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NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME

FULL PUBLIC REPORT

DYNASYLAN BSM 100 N

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Director
Chemicals Notification and Assessment

FULL PUBLIC REPORT

DYNASYLAN BSM 100 N

1. APPLICANT

Plastral Trading Company Pty Ltd, 11B Lachlan Street, Waterloo, Sydney, NSW, 2017.

2. IDENTITY OF THE CHEMICAL

Based on the nature of the chemical and the data provided, Dynasylan BSM 100 N is considered to be non-hazardous to humans. Therefore, the chemical name, Chemical Abstract Service (CAS) Registry Number, structural formula and spectral data have been exempted from publication.

Trade name(s): Dynasylan Ibteo
Dynasylan NH 42
Dynasylan BH 42 N
Dynasylan BSM 100 N
Drytreat Ibteo

Molecular formula: $C_{10}H_{24}O_3Si$

Molecular weight: 220g/mole

Method of detection and determination:

Detection is by UV-VIS, IR, and NMR spectroscopy and gas chromatography.

3. PHYSICAL AND CHEMICAL PROPERTIES

Appearance at 20°C and 101.3 kPa: Colourless liquid

Odour: None mentioned.

Boiling Point: 186.6°C at 101.3 kPa

Relative Density: 0.8849 at 20°C

Vapour Pressure: 0.61 kPa at 20°C

Water Solubility: 86 + 10 mg/L at 20°C, pH = 7

Fat Solubility: Not provided

Partition Co-efficient (n-octanol/water): log Pow = 2.033 at 20°C and pH 7. The study was conducted using pH 7.0 borate buffer to minimise hydrolytic effects.

Hydrolysis as a function of pH:

pH	Temperature	Half-life
Buffered		
4.0	50°C	< 1.2 hr
7.0	50°C	> 1 year
9.0	50°C	1.7 hr
Dist H2O		
6.15	50°C	< 1.0 hr

Adsorption/Desorption: Not provided

Dissociation Constant: There is no dissociation in water

Flash Point: 66°C closed cup

Flammability Limits: The product itself is described only as combustible.

Pyrolysis/combustion products:

Manufacturer states that there are no "hazardous" degradation products when Dynasylan BSM 100 N is incinerated. No specific products are mentioned.

Autoignition Temperature: 240°C

Explosive Properties:

The manufacturer states that there is no explosive potential resulting from the test product. Ethanol vapours produced during use can form explosive mixtures in air and the notified product may be explosive in confined spaces as a result of its low flash point.

Reactivity/Stability:

Dynasylan BSM 100 N has no oxidizing properties. It hydrolyses in water to produce ethanol and polysiloxanes and will undergo typical reactions of alkoxysilanes with ethanol.

Particle size distribution: Not applicable

Dynasylan BSM 100 N is a fluid under normal conditions and therefore particle size is not relevant.

An absorption/desorption study was considered unnecessary as the chemical rapidly hydrolyses and polymerises in water to polyisobutylsiloxane which is biodegradable and binds strongly to silica present in soil.

A variation on flammability limits was applied for on the basis that existing flammability is due to ethanol rather than Dynasylan BSM 100 N.

The above reasons for variations of data requirments are acceptable.

4. PURITY OF THE CHEMICAL

Degree of purity:

Dynasylan BSM 100 N	CAS confidential	>99%
Butyl-methoxy-diethoxysilane	CAS unknown	<0.7%
Ethanol	CAS 64-17-5	<0.1%
Butyltriethoxysilane	CAS unknown	<0.07%
Ethyltriethoxysilane	CAS 78-07-9	<0.05%
2-chloroethyltriethoxysilane	CAS 18279-67-9	<0.05%
Triethoxysilane	CAS 998-30-1	<0.03%

Additives/Adjuvants: No additives are used.

5. INDUSTRIAL USES

Dynasylan BSM 100 N has been in use for several years in the United States and the EEC. It is used as a water-proofing sealant for existing and new concrete and masonry. Dynasylan BSM 100 N is hydrolysed during application to produce ethanol vapour and isobutyl silanol. The isobutyl silanol binds to the silica in the capillaries and pores of the masonry leaving the hydrophobic isobutyl component exposed to the outside air. The chemical must be applied as a liquid rather than as a vapour, hence the importance of only low pressure pumping equipment. Due to the low viscosity and high wetting action, atomisation and subsequent loss is inevitable during spray on applications.

It is anticipated that between 20 and 200 tonnes of Dynasylan BSM 100 N are to be imported annually. Neither manufacture nor repackaging of Dynasylan BSM 100 N will occur in Australia.

6. OCCUPATIONAL EXPOSURE

Workers potentially exposed to Dynasylan BSM 100 N will include those involved in transport, storage and application. The notifier is unable to give any estimation of the number of people involved in these processes.

Dynasylan BSM 100 N will be transported from Germany where it is to be manufactured in 25, 50 or 200 L drums. The notified chemical arrives in Australia in moisture resistant, sealed, plastic inlined metal drums and is stored in well ventilated areas. Therefore, workers involved in transport and storage are unlikely to be exposed to significant amounts of Dynasylan BSM 100 N. Product degradation and subsequent ethanol build-up is expected to be limited under the transport and storage conditions proposed.

Workers involved in application will be using the liquid as a low pressure (nominated 50 kPa) spray, most commonly in outdoor areas. The notifier was unable to define the maximum time of exposure to Dynasylan BSM 100 N. Applicators are advised to wear protective equipment, especially when ventilation is inadequate. After the completion of application, potential exposure to Dynasylan BSM 100 N no longer exists.

No incidences of workplace exposure problems have been recorded for the several years that Dynasylan BSM 100 N has been in use

overseas. Workplace monitoring is not deemed to be necessary on the basis of the transient nature of the expected use, the difficulty in measuring outdoor air quality and the low toxicity of the substance.

7. PUBLIC EXPOSURE

Public exposure to Dynasylan BSM 100 N is anticipated to be very limited. The notified chemical will be imported in plastic-lined drums and is not intended to be available for use by the general public. People in areas adjacent to the site being treated may have potential for exposure, especially under adverse (windy) weather conditions but assuming good work practices this would be negligible, and of a short term nature. Mass release during usage is expected to be low. The notified chemical will not leach from the substrate to which it attaches.

8. ENVIRONMENTAL EXPOSURE

8.1 Release

Dynasylan BSM 100 N will replace a closely related existing product with similar use patterns, and as such there will be no increase in the environmental exposure of polyisobutylsiloxane.

It is projected that Dynasylan BSM 100 N will be used throughout Australia for the sole purpose of weather-proofing silica-based surfaces including buildings, bridges, pathways and driveways.

Horizontal application is by low pressure gravity spraying to wetted surfaces where the substance is allowed to bind while the solvent evaporates. No run-off is expected as the chemical will be sold to trained licensed contractors and it is claimed, that due to product costs, it would be uneconomical to allow poor application and subsequent waste.

Application to vertical surfaces of buildings and bridges requires closer scrutiny due to the greater likelihood of runoff, particularly to the aquatic compartment in the case of bridges. Application of Dynasylan BSM 100 N is by low pressure sprayer sufficient to deliver the product from the nozzle to the substrate (wall). The application commences at the base of the wall with the lowest volume to obtain a zero curtain length and moves up the vertical surface with increasing volume and

correspondingly longer curtain length to a maximum of 50 cm. The technique was developed in Europe and USA to obtain 100 % surface application, whilst avoiding run-off to non target areas, eliminating environmental exposure, particularly to the aquatic compartment, and keeping costs to a minimum.

Data in the product information booklet indicates that significant evaporation of the chemical is unlikely given the high level of adsorption to silica based substrates.

The quantity of Dynasylan BSM 100 N to be applied depends on the absorbency of the substrate to be treated and on the desired depth of penetration but it is likely to be in the range 0.4 to 1 $L.m^{-2}$ for surfaces from concrete through to hard-baked brickwork.

It is envisaged that container residues will be kept to a minimum by emptying residues from spent containers into the next one to be used with the final container being capped, at the completion of an application contract, for later use. Container residues, not recovered, are sent to licensed disposal contractors for incineration.

hydrolysis: Hydrolytic degradation studies indicate a hydrolytic half life of the chemical of over one year at pH 7.0. However at pH 4.0 and 9.0 the hydrolytic half life of the chemical was significantly lower , < 1.2 hours and 1.7 hours, respectively. Given that the likely environmental pH conditions are in the range of 6 - 10, the hydrolytic degradation of the substance is expected to be rapid, though the extent is uncertain.

bioaccumulation: The high water solubility and low partition coefficient (log P_{ow} = 2) of the notified chemical indicate that it is unlikely to bioaccumulate. Further, as the chemical is likely to be rapidly hydrolysed and polymerise to polyisobutylsiloxane and will preferentially bind to sediment and most mineral surfaces (eg concrete and earth), it is unlikely to be available for bioaccumulation. The literature supports that polysiloxanes are biologically innocuous to and poorly bioaccumulated by fish (1)

biodegradation: Biodegradation was observed when polyisobutylsiloxane (condensate from the complete hydrolysis of Dynasylan BSM 100 N) was tested in activated sludge using the closed bottle test according to OECD Guideline 301D (2,3) (19%

after 5 days, 58% after 15 days and 75% after 28 days). While this achieved the pass level for ready biodegradation, the additional requirement that this level is reached within 10 days after 10% biodegradation has occurred was not attained.

9. EVALUATION OF TOXICOLOGICAL DATA

9.1 Acute Toxicity

All studies were performed at the Huntingdon Research Centre Ltd in Huntingdon, Cambridgeshire, UK.

In each case the 'limit test' was used, and there were no indications that a more thorough study was necessary. 5 male and 5 female Sprague Dawley origin CFY rats were used for the chosen dose. Control animals were used only for the inhalation toxicity study. As the Dynasylan BSM 100 N exists as a liquid, no vehicle was required for these studies. No treatment related deaths occurred.

TEST	SPECIES	OUTCOME	REF
Oral	SD rat	LD_{50} > 5000 mg/kg	4.
Skin	SD rat	LD_{50} > 2000 mg/kg	5.
Inhalation	SD rat	LC_{50} > 5.88mg/l/4hr	6.
Skin Irritation	rabbit NZ White	persistent well defined irritation for up to 11 days	7.
Eye Irritation	rabbit NZ White	no iris or corneal injury, slight conjuctival injury, no symptoms after 48h.	8.
Skin Sensitisation	Guinea-pig H/D	not a sensitizer	9.

9.1.1 Oral Toxicity (4)

Dynasylan BSM 100 N of purity >98% was administered by oral gavage in a single dose of 5680 mg/ml to immature rats (age 4-6 weeks) of Sprague Dawley origin.

All animals exhibited pilo-erection, hunched posture and a waddling gait shortly after dosing. The only symptom to persist

on day 2 was pilo-erection. Recovery seemed to be complete by day 3, as judged by external appearance and behaviour. Body weight increased normally at 2-3 fold over the 14 days. One death occurred on day 6 to a female rat due to incorrect gavage technique. No other mortality was observed. Autopsies performed on termination of the experiment revealed no macroscopic abnormalities.

Dynasylan BSM 100 N was concluded to be non hazardous when administered orally under the conditions of this study.

9.1.2 Dermal Toxicity (5)

Dynasylan BSM 100 N of purity > 98% was applied to the skin of young adult rats (age 8-10 weeks) of Sprague Dawley origin at 2000 mg/kg.

One day prior to treatment the hair of the rats was removed from the dorso lumbar region of the animal with electric clippers. An area equivalent to 10% of the total body surface was exposed.

Twenty-four hours later Dynasylan BSM 100 N was spread evenly over the surface of the clipped skin and covered by gauze and a dressing. After 24 hours the dressings were removed and the skin washed in warm water and blotted dry. Animals were observed for a fortnight.

There were no dermal responses, clinical signs nor mortality observed after dermal application of Dynasylan BSM 100 N. Terminal autopsy revealed only normal macroscopic appearances. The only unusual event reported was the low body weight gain of one female animal on day 8 of the experiment.

In conclusion Dynasylan BSM 100 N was found to be non-toxic to rats via the dermal route of intake.

9.1.3 Inhalation Toxicity (6)

Inhalation toxicity of Dynasylan BSM 100 N (purity > 98%) was tested on young adult Sprague Dawley rats. The male and female rats were selected so that they all weighed about 200 g on the treatment day, regardless of age. The animals were placed in a whole body exposure chamber and the compound supplied in a constant flow as an aerosol to a concentration of 5.88 mg/l (+15

%) of air. Approximately 84% of the Dynasylan BSM 100 N was < 5.5µm and therefore of respirable range. The rats were exposed for 4 hours after which the supply of chemical was discontinued and the chamber allowed to clear before the rats were removed. Control animals were treated identically except that they were supplied with air only. After treatment the animals were observed for 14 days, after which they were killed and subjected to detailed macroscopic examination.

All treated animals showed the following symptoms: closing of the eyes, reddening of the feet and snout, lacrimation, slow respiratory rate, and abnormal body posture. These symptoms were only apparent during the exposure period. Immediately afterwards, brown staining of the snout and jaws and wet fur on the ventral surface were observed. All rats were clinically normal one day after treatment, and no mortalities occurred.

On completion of the experiment the lung to body weight ratios and histopathological findings were found to be normal but two male rats had abnormal dark spot(s) on the lungs.

Dynasylan BSM 100 N in aerosol form was concluded to be moderately irritating to the lungs of the rat.

9.1.4 Skin Irritation (7)

Skin irritation was tested on three New Zealand White rabbits. 0.5ml of Dynasylan BSM 100 N was applied to an area of intact clipped skin of the dorso-lumbar region. This was covered by a 2.5cm gauze pad and dressed and left for a four hour period, after which the dressing and pad were removed and the skin washed.

All three animals showed slight to well defined erythema and slight to moderate oedema persisting for at least 8 days. Desquamation of the stratum corneum occurred on day 9. All symptoms had disappeared by the 10th (2 animals) or 11th (1 animal) day.

Dynasylan BSM 100 N was concluded to be a slight to moderate skin irritant.

9.1.5 Eye Irritation (8)

Three New Zealand White rabbits weighing 2.5 - 3.5 kg weight were given 0.1 ml of Dynasylan BSM 100 N into the lower everted eyelid of one eye. The eyelids were held together for one second and examinations made 1 hour, and 1, 2, 3, 4, and 7 days after instillation. The untreated eye served as the control.

One hour after treatment all three animals showed slight to moderate redness of the conjunctivae of the eye and slight to obvious swelling of the lids and/or nictitating membranes. Symptoms had eased 1 day later and were no longer apparent 2 days after treatment. No reactions were elicited in the cornea or iris of the eye of any animal.

Dynasylan BSM 100 N was therefore concluded to be a slight eye irritant.

9.1.6 Skin Sensitisation (9)

Thirty female guinea pigs (Hartley/Dunkin strain) were separated into treatment (20) and control (10) groups.

Induction: To induce a skin response an area 4 x 6 cm of the dorsal scapular region was clipped with an electric clipper and irritating concentrations of Dynasylan BSM 100 N administered intradermally and topically as follows. Three pairs of intradermal injections (0.1 ml) were given along this shaved area:

1) Freund's complete adjuvant diluted with an equal volume of water,
2) Dynasylan BSM 100 N, 30 % v/v in liquid paraffin,
3) Dynasylan BSM 100 N, 30 % v/v in 50:50 mixture of Freund's complete adjuvant and liquid paraffin.

One week later the same area was clipped and shaved of hair, and a 2 x 4 cm patch of filter paper saturated with undiluted Dynasylan BSM 100 N was placed on the skin and covered by plastic tape and secured to the body by a bandage. This was removed after 48 hours. Control animals were treated identically except that Dynasylan BSM 100 N was omitted from the treatment.

No results were given as to the effects of the induction on the skin of the animals.

Challenge: Two weeks later, to challenge the skin to a sensitized response, an area on the left flank of each animal in both groups was clipped and shaved and a non irritating concentration of Dynasylan BSM 100 N applied topically. A 2 x 2 cm filter paper was soaked in 0.2 ml Dynasylan BSM 100 N (100%) and applied to an area on the anterior part of one flank. A solution of Dynasylan BSM 100 N 50% v/v in liquid paraffin was applied similarly to the posterior site of the flank. The filter paper was covered and bound to the animal with a bandage for 24 hours. The sites were checked 24, 48, and 72 hours later.

No response was elicited from the test animals compared to the control animals and Dynasylan BSM 100 N was therefore concluded not to be a skin sensitizer.

9.2 Repeated Dose Toxicity (10)

Dynasylan BSM 100 N was administered by oral gavage for 28 consecutive days at 1000 mg/kg/day to juvenile (28 day old) Sprague Dawley rats. Five male and five female rats were used in treatment and control groups. Control animals received water at 1.00 ml/kg/day. Four weeks later blood was removed from the anaesthetized animals and a comprehensive series of haematological and biochemical tests performed. Upon completion of the 28 days the adrenals, heart, kidneys, liver, spleen and any other macroscopically abnormal organs were removed and examined histologically.

No signs of ill health or behavioural oddities were observed in any animals. Food consumption and body weight changes were similar between treatment and control groups. The PCVs (packed cell volume) were slightly lower in the treated female group, as reflected by higher MCHCs (mean corpuscular haemoglobin concentration) and lower MCV (mean corpuscular volume) indices. Although this appears to be a treatment related response it is too small to be considered of toxicological relevance.

Of the biochemical analyses performed, the GPT (alanine aminotransferase) of treated females and the GOT (aspartate aminotransferase) of treated males were lower than control values. Elevated potassium levels were observed in both sexes but were statistically significant only in females, and were within the range of historical controls. Liver and kidney weights, adjusted according to body weight, were higher in the treated

female rats compared to controls. No macroscopic or microscopic damage was evident to these or any other organs.

The slight changes observed are unlikely to present a toxicological hazard.

9.3 Genotoxicity

9.3.1 Salmonella typhimurium Reverse Mutation Assay (11)

This study was said to be performed by Huntingdon Research Centre, UK. However, the original report was not included in the submission. The presented report consisted of an unsigned summary (internal report 89/01, by Dr P. Schoberl), and the results section, presumably reproduced from the original, which was submitted on request from the DHH&CS. Although this style of reporting is unsatisfactory, sufficient detail was present that evaluation of the results was possible.

In two assays, S. typhimurium strains TA98, TA100, TA1535, TA1537 and TA1538 were incubated in triplicate with Dynasylan BSM 100 N (vehicle was DMSO) at concentrations of 10 - 5000 ug/plate, in the presence or absence of rat liver S-9 mix. Negative controls were performed using DMSO. Positive controls were nitrofluorene (TA98, TA1538, 2.5 ug/plate), sodium azide (TA100, TA1535, 2.5 ug/plate), and aminoacridine (TA1537, 50 ug/plate). No evidence for cytotoxicity was reported.

Dynasylan BSM 100 N failed to increase histidine-independent colony formation compared to negative controls, in the presence or absence of the microsomal activation system. Positive controls produced the expected increases in colony formation. Dynasylan BSM 100 N therefore lacked the ability to induce point mutations (frame-shift or base-pair substitution) at the concentrations tested.

9.3.2 Micronucleus Assay in the Bone Marrow Cells of the Mouse (12)

The micronucleus test was performed on 35 day old SPF CD-1 outbred mice of Swiss origin. After preliminary tests the animals were treated by oral gavage with 10 ml/kg (8800 mg/kg) of Dynasylan BSM 100 N. Animals showed slight to moderate clinical reactions to the substance at this dose including pallor of the

extremities, pilo-erection, hunched posture and waddling, lethargy, decreased respiratory rate and ptosis. Bone marrow smears were taken at 24, 48, and 72 hours after treatment. One smear from each animal was examined for the presence of micronuclei in 1000 polychromatic and normochromatic erythrocytes and at no time was this found to be increased over controls. A significant but small decrease in the ratio of polychromatic to normochromatic erythrocytes was observed but as this occurred only at 48 hours after dosing it is unlikely to indicate cell toxicity.

Under conditions of the test, Dynasylan BSM 100 N lacked clastogenic effects in the in vivo mouse micronucleus assay.

9.4 Overall Assessment of Toxicological Data

Dynasylan BSM 100 N has low oral (LD_{50} > 5000 mg/kg), dermal (LD_{50} > 2000 mg/kg) and inhalation (LC_0 = 5.88 mg/l/4hr) toxicity. It caused mild to moderate respiratory irritation in rats. It was a mild to moderate skin irritant with symptoms not ceasing until day 11, and a slight irritant of the conjuctivae of the eye. Dynasylan BSM 100 N was not a skin sensitizer. After 28 days of oral intake Dynasylan BSM 100 N produced slightly high liver and kidney weights in females compared to controls, and small changes in several biochemical markers of doubtful biological significance.

The chemical did not appear to be a mutagen. It did not induce point mutations in the Ames test nor did it cause clastogenic effects *in vivo* in the mouse.

10. ASSESSMENT OF ENVIRONMENTAL EFFECTS

The following test results, obtained according to OECD Guidelines 203 (13) and 202 (14), were provided for aquatic species.

Test	Species	Result	Ref
Acute tox.	Rainbow trout	96h LC_{50} = 85 $mg.L^{-1}$	15
	Daphnia magna	48h LC_{50} = 49 $mg.L^{-1}$	16

As Dynasylan BSM 100 N has been found to be very unstable in water with an approximate half-life of one hour, the ecotoxicity results presented used polyisobutylsiloxane as the test substance. The above results indicate that polyisobutylsiloxane is slightly toxic to aquatic fauna.

No data were provided for algal growth inhibition on the grounds that "the instability of the product in water, where it polymerizes to form polysiloxanes, renders the testing technically difficult." Given the predicted low exposure to the aquatic environment, this is acceptable.

11. ASSESSMENT OF ENVIRONMENTAL HAZARDS

The main route of environmental exposure for the notified chemical may occur as a result of runoff or "washoff" from concrete surfaces during application, directly to the ground or aquatic compartment in the case of bridge pylon application.

The "worst case" environmental hazard scenario will be from application to existing bridge structures where the bases of the pylons are submerged in rivers or harbours. The hazard may be greatest where application is close to the water line, although it is envisaged that most use will be to new structures (pylons) before they are lowered into the water or where water courses are diverted during construction.

The case for application to existing sea harbour bridge pylon structures in areas close to the water line requires closer scrutiny. As mentioned above, chemical runoff during application is minimized given the precise techniques utilised. However, "washoff" caused by wave motion may remove some Dynasylan BSM 100 N from the concrete surfaces before strong bonding can occur.

Assuming an application rate of 0.4 $L.m^{-2}$, a 1 metre swell and a pylon circumference of 10 metres, a maximum of 4L of the chemical may be washed into the sea. The instantaneous dilution, in the event of "washoff", will be approximately 4 L in 200 m^3 of sea-water. Subsequent wave motions and eddy effects around the bridge pylons will cause further dilution. Rapid polymerization to polyisobutylsiloxane will further swiftly reduce aquatic concentrations of the notified substance.

Therefore, in the unlikely event of 100% "washoff", the immediate aquatic concentration of Dynasylan BSM 100 N will be approximately 64 ppm which will be further swiftly diminished (within minutes) by a number of factors described above to concentrations which provide an adequate safety margin in light of ecotoxicity data provided.

The aquatic concentrations are expected to be at least three orders of magnitude less than the ecotoxicity results presented above and indicate Dynasylan BSM 100 N is unlikely to present either an acute or chronic hazard to aquatic invertebrates, freshwater fish and microorganisms at likely environmental levels.

If the notified chemical and/or its condensate (polymer) does bind to sediment to some extent it is unlikely that significant toxic levels of the notified chemical or the polymer will occur due to the indicated high level of biodegradation and expected lack of bioaccumulation potential. Recent reviews of the environmental fate and effects of polysiloxanes suggest that any Dynasylan BSM 100 N released to the aquatic compartment will become a permanent but biocompatible resident of sediments (17).

12. ASSESSMENT OF PUBLIC AND OCCUPATIONAL HEALTH AND SAFETY

The likely modes of exposure to Dynasylan BSM 100 N are via inhalation, dermal or eye exposure during application. Animal tests have demonstrated that Dynasylan BSM 100 N is of low oral toxicity but causes slight irritancy to the eyes,and mild to moderate irritancy to skin and the respiratory system. The impurities present are not expected to be hazardous. Once dried onto the concrete Dynasylan BSM 100 N is inert and provides no hazard.

Dynasylan BSM 100 N has potential to be a fire hazard due to the ethanol vapours that are produced by hydrolysis during its use. The low flash point of 66°C is further reason to take care with sources of heat. The chemical has a low vapour pressure but is expected to vaporize to some extent during the application procedure. Dynasylan BSM 100 N is not reported to have any hazardous degradation products.

Provided that the precautions recommended by the manufacturer are adhered to it is unlikely that Dynasylan BSM 100 N would cause any significant public or occupational health problems.

13. RECOMMENDATIONS FOR THE CONTROL OF PUBLIC AND WORKER EXPOSURE

To minimise public and worker exposure to Dynasylan BSM 100 N the following guide-lines and precautions should be observed:

- During storage the containers should be kept tightly closed in a well ventilated place free from moisture;

- Dynasylan BSM 100 N should be applied in open air or else in a well ventilated place;

- Protective equipment is to be used during the application of Dynasylan BSM 100 N. These are to include:

  - rubber gloves (AS 2161) - *Industrial Safety Gloves and Mittens (excluding Electrical and Medical Gloves)* (18);

  - respiratory protection (AS 1716) - *Respiratory Protective Devices*, if ventilation is inadequate (19);

  - safety goggles (AS 1337) - *Eye Protectors for Industrial Applications* when facial contact with the substance is possible (20);

  - appropriate protective clothing (AS 3765) - *Clothing for Protection Against Hazardous Chemicals* (21).

- Safety signs or a barricade to prevent public access should be erected at the work site.

- The product is only to be applied with LOW pressure pumping equipment in accordance with the manufacturers directions.

- After use the applicators are to remove protective equipment and wash the exposed skin thoroughly.

- Precautionary measures are to be taken against static charges, i.e. no smoking or other possible sources of ignition should be allowed near the product.

- A copy of the MSDS should be available to all users of this product.

14. MATERIAL SAFETY DATA SHEET(S)

The Material Safety Data Sheet (MSDS) for Dynasylan BSM 100 N (Attachment 1) was provided in Worksafe format (22). This MSDS was provided by Plastral Trading Company Pty Ltd as part of their notification statement. It is reproduced here as a matter of public record. The accuracy of this information remains the responsibility of Plastral Trading Company Pty Ltd.

15. REQUIREMENTS FOR SECONDARY NOTIFICATION

Under the *Industrial Chemicals (Notification and Assessment) Act 1989* (the Act), secondary notification of Dynasylan BSM 100 N 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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3. Assessment of ready biodegradability of Dynasylan Ibteo kondensat; HRC Report No. DNN 28 (a)/88688; Huntingdon Research Centre Ltd; Huntingdon, England, August 1988.

4. Acute oral toxicity to rats of Isobutyltriethoxysilane, HRC Report No. 87414D/DNN 11/AC; Huntingdon Research Centre Ltd; Huntingdon, England, May 1987.

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6. Dynasylan Ibteo acute inhalation toxicity study in rats- 4-hour exposure, HRC Report No. DNN 53/90393; Huntingdon Research Centre Ltd; Huntingdon, England, May 1990.

7. Irritant effects on rabbit skin of Isobutyltriethoxy- silane [Dynasylan Ibteo], HRC Report No. 87425D/DNN 13/SE; Huntingdon Research Centre Ltd; Huntingdon, England, May 1987.

8. Irritant effects on the rabbit eye of Isobutyltriethoxy-silane [Dynasylan Ibteo], HRC Report No. 87426D/DNN 14/SE Huntingdon Research Centre Ltd; Huntingdon, England, May 1987.

9. Delayed contact hypersensitivity in the guinea-pig with isobutyltriethoxysilane, HRC Report No. 8872D/DNN 17/SS; Huntingdon Research Centre Ltd; Huntingdon, England, February 1988.

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11. Mutagenicity test on isobutyl triethoxysilane (Dynasylan IBTEO) No. 020386 by means of the Ames *Salmonella typhimurium* /microsomes mutagenicity test; Huels Ag Internal Report No. 89/008, Huntingdon Research Centre Ltd; Huntingdon, England January 1989.

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