observed:

- If ventilation is inadequate, or the concentration of residual MDI in the product is greater than or equal to 1%, respiratory protection should be selected and fitted in accordance with AS/NZS 1715 (5) and AS/NZS 1716 (6).

- Impermeable gloves or mittens conforming to AS 2161 (7) should be worn, particularly if the concentration of residual MDI in the product is greater than or equal to 1%.

- If the content of the residual monomer, MDI, in a product containing the notified polymer is greater than or equal to 1%, the product should be classified and labelled according to Worksafe documents (1,4,8,9) as a hazardous substance;

- The Worksafe Australia document *Exposure Standards for Atmospheric Contaminants in the Occupational Environment: Guidance Note and National Exposure Standards* (10) should be used as a guide in the control of workplace exposure to the residual isocyanates in Polyurethane Prepolymer in Sika Tack Plus;

14. MATERIAL SAFETY DATA SHEET

The MSDS for the notified chemical was provided in accordance with the *National Code of Practice for the Preparation of Material Safety Data Sheets* (7).

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, secondary notification of the notified chemical 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. National Occupational Health and Safety Commission 1994, *List of Designated Hazardous Substances* [NOHSC:10005(1994)], Australian Government Publishing Service Publ., Canberra.

2. Nabholz J V, Miller P and Zeeman M, 1993, *Environmental Risk Assessment of New Substances under the Toxic Substances Control Act Section Five*. In W G Landis, J S Hughes and M A Lewis (Eds), Environmental Toxicology and Risk Assessment, American Society for Testing and Materials, ASTM STP 1179, Philadelphia. pp 40-55.

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

4. Standards Australia/Standards New Zealand 1994, *Australian/New Zealand Standard 1715-1994, Selection, Use and Maintenance of Respiratory Protective Devices,* Standards Association of Australia Publ., Sydney, Standards Association of New Zealand Publ, Wellington.

5. Standards Australia/Standards New Zealand 1994, *Australian/New Zealand Standard 1716-1994, Respiratory Protective Devices,* Standards Association of Australia Publ., Sydney, Standards Association of New Zealand Publ, Wellington.

6. Standards Australia 1978, *Australian Standard 2161-1978, Industrial Safety Gloves and Mittens (excluding electrical and medical gloves),* Standards Association of Australia Publ., Sydney.

7. 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.

8. National Occupational Health and Safety Commission 1994, *National Code of Practice for the Labelling of Workplace Substances* [NOHSC:2012(1994)], Australian Government Publishing Service, Canberra.

9. 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 Publ., Canberra.