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NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION
AND ASSESSMENT SCHEME

FULL PUBLIC REPORT

EMULSION K 1418

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Director
Chemicals Notification and Assessment

Full Public Report

EMULSION K 1418

1. IMPORTER/MANUFACTURER

Dulux Australia Pty Ltd, PO Box 60, Clayton, Victoria, 3168.

2. IDENTITY OF THE CHEMICAL

Marketing Name: Emulsion K 1418

Molecular Weight: The number average molecular weight of the Tetrahydrofuran (THF) soluble fraction of the polymer (5%) was demonstrated to be below 10,000. The THF insoluble fraction (95%) had a number average molecular weight of >180,000.

Emulsion K 1418 is classified as a non-hazardous chemical to humans because polymers with a molecular weight of >1000 are unlikely to be able to cross biological membranes. For this reason, the chemical name, Chemical Abstract Registry Number (CAS No.:) and the molecular and structural formulae have been exempted from publication.

3. PHYSICAL AND CHEMICAL PROPERTIES

The polymer is always prepared as an emulsion in water. At room temperature and atmospheric pressure the emulsion is a white opaque liquid with a faint sweet odour.

Specific gravity: 1,068 kg/m^3 (52% water emulsion)

Comments on Physico-Chemical Properties

The 52% water emulsion would be expected to boil at 100°C.

Data on Flash point, Flammability limits, Autoignition temperature and Explosive properties are not required for a polymer of this type.

The vapour pressure for a polymer of this molecular weight would be negligible.

The physical state of the polymer in emulsion and the fact that the removal of water from the polymer emulsion will cause further polymerisation will make physico-chemical testing difficult. By analogy with similar polymers, this polymer is essentially insoluble in water and data on Hydrolysis as a function of pH, Partition Coefficent, Adsorption/Desorption and Dissociation Constant are not required.

Particle size is not relevant to the polymer emulsion and the polymer is not normally used except as an emulsion.

4. METHODS OF DETECTION AND DETERMINATION

Infrared spectroscopy is used to detect the polymer in Emulsion K 1418.

5. PURITY OF THE CHEMICAL

Degree of purity of polymer: ≥99.88% w/w

Amount of polymer in Emulsion K 1418: 52%

Low molecular weight polymer: There is minimal amount of polymer with a number average molecular weight <1000

6. INDUSTRIAL USE

The polymer, as a 52% emulsion in water, will be used as a film forming resin in an industrial paint, Wood Primer, used for coating wood panels. The primer is applied to the panels by automatic spray equipment in a controlled spray booth and cured by the application of heat from infra red lamps. During the heat curing process, the polymer reacts with the other components in the paint formulation to form an integral part of the paint film.

7. OCCUPATIONAL EXPOSURE

Emulsion K 1418 will initially be imported but later manufactured in Australia. Importation will be in plastic lined 200L steel drums.

Manufacture of the emulsion will be in a closed reactor vessel from which 200L plastic lined steel drums are filled as the emulsion is being filtered so that occupational exposure is expected to be low. Potential spillage would be contained to the plant by existing bunding.

At the paint manufacturing plant the polymer emulsion and other ingredients are dispersed and blended in an enclosed mixer fitted with exhaust ventilation. During this process batch adjusting and testing occur following which 200L plastic lined steel drums are filled as the emulsion is being filtered. Potential spillage would be contained to the plant by existing bunding.

8. PUBLIC EXPOSURE

Under normal conditions, the potential for public exposure to Emulsion K 1418 is low. The polymer, in the form of a 52% emulsion in water, will be used as a film forming resin in an industrial paint used for coating wood panels. Heat curing crosslinks the polymer with urea-formaldehyde resin to form a high molecular weight stable paint film that is firmly adherent to wood panels and resistant to degradation. Some slow deterioration of this film may occur as the result of polymer chain scission through UV absorption from sunlight. However the treated wood, which is to be sold as internal panelling for buildings, would be expected to be further coated with other paints.

9. ASSESSMENT OF PUBLIC AND OCCUPATIONAL HEALTH AND SAFETY EFFECTS

There is no toxicity data on the polymer component in Emulsion K 1418 but the polymer has a high molecular weight and is therefore unlikely to be absorbed across biological membranes such as the skin, gastrointestinal tract or respiratory system.

Residual monomers and low molecular weight polymers are present at <0.12% and thus the potential hazard from this source is considered not to be significant.

Providing that the containment procedures noted above as being used in the manufacturing process continue to be followed, it is unlikely that Emulsion K 1418 will pose any serious occupational health or safety hazard.

No data were provided on thermal stability of the polymer. However, the tendency to further polymerise on removal of water from the emulsion suggests that this is a more common event than degradation.

Due to the extremely low public exposure under normal use conditions, it is unlikely that Emulsion K 1418 will pose any serious health or safety hazard to the public.

10. ENVIRONMENTAL EXPOSURE

Release

Volume

Initial quantities of the polymer will be imported as a component in a primer paint at the rate of 10-100 tonnes per annum. The polymer emulsion and hence the primer will be manufactured in Australia at the rate of 10-100 tonnes per annum once the appropriate research and development has been completed.

Use

The polymer, as a 52% emulsion in water, will be used as a film forming resin in an industrial paint, Wood Primer, used for coating wood panels. The wood panel is sold as internal panelling (walls, doors etc) for buildings.

Manufacture

The manufacture of the polymer emulsion involves placing the reactants and water into a sealed reactor, filtering and filling 200L drums with the polymer and storing for reprocessing. The paint manufacture involves the high speed dispersing and blending of the polymer and other ingredients, filtration, drum filling and storage for distribution.

Waste polymer generated from the filtration and filling operation during its manufacture will be 200 kg.

The company estimates that approximately 500 kg of waste polymer per annum will be generated by cleaning up minor spills, cleaning out manufacturing equipment and rinsing polymer emulsion drums during paint manufacture.

At the customer's production site, paint drums will be rinsed clean and returned for reuse at Dulux. Aqueous waste will also be generated in the customer's water washed spray booth. This waste is estimated to contain 165 kg polymer per week (about 8 tonnes per annum).

Fate

The 200 kg waste polymer generated during the filtration and filling operations during manufacture will be diluted with water to an appropriate waste water specification and passed to sewer. All aqueous waste from the site passes through a triple interceptor trap so that settling, solvent, oil and grease interception can occur. The plant is licensed to discharge 40 KL/day waste. Assuming that the estimated stream volume from municipal sewage works is 50 ML/day and approximately 550 g/day of waste polymer will be released, the predicted environmental concentration to receiving waters will be 11 ppb.

The 500 kg of waste polymer generated by cleaning up spills, cleaning out manufacturing equipment and rinsing polymer emulsion drums during paint manufacture is expected to be mixed with kiln dust to form a non-leaching solid which is to be disposed of by landfilling through a licensed waste disposal contractor at Willawong tip, Brisbane. Due to bunding arrangements in production and storage areas, there will be no release of polymer to drains and sewer.

The estimated 8 tonnes per annum waste polymer generated at the customer's production site will be treated as follows:

1. Break emulsion by acidification.
2. Test leachability and neutralise liquid waste.
3. Test for sewage suitability (heavy metals and toxic organics).
4. Precipitate heavy metals.
5. Perform chemical fixation and solidification with clay, cement, kiln dust and fly ash.
6. Test leachability with USEPA leach test.

This non-leaching solid will be disposed of by landfilling.

The polymer in the paint is cross-linked with urea-formaldehyde resin under the action of heat to form a very high molecular weight stable paint film that is firmly adherent to the panels to

which it is applied. Very slow deterioration of this film may occur as a result of polymer chain scission through UV absorption. This, however, is unlikey to occur as the panels will be used for internal applications in buildings and will be further coated with other decorative paints.

Under extreme heat conditions (fire), the polymer would combust emitting oxides of carbon and nitrogen.

11. ASSESSMENT OF ENVIRONMENTAL EFFECTS

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

The notified substance would not be expected to exhibit toxic characteristics because large polymers of this nature are not readily absorbed by biota.

12. ASSESSMENT OF ENVIRONMENTAL HAZARD

The predicted environmental concentration of the Emulsion K 1418 from disposal of the polymer manufacturing wastes to receiving waters via sewer treatment is approximately 10 ppb and as such the environmental hazard is expected to be low.

13. RECOMMENDATIONS FOR SAFETY PROCEDURES TO CONTROL OCCUPATIONAL EXPOSURE AND OCCUPATIONAL HAZARDS

The hazards associated with the polymer content of Emulsion K 1418 appear to be minimal. However, skin and eye irritation resulting from repeated or prolonged contact due to the low pH and presence of low levels of surfactants in the emulsion dictates that the practices listed below should be followed.

. the workplace should be well ventilated and enclosed systems fitted with local exhaust ventilation should be used in polymer and paint mixing and handling operations;

. good work practices should be followed to avoid spillages or splashings;

. good housekeeping and maintenance are essential. Empty drums or cans should be removed to a safe place whilst awaiting disposal. Disposal should be in accordance with local regulations. Should there be an accidental spillage

or leakage small quantities should be absorbed onto paper towels and larger quantities should be collected and atomised in a suitable combustion chamber. Full personal protection should be worn in the event of a spillage or leakage.

. a copy of MSDS for the polymer and paints should be easily accessible to employees.

The recommendations outlined in the MSDS for Emulsion K 1418 with regard to Precautions for Use and Safe Handling Information should be followed.

14. RECOMMENDATIONS FOR MATERIAL SAFETY DATA SHEET (MSDS)

The MSDS for Emulsion K 1418 and for the paint Wood Primer have been compiled in accordance with Worksafe Australia format (1) and are provided as attachments 1 and 2. The information and recommended control measures contained in these MSDS generally reflect the hazards associated with the use of Emulsion K 1418. The accuracy of this information remains the responsibility of Dulux Australia Pty Ltd.

15. REQUIREMENTS FOR SECONDARY NOTIFICATION

Under the Industrial Chemicals (Notification and Assessment) Act 1989 (the Act), secondary notification of Emulsion K 1418 by Dulux Australia Pty Ltd shall be required if any of the circumstances stipulated under section 64(2) of the Act arise.

16. REFERENCES

1. National Occupational Health and Safety Commission *Guidance Note for the Completion of a Material Safety Data Sheet*, 2nd Edition, Australian Government Publishing Service Publ., Canberra, 1990.