Kao Corporation

Enriching lives,
in harmony with nature.

Polyester resin for toner

The document of the safety summary provides the safety information of the chemical substance to the general public. The safety summary is NOT intended to be an alternative document of Safety Data Sheet which is described from the recommendable detailed safety measures for each use. The safety summary is NOT intended to be an alternate document of the instructions for use nor the warning of consumer products including this substance. The contents of this summary are based on the laws, documents, information, and data available at present, without any warranty.

1. Chemical Identity

Category Name	Polyester resin for toner
Substance Name	Polyester resin
CAS Number	116736-81-3, 168406-64-2, 39382-25-7

2. Product Uses and Benefits

Polyester resin for toner (PRT) is polyester resin used exclusively as a toner binder resin.

3. Physical/Chemical Properties

The physicochemical properties of the representative structure of PRT which are calculated using computer software EPI suite 4.1 of the U.S. Environmental Protection Agency or measured are shown below.

Physicochemical properties of PRT

Property	Value
Molecular weight (Mw)	3000～
Molecular weight (Mn)	1500～5000
Softening point (℃)	100~150
Glass transition point (℃)	50~90
Water solubility (mg/L)	insoluble

4. Human Health Safety Assessment

Consumer: The exposure to PRT is at safe levels.
Worker: The repeated exposure of PRT does not cause any toxic effects

Effect Assessment	Result
Acute Toxicity oral/ dermal	No acute toxicity after oral/ dermal exposure in practical use The substance does not cause damage to any organs following single exposure
Irritation skin/ eye	Based on the available data, unlikely to cause irritation/corrosivity to skin or eyes
Sensitization	Based on the available data, unlikely to cause allergic skin reaction
Toxicity after repeated exposure	Unlikely to cause any toxic effects through prolonged or repeated oral exposure in practical use
Mutagenicity	Based on the available data, unlikely to cause genetic defects
Carcinogenicity	Based on the available data, unlikely to cause cancer
Toxicity for reproduction	Based on the available data, unlikely to be damaging to fertility or the unborn child

5. Environmental Safety Assessment

The test results with fish, aquatic invertebrates and algae suggest that PRT not to cause a toxicity for aquatic organism. From the information of general polyester resins, it seems to be not readily biodegradable, but it is considered to be removed by sewage treatment etc. It is a polymeric substance, it is not absorbed in vivo, so it is not bioaccumulative.

Effect Assessment	Result
Aquatic Toxicity	Suggests not to cause toxicity for aquatic organism.
Biodegradation	It seems to be not readily biodegradable
PBT/ vPvB conclusion*	It is not applicable to PBT / vPvB.

*PBT=Persistent, Bioaccumulative and Toxic
vPvB=Very Persistent and Very Bioaccumulative

6. Exposure

- **Consumer**

The consumer may come into contact with PRT in use of the toner, electrophotographic printed materials, etc. However, since PRT do not show any harmful effect on human health, when used in recommended use, there is no risk to consumer. However, always refer to the product information before use and follow the usage notes stated on the label/ use instructions.

- **Worker**

The exposure can occur either in PRT manufacturing facilities or in the various industrial facilities when PRT is used. Those workers in industrial operations during maintenance, sampling, testing, or other procedures could be exposed with PRT. Only qualified and trained workers handle the substance. The manufacturing facilities offer thorough training program for employees and appropriate work processes, as well as safety equipment (goggles, gloves and dust mask) in place to present an unnecessary exposure. Safety showers and eye-wash stations are accessible nearby. Workers are required to be trained in accordance with the safety measures in the Safety Data Sheet.

- **Environment**

This substance may be discharged due to the disposal of electrophotographic printed materials. It is discharged to wastewater treatment plants from industrial sites such as manufacturing, preparation, handling, storage and blending. However, this material is considered to be efficiently removed at the wastewater treatment plants. Even if it remains slightly in the wastewater, it is considered not toxic to aquatic organisms. Furthermore, this substance dose not accumulate in the food chain, so that there is no concern of human exposure through environmental pathway.

7. Risk management recommendations

When you use the substance, make sure to be measured the adequate ventilation. Always use appropriate chemical-resistant gloves to protect your hands and skin and always wear eye protection equipment. Please wear appropriate dust mask to prevent inhalation. Do not eat, drink or smoke where the substance is handled, processed or stored. Wash hands and skin after contact with the substance. When the substance attaches to skin (or hair), take off the contaminated clothes. Wash with a large amounts of water and soap. When it causes your skin irritation, consult doctor (medical diagnosis/therapy). If the substance gets into your eyes, rinse your eyes thoroughly for several minutes. If you wear contact lens, and you can take it off easily, take it off and continue to rinse your eyes. When it causes your eys irritation, consult doctor (medical diagnosis/therapy)

Waste water containing the substance must be passed the waste water treatment plants in order to remove the substance. In work environments where dust is expected, install appropriate dustproof / dust collecting equipment.

8. Regulatory Information/Classification and Labeling

Under GHS classification chemical substances are classified in hazards for physical properties, human health and environment. The hazard information for industrial products are transmitted via specific labels and Safety Data Sheet. GHS offers the standardization for hazard communication. The subjects who could be assumed to be exposed to the substance, workers, consumers, transport workers, and emergency responders, can better understand the hazards of the chemicals in use through the transmission.

PRT is not assigned any GHS classification.

The laws of manufacturing, sale, transport, use and disposal are different among countries or areas. Details are referred to Safety Data Sheet provided by the supplier.

9. Conclusion

PRT is thought to be not readily biodegradable, but since it shows no toxicity to aquatic organisms, the risk to the environment is not considered to be a concern. In the PBT/vPvB assessments for PRT, the substance is not applicable to PBT/vPvB. Although PRT is not considered to exhibit toxicity due to short-term and repeated exposure, workers need to refer to Safety Data Sheet according to standard safety measures. Consumers are not considered to have a risk in use.

10. Contact

For further information on this substance or Safety Summaries in general, please contact us.

Name	Kao Corporation
URL	https://ssl.kao.com/en/chemical/

11. Glossary

Hazard	Hazardous property for human health or environments
GHS	Globally Harmonized System of Classification and Labelling of Chemicals
Acute Toxicity	Adverse effects that result from a single exposure
Sensitization	Inducibility of allergy
Mutagenicity	Effects to induce gene mutations
Toxicity after repeated exposure	Adverse effects that result from repeated exposure
Toxicity for reproduction	Adverse effects for teratogenicity, embryotoxicity, and reproductivity
Carcinogenicity	Action influence to cause a cancer
Biodegradation	Biological degradation of a substance in environments
Bioaccumulation	Accumulation of substances in environments

12. Date of Issue

May 31, 2018