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**NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION  
AND ASSESSMENT SCHEME**

**FULL PUBLIC REPORT**

**Polymer in Glassodur-HS Top Clear 923-94**

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 Worksafe Australia which also conducts the occupational health & safety assessment. The assessment of environmental hazard is conducted by the Department of the Environment, Sport, and Territories and the assessment of public health is conducted by the Department of Human Services and Health.

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Director  
Chemicals Notification and Assessment

**FULL PUBLIC REPORT****Polymer in Glassodur-HS Top Clear 923-94****1. APPLICANT**

European Automotive Paint Supplies Pty Ltd of 59 Goodwood Road WAYVILLE South Australia 5034 has submitted a limited notification with their application for an assessment certificate for the polymer in Glassodur-HS Top Clear 923-94. The notified polymer will be used as a binder in solvent borne clear coats of lacquer used for automotive crash repairs.

**2. IDENTITY OF THE CHEMICAL**

Based on the nature of the chemical and the data provided the polymer in Glassodur-HS Top Clear 923-94 is considered to be non-hazardous. Therefore, the chemical name, CAS number, molecular and structural formulae, molecular weight, composition of the chemical, purity, methods of detection and determination, spectral data and exact import volumes and environmental release volumes have been exempted from publication in the Full Public Report and the Summary Report.

<b>Other name:</b>	none
<b>Trade name:</b>	Polymer in HS Top Clear 923-94
<b>Method of detection determination:</b>	the polymer is identified using Infra-red <b>and</b> (IR) spectroscopy; Gel Permeation Chromatography (GPC) analysis is used to determine molecular weight and weight distribution

**3. PHYSICAL AND CHEMICAL PROPERTIES**

As the notified polymer is imported for use dissolved in solvents and is not isolated as a defined entity, some physical and chemical properties have been determined solely for the formulation and not for the polymer. This is indicated below:

<b>Appearance at 20°C and 101.3 kPa:</b>	clear colourless liquid (formulation; polymer in 48% solvent carrier)
<b>Odour:</b>	solvent odour (formulation)
<b>Melting Point/Boiling Point:</b>	M.P. not applicable, expected to boil at the B.P. of the solvent carrier
<b>Glass-transition Temperature:</b>	not determined
<b>Density:</b>	0.992 g cm <sup>-3</sup> at 20°C
<b>Vapour Pressure:</b>	not determined

<b>Water Solubility:</b>	not quantified; not considered soluble
<b>Fat Solubility:</b>	not determined
<b>Partition Co-efficient (n-octanol/water) log P<sub>ow</sub>:</b>	not determined
<b>Hydrolysis as a function of pH:</b>	not determined
<b>Adsorption/Desorption:</b>	not determined
<b>Dissociation Constant pK<sub>a</sub>:</b>	not determined
<b>Flash Point:</b>	31°C (formulation)
<b>Flammability Limits:</b>	not determined
<b>Combustion Products:</b>	not determined
<b>Pyrolysis Products:</b>	oxides of carbon
<b>Decomposition Temperature:</b>	not determined
<b>Decomposition Products:</b>	carbon and nitrogen oxides
<b>Autoignition Temperature:</b>	not determined
<b>Explosive Properties:</b>	molecular structure does not indicate a potential explosion hazard
<b>Reactivity/Stability:</b>	considered stable, however may react with strong oxidising substances, alkalis and acids
<b>Particle size distribution:</b>	not applicable, in a solvent carrier

• **Comments on physico-chemical properties**

The lack of data on the polymer is due to the fact that the polymer is manufactured and stored in the solvent solution until mixed to form the final paint product.

No data were provided for vapour pressure. By analogy with similar polymers, this polymer is not expected to be volatile. For the polymer solution the vapour pressure would be that of the constituent solvents.

The notifier claims that the polymer would not be soluble in water at room temperature. This is acceptable by analogy with similar polyesters.

No data were provided for partition coefficient on the grounds that "due to its molecular size, the polymer is not expected to permeate through biological

membranes". The high molecular weight of the polymer is likely to prevent it from crossing biological membranes, though some low molecular weight material may do so. Again this test would be difficult to perform and interpret.

No data were provided for hydrolysis on the grounds that by analogy with similar polymers, this polymer is not subject to hydrolysis. The polymer contains a number of hydrolysable groups but hydrolysis under environmental conditions is not expected due to low solubility.

No data were provided for adsorption/desorption on the grounds that as the solvent evaporates from the polymer solution it will become more and more viscous and sticky and will readily bind to the soil, thereby becoming immobilised. This is acceptable.

No data were provided for dissociation constant. This is acceptable as no acidic or basic functionalities are present in the molecule.

The chemical has the potential to react with strong acids, strong bases and oxidising agents.

The polymer is not expected to degrade, decompose or depolymerise under normal conditions of use. Thermal decomposition may release acrid and toxic fumes that may include carbon monoxide and carbon dioxide. No losses by volatilisation, exudation or leaching are expected from the polymer.

#### **4. PURITY OF THE CHEMICAL**

<b>Toxic or hazardous impurity:</b>	Residual monomers all below threshold requiring hazardous classification (1).
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<b>Non-hazardous impurity (&gt; 1% by weight):</b>	none
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<b>Additives/Adjuvants:</b>	formulation contains 2% additives. The following information is provided for the formulation as the polymer is never isolated and only imported in this form.
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None of the additives/adjuvants (in the formulation) appear on the List of Designated Hazardous Substances (1), however one of the additives is a skin sensitiser (2) and another has been found to cause thymic atrophy in rats (2). The low concentrations of these additives/adjuvants in the imported formulation are unlikely to constitute a hazard.

The imported formulation also contains the following organic solvents:

Chemical Name	CAS No.	Weight Percentage
xylene	1330-20-7	2.5-10
ethylbenzene	100-41-4	2.5-10
1,3,5-trimethylbenzene	108-67-8	1-2.5
<i>N</i> -butylacetate	123-86-4	10-25
solvent naptha	64742-95-5	10-20

Although all solvents are below the thresholds for individual classification (1) as hazardous substances in the mixture, their cumulative effect overall results in a hazardous classification for the formulation.

## 5. INDUSTRIAL USE

The notified polymer will be used as a binder in solvent borne clear coats of lacquer used for automotive crash repairs. It will be imported in either 1 or 5 litre tins. The polymer solution will be dispatched in original packaging to the end user (vehicle repair shops around the country) and formulated prior to application to car bodies in a controlled environment. Individual crash shops are expected to purchase the product at the rate of ca. 1-2 cans per fortnight. The notified polymer comprises 52% of the imported lacquer formulation. The formulation will be imported into Australia at a rate of >1 tonnes/annum for the next five years. The polymer is never isolated as a defined entity but always remains in solution in a mixture of organic solvents. The formulation is currently used in Europe for the same purpose that is intended in Australia.

## 6. OCCUPATIONAL EXPOSURE

The notified polymer will not be manufactured or isolated in Australia, it will only be imported as a component of the formulation (52% in carrier solvents). Exposure during unloading at the docks, during transport and warehousing will only occur through accidental release of the formulation. It is imported in containers, with the formulation prepacked in either 1 or 5 litre tins.

The most significant area of occupational exposure to the notified polymer will be at the end user, crash repair shops. The operators will be exposed for approximately 5-10 minutes when the formulation is mixed with hardener and reducer, then for an additional 10-45 minutes when spraying. Spray-painters are therefore likely to be exposed for a maximum of 5 hours/week. It is anticipated by the notifier that approximately 1000 spray-painters will use the imported product. The main exposure routes will be to exposed skin, eyes and through inhalation during mixing and application. Exposure to the polymer will be limited in part due to its high number-average molecular weight (NAMW) which will reduce transmission across membranes including the skin. Exposure to the solvent carriers in the paint formulations will be the main risk associated with the use of the formulations; during mixing and application, ventilation and/or protective clothing will be required to reduce exposure and ensure compliance with the exposure standards for the solvents.

The formulation is applied using high pressure spray equipment in enclosed spray booths with fume extraction systems. Spray-painters should be using respirators to limit exposure to the organic solvents used in the formulation. This is due to the solvents constituting the main risk in the use of the formulation containing the notified polymer.

## **7. PUBLIC EXPOSURE**

The product will be for use by professional spray painters, the only use being in the automotive repair industry.

The paint is mixed with hardener and reducer then applied to metal car bodies using high pressure equipment in enclosed spray booths with fume extraction systems. The public will come into contact with the hardened, cured film of paint on the surface of automobiles, and minimal exposure may occur if the paint film is accidentally removed from the surface of the automobile. In such instances the polymer will be effectively immobilised in the hardened lacquer, and should pose negligible hazard to the public. The polymer is not expected to degrade, decompose or depolymerise under normal conditions of use. The polymer contains ester groups which are potentially vulnerable to hydrolysis, but this process is unlikely to be significant because of low water solubility, and since the resin is non-volatile there would be negligible release to the atmosphere.

Approximately 30% of the polymer will form waste in the form of overspray, which will be disposed of in accordance with local, state or national regulations. Some unused residues may be left in cans. Minor public exposure may result from disposal of this waste, or disposal of vehicles coated with this product, or accidental spillage of the notified polymer during transport and storage.

## **8. ENVIRONMENTAL EXPOSURE**

### **. Release**

Due to the non volatile nature of the resin there would be negligible release to the atmosphere. Paint manufacture and application processes are carried out in well ventilated areas where atmospheric concentrations of vapours from the solvents are monitored and extracted from the exhaust air.

Areas in the plant where spills may occur have cleanup materials available on site. The polymer solution will be stored in 5 Litre or 1 Litre cans, and dispatched by road transport to the customer. As the polymer is produced as a 52% solution in flammable solvents, it will be stored and transported according to the statutory requirements applying to Class 3 Dangerous Goods.

The potential for release of polymer in the customer's factory occurs where the paint is first thinned then applied in painting booths to metal car bodies. The plant utilises an air ducting system for control of solvent vapour emissions and good work practices are encouraged to minimise paint spills. Approximately 30% of the

polymer as paint overspray from the spray booths and residues left in used cans will amount to wastage. For the first year this amount is estimated to be up to 7.02 tonnes. It is proposed to dispose of this waste in accordance with local, state or national EPA regulations.

## **. Fate**

On disposal to landfill the polymer is expected to remain immobile and inert. While the polymer contains ester groups which are potentially vulnerable to hydrolysis and metabolism, these processes are unlikely to occur at significant rates under environmental conditions due to low water solubility.

The resin in the paint formulation when applied and cured is in a form that is not readily susceptible to breakdown in the environment. Under extreme heat conditions (eg. fire) the paint film containing the polymer would burn emitting carbon and nitrogen oxides. No loss of monomers, impurities or additives is expected to occur over the life of the car which the paint has been applied to.

## **9. EVALUATION OF TOXICOLOGICAL DATA**

For a synthetic polymer with NAMW > 1000, toxicology data are not required under the Act. None was provided by the notifier.

The notified polymer has a NAMW of >1000 and is therefore not expected to traverse biological membranes and constitute a significant toxicological hazard. Although the notified polymer contains low levels of a number of residual monomers (in total <1%) and moderate levels of low molecular weight species <10% with NAMW <1000 and <6% with NAMW <500), they are not expected to present a significant toxicological threat. As there was no toxicological information provided a comprehensive assessment could not be made.

## **10. ASSESSMENT OF ENVIRONMENTAL EFFECTS**

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

## **11. ASSESSMENT OF ENVIRONMENTAL HAZARD**

The polymer is unlikely to present a significant hazard to the environment when it is incorporated into the paint and applied to car bodies in the proposed manner.

The main environmental exposure arises from disposal of the waste generated each year as overspray and drum residue. As the solvent evaporates from the paint containing the polymer, the paint thickens and becomes less likely to be mobile in the environment. Also due to the high molecular weight, low water solubility, and low vapour pressure of the polymer, the overall environmental hazard is expected to be low.

## **12. ASSESSMENT OF PUBLIC AND OCCUPATIONAL HEALTH AND SAFETY EFFECTS**

The notified polymer will be incorporated into automotive paint finishes and used in spray booths, and will not be available to the general public. The public will come into contact with the paint on the surface of automobiles, and minimal exposure may occur if the paint film is accidentally removed from the surface of the automobile. The polymer will effectively be immobilised in the lacquer film. Due to its large average molecular weight the notified substance is not expected to be able to pass through biological membranes; as such it is expected to pose negligible public risk. The potential for minor public exposure exists during transport and disposal of the polymer formulation. This should be minimised by following the recommended handling practices during storage, transportation and waste disposal.

Occupational exposure to the notified polymer prior to its end use in crash repair shops will be minimal, and will only occur if the tins in which it is imported, stored and transported are ruptured accidentally. The formulation is classified as Class 3 dangerous goods and it is stored and transported in accordance with this classification.

Occupational exposure during the end use of the formulation, in motor vehicle repair shops, will be significant. Up to 1000 employees will be exposed to the notified chemical for periods of approximately 5 hours/week. The formulation contains hazardous solvents as such it should be used in vehicle spray booths with exhaust ventilation to minimise exposure. If these precautions are taken then exposure to the notified polymer will also be reduced. The main occupational exposure pathways will be via dermal and ocular contact and through inhalation of paint mist during the spray process. The use of industrial safety equipment including goggles or face shields, clothing, gloves and respiratory protective devices will minimise this exposure.

The high NAMW of the polymer would limit transport across biological membranes and the low level of residual monomers and absence of toxic or hazardous impurities would further limit harmful biological effects. The polymer on the basis of an assessment of the information provided by the notifier would not be classified as hazardous, however no toxicological data is available to confirm this. The polymer is not isolated or manufactured in Australia, only the formulation Glassodur-HS Top Clear 923-94 is imported. Due to the solvent type and concentration in the formulation, it is classified as hazardous according to the criteria of Worksafe Australia.



### 13. RECOMMENDATIONS

To minimise occupational exposure to the polymer in Glassodur-HS Top Clear 923-94 the following guidelines and precautions should be observed. The precautions for the use of the notified polymer should recognise the presence of the carrier solvents in the formulations:

- . Local exhaust ventilation should be used during mixing.
- . Application should take place in spray booths with appropriate engineering controls to reduce exposure to employees.
- . When using the notified chemical (as the imported formulation) the following protective equipment should be worn:
  - impervious gloves conforming to Australian Standards (AS) AS 2161 (3),
  - protective eye goggles conforming to AS 1336 (4), and AS/NZS 1337 (5)
  - protective clothing conforming to AS 3765.2 (6), and
  - protective footwear conforming to AS/NZS 2210 (7).
- . If engineering controls are not sufficient to control exposure, the following protective equipment should also be worn:
  - respiratory protection conforming to AS/NZS 1715 (8) and AS/NZS 1716 (9).
- . Good personal hygiene practices should be observed.
- . A copy of the Material Safety Data Sheet (MSDS) should be easily accessible to employees.

#### **14. MATERIAL SAFETY DATA SHEET**

The MSDS for the polymer in Glassodur-HS Top Clear 923-94 was provided in a format similar to the Worksafe Australia format (10).

This MSDS was provided by European Automotive Paint Supplies Pty Ltd as part of their notification statement. The accuracy of this information remains the responsibility of European Automotive Paint Supplies Pty. Ltd.

#### **15. REQUIREMENTS FOR SECONDARY NOTIFICATION**

Under the Act, secondary notification of the polymer in Glassodur-HS Top Clear 923-94 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**

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5. Standards Australia, Standards New Zealand 1992. *Australian/ New Zealand Standard 1337-1992, Eye Protectors for Industrial Applications*, Standards Association of Australia Publ., Sydney, Australia, Standards Association of New Zealand Publ. Wellington, New Zealand.
6. Standards Australia, 1990 Australian Standard 3765 - 1990. *Clothing for Protection Against Chemical Hazards, Part 1, Protection against General or Specific Chemicals; Part 2, Limited Protection Against Specific Chemicals*, Standards Australia Publ., Sydney, Australia.
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8. 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,

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10. National Occupational Health and Safety Commission, 1994. *National Code of Practice for the Preparation of Material Safety Data Sheets*, [NOHSC:2011(1994)], AGPS, Canberra.