



Environmental Assessment

1. Date:

October 29, 2001

2. Name of submitter:

UBE Industries, Ltd.

3. Address:

Seavans North Building, 1-2-1, Shibaura, Minato-ku, Tokyo 105-8449, Japan

4. Description of the proposed action:

a. Requested action:

The submitter has provided a notification with respect to the use of polybutadiene manufactured using 1,5-cyclooctadiene in the process. 1,5-cyclooctadiene (COD) is synthesized by dimerization of butadiene by using one catalyst such as Polybutadiene Rubber (BR) is produced by using the COD to control molecular weight. But COD itself is removed from into BR gradually via removing process of solvent and drying process. The residual COD in our product does not exceed 250 ppm as determined by Gas Chromatography. The BR is used to modify polystyrene (PS) and to increase impact energy. This modified PS is called HIPS (High Impact Polystyrene) and it is used as the food contact surface. As for container application, the rubber content is less than 8 wt% and the finished HIPS are no thicker than 0.08 cm. The EDI (Estimated Daily Intake) for COD in accordance with the condition as mentioned above is 142.2 microgram/ (man-day).

b. Need for action:

If the COD is not charged into reactor, operation condition is unstable. Namely it is impossible to control temperature and reaction, and controlling quality is very difficult. It is necessary to use the COD to design characteristic BR produced using catalyst. Regarding BR produced using catalyst without COD BR has a wide or bi-modal molecular weight distribution (broad type BR). But by means of using COD, BR has a variety of molecular weight can be synthesized, and combination of the molecular weight depends on pattern of molecular weight distribution. In the end, it means enabling to produce broad BR. BR is used to modify PS and to increase impact energy. As for the impact energy, in case of comparing at same ratio of BR, broad BR is superior to narrow BR for all application of HIPS.

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c. Location of use/disposal:

Location address

Goi Minamikaigan Ichiharashi Chiba Pref. 290-8550, Japan

Types of environments

Though the COD used to manufacture our BR is removed from into BR via removing process of solvent and drying process, all of the COD is recycled or incinerated. Accordingly as the COD emitted from our plant site is nothing, there is no influence for the environment.

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5. Identification of substances that are the subject of the proposed action:

(1) Complete nomenclature;

1,5-Cyclooctadiene

(2) Chemical Abstract Service (CAS) registration number;

111-78-4

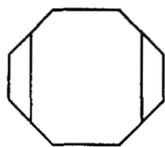
(3) Molecular weight;

108 gram/mole

(4) Molecular formula;

C₈H₁₂

(5) Structural formula;



(6) Physical description;

Clear liquid

6. Introduction of substances into the environment:

a. Introduction of substances into the environment as a result of manufacture;

There are no extraordinary circumstances pertaining to the manufacture of the COD.

b. Introduction of substances into the environment as a result of use/disposal:

(1) An estimate of the maximum yearly market volume of the processing aid for the proposed use based on total fifth year production estimates;

We purchase the COD of . . . ton per year at a rough estimate. We dispose of . . . tons of COD by incineration annually.

(2) The percent of the market volume that will enter the waste stream at the site where the processing aid is used to manufacture 1,3-butadiene homopolymer;

88% of the purchase volume of COD will enter the waste stream at the site where the COD is used to manufacture BR. The COD is recycled with some waste being incinerated.

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(3) The mode by which the substances are introduced into the environment;

The COD is not introduced into the environment.

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(4) The expected introduction concentration (EIC) of substances introduced into the environment at these site, e.g., concentration in wastewater, solid waste (including sewage sludge, also known as biosolids), and the workplace;

The mixture of the butadiene monomer and solvent is charged into the reactor and in succession the and COD are added into it. After polymerization, the reaction is stopped. The polymer is stored into the storage tank at one time and finally the final product is made up via de-solvent process and drying process. As almost COD is removed from final product through the two processes, the COD is left less than around in the final product.

Next we will explain COD's whereabouts vaporized into gas phase and shifted into water phase through de-solvent process as follows.

Gas phase

All of the COD is recycled after refining; it is not emitted into the air.

Water phase

Basically as the COD is not dissolved in water, we think that there will be nothing of possibility to be emitted into water. Actually we measured the COD level at the outlet of de-solvent process before but we could not detect it by Gas Chromatography. And our process has aeration system and we emit the wastewater to the sea after removing very small quantity of the organic component by passing the system. And since the collected component (condensed solvent) is recycled, there will be no bad influence to the environment.

Next we will explain COD's whereabouts vaporized into gas phase through drying process. All of the COD is adsorbed by active carbon together with solvent one time and is incinerated after collecting as waste solvent. The annual quantity of incineration is tons. The COD is composed of the elements carbon and hydrogen. In a correctly operating incinerator, COD will burn to simple compounds such as carbon dioxide and water. The water emitted as a result of combustion cannot result in any environmental impact. Although carbon dioxide emitted to the atmosphere is considered to have potential for

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environmentally significant global changes, the levels of carbon dioxide emitted by the combustion of the COD are extremely small compared to levels emitted from other sources, e.g., burning coal and oil or operation of motor vehicles.

All of the COD is not emitted from our plant to the environment in conclusion we think that there will be nothing of possibility to give bad influence to the environment.

(5) The material safety data sheets for substances to which workers are expected to be exposed, if available;

The material safety data sheets about the COD submitted from the COD producer is attached.

7. Fate of substances released into the environment:

Extremely small amounts of COD are released into water as discussed under Format Item 6. So no information need be provided on the fate of substances released into the environment as a result of manufacturing BR by using the COD.

8. Environmental effects of released substances:

As extremely small amounts of COD are released into water, the EEC of COD will be extremely small. So on environmental effects are expected based on the EEC.

9. Use of resources and energy:

We are producing many kinds of BR grades with the COD. If the COD replaces another substance for the same purpose, it is very difficult for us to produce all grades. So we'd like to suggest that the COD does not replace another substance. The COD is produced by dimerization of butadiene monomer and the reaction is simple and not special. In addition we consulted with the manufacture of COD about this matter and their comment is shown below.

"The COD is not special chemical. So we suppose that there is little difference between energy used by producing the COD and energy used by producing general chemicals all over the world."

10. Mitigation measures:

No potential adverse effects have been identified; therefore, mitigation measures need not be discussed.

11. Alternatives to the proposed action:

No potential adverse effects have been identified; therefore, mitigation measures need not be discussed.

12. List of prepares:

Name: H. Nakamura

Job Title: Sales Officer

Qualifications: Graduate from Tokyo Science University, Industrial Chemical Course

13. Certification:

The undersigned official certifies that the information presented is true, accurate, and complete to the best of the knowledge of Ube Industries, Ltd.

August 15, 2001

/s/

T. Fukano

**Synthetic Rubber Business Unit Leader
Polyolefins & Synthetic Rubber Division
UBE Industries, Ltd.**