

**NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT
SCHEME**

POLYMER OF LOW CONCERN

FULL PUBLIC REPORT

Burez S-160

Under subsection 38(5) of the *Industrial Chemicals (Notification and Assessment) Act 1989* (the Act), the Director of Chemicals Notification and Assessment publishes this assessment report by giving a copy of it to:

- . the Chief Executive Officer of the National Occupational Health and Safety Commission (Worksafe Australia);
- . the Secretary of the Department of the Environment, Sport and Territories;
- . the Secretary of the Department of Health and Family Services; and
- . the Director of the Department of Occupational Health Safety and Welfare, Western Australia

This assessment report will not be available for inspection by the public.

Director
Chemicals Notification and Assessment

November 1997

FULL PUBLIC REPORT**Burez S-160****1. APPLICANT**

Eka Chemicals (Australia) Pty Ltd of 15 Conquest Way HALLAM VIC 3803 has submitted a notification statement accompanying their application for assessment of a synthetic polymer of low concern, Burez S-160.

2. IDENTITY OF THE CHEMICAL

Burez S-160 meets the definition of a Polymer of Low Concern under the Act, and is not considered to be hazardous according to Worksafe Criteria, based on the nature of the polymer and the data provided. Therefore the chemical name, CAS number, molecular and structural formulae, molecular weight, spectral data, details of the polymer composition and details of exact import volume and customers have been exempted from publication in the Full Public Report.

Trade Name: Burez S-160

3. PHYSICAL AND CHEMICAL PROPERTIES

Appearance at 20°C and 101.3 kPa:	pale yellow-white waxy solid with slight odour
Melting Point:	softening point is 40°C to 80°C
Specific Gravity:	1.0
Vapour Pressure:	negligible
Water Solubility:	8% (estimate)
Hydrolysis as a Function of pH:	not available (see comment below)
Partition Co-efficient (n-octanol/water):	not available (see comment below)
Adsorption/Desorption:	not available (see comment below)
Dissociation Constant:	not available (see comment below)

Flash Point:	> 280°C
Flammability Limits:	not available
Autoignition Temperature:	> 300°C
Explosive Properties:	none
Reactivity/Stability:	the polymer has no oxidising properties, and is unreactive and stable under storage conditions

Comments on Physico-Chemical Properties

Solubility has been determined by a simple bench test. Measured amounts of the polymer were added to measured amounts of water at 20°C and stirred for one hour. Solution was found to remain clear until polymer dissolved up to 8% (w/v) after which the mixture formed a gel.

The notifier has applied for variation of schedule requirements on the properties of hydrolysis, partition coefficient, adsorption/desorption and dissociation constant. This is acceptable for the following reasons:

The two reactants used to produce the notified polymer are themselves very stable. The two reactants are linked through ester bonds that are generally stable under the environmental pH range (4 to 9). However, slight hydrolysis may be possible given the moderate water solubility of the polymer.

The notifier has indicated that the octanol/water partition coefficient could not be measured due to the surface active nature of the polymer.

The adsorption/desorption characteristics have not been determined due to the lack of an officially approved method in the EEC. From the water solubility, the polymer's ability to adsorb to soil and sediment can be expected to be low. However, this would be balanced by its propensity to be attracted to surfaces.

The polymer is non-ionic and does not contain dissociable functionalities.

Burez S-160 is imported as a 200 L approximately solid block. Information of the particle size of Burez S-160 is not necessary.

4. PURITY OF THE CHEMICAL

Degree of Purity: high

Additives/Adjuvants: none

5. USE, VOLUME AND FORMULATION

The notified polymer is used as a dispersing agent for rosin-based tackifiers intended for use in the manufacture of pressure-sensitive adhesive coated paper products.

The finished tackifier will be a liquid formulation containing less than 10% of the notified chemical. The tackifier will be further mixed with a second component, and applied to form a water based pressure-sensitive adhesive coating on paper labels. The final concentration of the notified chemical on labels will be very low.

6. OCCUPATIONAL EXPOSURE

Burez S-160 is supplied as a solid block formed by pouring molten polymer into drums of approximately 200 L and allowing to cool. As the vapour pressure of the notified chemical is negligible, the main exposure route will be dermal contact.

Transportation and storage workers will handle the drums containing Burez S-160. They would not be expected to be exposed to the notified chemical except in the event of accident.

At the formulation site, the formulators will attach drums to a drum heater to melt the polymer, measure the required volume of melted polymer and mix with other materials in the mixing vessel. The workers are likely to be exposed to the notified chemical during formulation. The estimated maximum exposure time will be 24 hours per year. The mixing vessel at the formulation site has a vapour extraction system and the work area is well ventilated.

Laboratory personnel will assay the finished tackifier samples for quality control. The exposure for laboratory workers will be limited because of the small sample size. The filling operators will fill the finished tackifier from a bulk storage tank into containers. Their exposure to the notified chemical is expected to be low as the concentration of the notified chemical in the finished tackifier will be low, and mechanical equipment for filling process will be used.

The finished tackifier containing less than 10% of the notified chemical is then delivered to the paper product manufacturer. Warehouse workers will handle the finished tackifier for storage and distribution. Exposure to the notified chemical during storage and distribution will only occur in the unlikely event of an accident.

At the paper product manufacture sites, the finished tackifier is mixed with a second component of the adhesive and the resulting mixture containing a very low concentration of the notified polymer is applied mechanically to the paper. The

coating is then allowed to dry when water evaporates leaving a pressure-sensitive adhesive coating on the paper. The occupational exposure to the notified chemical during the end uses will be low due to the low concentrations of the notified chemical in the tackifier and adhesive mixtures.

7. PUBLIC EXPOSURE

The notified polymer will not be available to the general public, and will be used by industrial trade customers only.

The public may contact the adhesive if the label is accidentally, or intentionally removed. In such instances the polymer, which has a high number-average molecular weight, will be immobilised in the adhesive and should pose negligible hazard to the public.

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

8. ENVIRONMENTAL EXPOSURE

Release

The notifier claims there is no release of the polymer to the environment during the formulation of the product. Any left over molten material is poured into the mixing tank. Equipment is flushed through with water and this water is also added to the mixing tank. The site is bunded and a first flush drainage system is in place to prevent the entry of contaminated water into the storm water drainage system or the sewerage system. Vapours from the mixing tank are passed through a scrubber into a biobox. The notifier claims that no polymer passes through this route due to its negligible vapour pressure and high molecular weight.

At the paper product manufacturer, up to 1.5 tonnes of the polymer per annum can be lost as waste from a volume of 100 tonnes. Apart of this originating from pipe and container washing will be coagulated in the waste water treatment plant of the company and the resultant solid matter disposed via authorised waste disposal contractors. The remainder of the waste originate from some of the adhesive coated paper going into scrap. This is disposed of to landfill.

Fate

The fate of bulk of the polymer (98.5%) will be tied to the fate of the adhesive labels. When the useful life of the paper material carrying the label has ended it is either recycled or sent to landfill. When paper is recycled labels are removed before the actual recycling process and sent to landfill.

Considerable amount of the polymer therefore will end up in landfill through used labels and waste from label manufacture. At landfill sites there is potential for the polymer to leach due to its moderate solubility. This however would be largely mitigated by the high molecular weight of the polymer. The hydrolysis of the ester linkages under the environmental pH range (4 to 9) would be minimal. The polymer will undergo slow biodegradation at the landfill sites. Incineration will destroy the polymer.

9. EVALUATION OF TOXICOLOGICAL DATA

No toxicological data were provided, which is acceptable for polymers of NAMW greater than 1000 according to the Act.

10. ASSESSMENT OF ENVIRONMENTAL EFFECTS

No ecotoxicological data were provided, which is acceptable for polymers of NAMW greater than 1000 according to the Act.

Water soluble polymers with NAMW greater than 1 000 and surfactant characteristics, although are not absorbed through biological membranes can affect outer membranes of aquatic organisms (2). However with the present polymer, potential for aquatic contamination is very low.

11. ASSESSMENT OF ENVIRONMENTAL HAZARD

Paper coated with the adhesive product containing the polymer will gain wide distribution across the country.

Most such paper will finally reach landfill sites in a very dispersive manner while some will be incinerated. Waste resulting from the formulation and manufacture of the adhesive paper will also be disposed of to landfill or incinerated.

With a considerable amount of polymer finding its way to landfill sites and considering the moderate solubility of the polymer, some potential exists for it to leach into ground water. However, its mobility and bioaccumulation will be constrained due to its high molecular weight and surface activity. The environmental hazard from the notified polymer is therefore predicted to be low.

12. ASSESSMENT OF PUBLIC AND OCCUPATIONAL HEALTH AND SAFETY EFFECTS

The notified polymer will be incorporated into a pressure-sensitive adhesive coating for paper labels. Due to its high number-average molecular weight and physico-chemical properties, the notified chemical is unlikely to cross biological membranes and have any toxicological significance. Contents of both the low molecular weight species and the residual monomers in Burez S-160 are determined to be low. Therefore, the notified chemical would not be classified as hazardous according to National Occupational Health and Safety Commission's *Approved Criteria for Classifying Hazardous Substances* (3).

The notified chemical will be imported as solid blocks in drums. The occupational health risk for transport and warehouse workers is negligible under normal conditions of storage and handling.

In Australia, the notified chemical will be formulated into a finished tackifier containing less than 10% of the notified chemical. Then the workers in paper product manufacture will further dilute the tackifier to a very low concentration of the notified chemical and apply it to paper products. The exposure is expected to be low for workers handling the notified chemical. The formulators are most likely to be exposed to the notified chemical via dermal contact.

Minimal public exposure may result following contact with surfaces covered by the adhesive after accidental or intentional label removal. However, the polymer, which has a high number-average molecular weight and is present at a very low concentration, will be immobilised in the adhesive and would therefore pose a negligible public health risk. There is potential for minor public exposure during adhesive manufacture, transport and disposal of the polymer if it is accidentally spilt. This is minimised by the recommended practices during manufacture, storage and transportation.

13. RECOMMENDATIONS

To minimise occupational exposure to Burez S-100 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 Sheets (MSDS) should be easily accessible to employees.
- It is proposed that under item 13 (disposal considerations) in the MSDS incineration be recommended as the preferred method for disposal.

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* (4).

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. Merck & Co 1989, *The Merck Index*, 11th Edition, USA.
2. Nabholz, J.V., Miller, P. & Zeeman, M. 1993, 'Environmental Risk Assessment of New Substances under the Toxic Substances Control Act Section Five', in *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. 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.