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**NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION
AND ASSESSMENT SCHEME**

FULL PUBLIC REPORT

Polymer in Sokalan SK 2 E

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FULL PUBLIC REPORT**Polymer in Sokalan SK 2 E****1. APPLICANT**

BASF Australia Ltd of 500 Princes Highway, Noble Park, Victoria 3174 (ABN 62 008 437 867) has submitted a notification statement in support of their application for an assessment certificate for the synthetic polymer of low concern (PLC) **Polymer in Sokalan SK 2 E**.

2. IDENTITY OF THE CHEMICAL

The chemical name, CAS number, molecular and structural formulae, molecular weight, spectral data and details of the polymer composition have been exempted from publication in the Full Public Report.

Marketing names: Sokalan SK 2 E

Other names: Sokalan HP 80

3. POLYMER COMPOSITION AND PURITY

Details of the polymer composition have been exempted from publication in the Full Public Report.

4. PLC JUSTIFICATION

The notified polymer meets the PLC criteria.

5. PHYSICAL AND CHEMICAL PROPERTIES

Property	Result	Comments
Appearance	Colourless to light yellow liquid	
Boiling point	Not determined	
Density	1.1 at 20°C	

Water solubility	Not determined	See comments below.
Particle size	Not applicable	
Autoignition temperature	> 200°C	
Flammability	Not applicable	
Explosive properties	Not explosive	
Stability/reactivity	Partial hydrolysis may occur.	See comments below.
Hydrolysis as function of pH	Not determined	

5.1 Comments on physical and chemical properties

Water solubility was not determined for the notified polymer. However, the polymer is claimed to be dilutable in all proportions with water. The polymer stability is uncertain as the concrete in which the polymer is to be used is alkaline. Therefore there is the potential for partial hydrolysis of the polymer.

6. USE, VOLUME AND FORMULATION

Use:

The polymer is intended to be used as a plasticiser additive for concrete.

Manufacture/Import volume:

The product containing the notified polymer will be imported in 1000L intermediate bulk containers or 204L steel drums at a rate of 300 tonnes (120 tonnes of notified polymer) per year.

Formulation details:

The notified polymer will be imported as a 40% aqueous solution and formulated into concrete admixtures at 0.3-0.4%. The product is mechanically pumped into a 16 tonne main processing vessel where mixing takes place. It may be mixed with Sokalan SK 3.2 (PLC193). The product is drained from here into 1000L intermediate bulk containers for delivery to end-use customers such as ready mix and precast concrete plants and mining and tunnelling shotcretors.

7. OCCUPATIONAL EXPOSURE

Exposure route	Exposure details	Controls indicated by notifier
<i>Transport and storage</i>		
<i>Transport of Imported Solution</i>		
Dermal and/or	Accidental breach of bulk containers or drums containing	No exposure controls specified.

ocular 40% polymer.

Storage and Transport of Admixture from Customer Site to End-use Site (5 workers)

Dermal Accidental breach of bulk No exposure controls specified.
and/or containers containing 0.3-0.4%
ocular polymer.

Formulation of Concrete Admixture

Filling of Mixing Vessel (4 workers)

Dermal Spillage during manipulation of Coveralls, safety goggles, boots, face
and/or pump line between import bulk shield, apron and impervious gloves;
ocular container and mixing vessel. Closed pump lines; Exhaust ventilation.

Decanting of Admixture into Intermediate Bulk Containers (2 workers)

Dermal Spillage during manipulation of Coveralls, safety goggles, boots, face
and/or pump line between mixing vessel shield, apron and impervious gloves.
ocular and bulk containers. Closed pump lines; Exhaust ventilation.

Quality Analysis

Sampling of Imported Product and Admixture (1 worker)

Dermal Spillage during sampling of Coveralls, safety goggles, boots, face
and/or imported product (40% notified shield, apron and impervious gloves.
ocular polymer) and admixture (0.3-0.4% Exhaust ventilation.
notified polymer)

End use

Adding Admixture to Concrete

Dermal Spillage during manipulation of No exposure controls specified.
and/or pump line between bulk containers
ocular and concrete mixing vessels.

Concrete Transport and Pouring

Dermal Spillage of concrete (0.17% No exposure controls specified.
and/or notified polymer).
ocular

8. PUBLIC EXPOSURE

It is expected that during transport, storage and industrial use, exposure of the public to the notified chemical will be minimal, except in the event of an accidental spill. There is likely to be a high level of public exposure arising from dermal contact with finished concrete structures containing the notified polymer at approximately 0.17%.

9. ENVIRONMENTAL EXPOSURE

9.1. Release

Release of the new polymer is expected to be minimal, unless exposure occurs through accidental spillage.

Reformulation at customer site

Spillage during normal operating procedures will be contained by plant bunding and will be soaked up with absorbent material before being transported off-site for disposal by incineration or landfill. No release is expected from washing of concrete mixing trucks or equipment used to formulate the concrete admixture as all washings are recycled into subsequent concrete mixtures. It is expected that 80% of the Sokalan SK 2 E will be supplied in returnable intermediate bulk containers, so no waste is expected from these. The remaining 20% will be supplied in non-returnable drums with the maximum residue per drum being approximately 1–2%. Therefore, it is expected that up to 480 kg of the new polymer will be disposed of to landfill in this way. Other losses of the polymer will occur in unused concrete. However, in this situation the polymer will be bound into the concrete matrix and not available for release into waterways.

Release due to spills and equipment cleaning during end uses is estimated to be 1%.

Therefore release from:	- ready mix application	= 720 kg
	- precast concrete application	= 240 kg
	- mining shotcreting application	= 240 kg
	Total	= 1.2 tonnes

Release of the polymer from final uses is estimated to be 0.1 %. Therefore release from:

- ready mix application	= 72 kg
- precast concrete application	= 24 kg
- mining shotcreting application	= 24 kg
Total	= 120 kg

9.2. Fate

The majority of the notified polymer will be bound within the matrix of the concrete and, once hardened, will remain immobile. Its fate will be linked to the disposal of the concrete fabrications into which it has been incorporated. The concrete rubble from building demolitions is usually directed to landfill where the notified polymer is expected to remain immobile and not leach out.

If the spilt material cannot be recycled, it is likely to end up in landfill, along with spill clean-up absorbants. Container residue may be disposed of to landfill if it cannot be recycled. Given the solubility, the notified polymer is not likely to adsorb to soil but to leach.

No information was provided regarding the degradability of the notified polymer. It may partition between solution and sorbed phase (bound to aquatic sediments and organic particles in suspension) through the presence of reactive carboxyl and ether functional groups. Under these circumstances it is anticipated to degrade very slowly via biotic and abiotic processes. Polymers of high molecular weight are considered to be impermeable to biological membranes (Connell, 1990) and consequently bioaccumulation of the notified polymer is not expected.

10. EVALUATION OF HEALTH EFFECTS DATA

No toxicological information was provided. One of the monomers is a Type 1 hazardous substance (corrosive). However, it is present in the notified polymer at a concentration below its cut-off level for hazard classification.

11. EVALUATION OF ENVIRONMENTAL EFFECTS DATA

No ecotoxicological data were provided.

12. ENVIRONMENTAL RISK ASSESSMENT

The majority of the notified polymer will be incorporated into the matrix of the concrete. Once solidified, the notified polymer is expected to pose minimum risk to the environment.

There is potential for up to 1.8 tonnes per annum of the notified polymer to be released into the environment as a consequence of spillage, drum residues and equipment washing. The spillage is expected to be dispersed and not restricted to a single site. This would minimise the risk to the environment at any given time. If the spilt imported material or raw product cannot be recycled, it is likely to end up in landfill adsorbed to the inert material used for the spill clean-up (such as sand), where it is likely to leach out in a diffuse manner at low concentrations.

The main environmental hazard would occur from release of the notified polymer during storage or transport. The use of bunded containment minimises the risk of release at storage sites. The Material Safety Data Sheet (MSDS) adequately addresses spills and disposal.

A further environmental hazard could occur from release of untreated polymer-contaminated water into the aquatic compartment. This risk will be greatly reduced by the recycling of truck wash water for subsequent batches of cement.

The low expected environmental exposure of the notified polymer when integrated into concrete suggests the overall environmental hazard should be minimal.

13. HEALTH AND SAFETY RISK ASSESSMENT

13.1. Hazard assessment

No toxicological information has been provided for the notified polymer and so the polymer cannot be assessed against the NOHSC *Approved Criteria for Classifying Hazardous Substances* (NOHSC, 1999b). However, due to its high molecular weight and presence of only low concern reactive functional groups, it is unlikely to be classified as a hazardous substance.

Although the notified polymer meets the criteria for a Polymer of Low Concern, one of the residual monomers present is a corrosive substance and so the imported polymer solution may be a slight skin and eye irritant.

13.2. Occupational health and safety

Exposure to the notified polymer is not expected during import and storage of the polymer solution nor storage and transport of the formulated concrete admixture to end-user sites. Import containers of polymer and containers of concrete admixture are not opened prior to formulation and end-use respectively and so occupational exposure of import/storage workers to the polymer would only be envisaged in the case of accidental puncture of containers.

For workers involved in formulation and quality analysis of the concrete admixture, the main exposure routes will be dermal and ocular from splashes and spills, so slight skin and eye irritation is possible. Exposure is most likely to occur during connection and disconnection of pump lines for filling and emptying the main mixing vessel and during manual sampling of imported polymer and formulated admixture for quality analysis. The low likelihood of vapour or aerosol formation during transfer makes inhalation exposure to the notified polymer unlikely.

A combination of personal protective equipment worn by workers and engineering controls in the form of enclosed transfer lines and exhaust ventilation should control exposure to the polymer during formulation. However, there is the risk of irritation if spillage occurs. Otherwise, the low possibility of exposure and the low health hazard associated with the notified polymer renders the health risk for these workers low.

Dermal and ocular exposure to the notified polymer may also occur during end-use when the admixture is transported to concrete formulators and added to concrete. At this point, the notified polymer is at low concentration (0.17%) and so the health risk for workers involved in this end-use would be assessed as low.

The polymer is unavailable for absorption by workers once the concrete is set.

13.3. Public health

Given the polymer's low reactivity, limited availability (industrial use only), high molecular weight, low concentration and biological unavailability in finished concrete structures, the risk to public health from exposure to the notified polymer throughout all phases of its life-cycle is considered to be low.

14. MSDS AND LABEL ASSESSMENT

14.1. MSDS

The MSDS of the product containing the notified polymer provided by the notifier was in accordance with the NOHSC *National Code of Practice for the Preparation of Material Safety Data Sheets* (NOHSC, 1994a). It is published here as part of the assessment report. The accuracy of the information on the MSDS remains the responsibility of the applicant.

14.2. Label

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

15. RECOMMENDATIONS

Due to the possible irritant effects of the notified polymer solution, the following guidelines and precautions should be observed:

- Protective eyewear, chemical resistant industrial clothing and footwear and impermeable gloves should be used during use;
- 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;
- A copy of the MSDS should be easily accessible to employees.

If products containing the notified polymer 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 protective eyewear 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 3765.2 (Standards Australia, 1990); for impermeable gloves or mittens, in AS 2161.2 (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) and other internationally acceptable standards.

16. REQUIREMENTS FOR SECONDARY NOTIFICATION

Secondary notification may be required if:

- (i) any of the circumstances stipulated under subsection 64(2) of the Act arise. If any importer or manufacturer of (the notified chemical) becomes aware of any of these circumstances, they must notify the Director within 28 days; or
- (ii) the notified polymer is introduced in a chemical form that does not meet the PLC criteria.

17. REFERENCES

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