

FYI-0794-001174

SHEREX

SHEREX CHEMICAL COMPANY, INC.



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INIT 07/14/94

June 9, 1988



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Ms. Roberta Wedge
Dynamac Corporation
11140 Rockville Pike
Rockville, Maryland 20852

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Dear Ms. Wedge:

This is a sanitized response to your letter of April 13, 1988, concerning Adogen 343, CASRN 67700-99-6. Adogen 343 is an intermediate in the manufacture of quaternary ammonium compounds. As such, most of it is used at Sherex facilities, but a small amount is sold to other companies. These companies use it as an intermediate also.

PRODUCTION VOLUME AND PROCESS DATA

Adogen 343 is one of a group of tertiary amines that those in the industry call "dialkyl methyl" tertiaries. These amines are usually prepared from formaldehyde and a "dialkyl secondary amine" such as secondary tallow amine. The amine may be preformed or it may be synthesized from the corresponding nitrile. In this case, the reactions are hydrogenation of the nitrile to a primary amine, simultaneous conversion of the primary amine to the secondary amine, followed by methylation with formaldehyde. The overall scheme is:

- 1a. $2 \text{ Nitrile} + \text{H}_2 + \text{Catalyst} \rightarrow 2 \text{ (Primary amine)}$
- 1b. $2 \text{ (Primary amine)} \rightarrow \text{Secondary amine} + \text{Ammonia}$
2. $\text{Secondary amine} + \text{Formaldehyde} + \text{Hydrogen} + \text{Catalyst}$
 $\rightarrow \text{Dialkyl methyl tertiary amine.}$

Normally, steps 1a and 1b are run until the conversion to secondary amine is complete. Then, step 2 is initiated. It is not necessary to isolate the secondary amine nor to change reactors.

The second reason for beginning with a nitrile rather than a secondary amine is economic. In the same vein, 37 percent formalin is the preferred formaldehyde source but other sources work equally well.

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Adogen 343

UNPUBLISHED TOXICITY DATA

Adogen 343 is a solid at room temperature. Its vapor pressure is very low. Fatty amines have a reputation as skin and eye irritants, but there is a substantial reduction in the toxicity of tertiary amines compared to other fatty amines.

OCCUPATIONAL EXPOSURE DATA

Since Adogen 343 is used solely as an intermediate, there is little employee contact with the product. It is synthesized as described above, then either transferred to another reactor for further use, or it goes to storage. Employee contact is limited to sampling and quality assurance testing. Any of the product that is shipped to other sites is shipped in bulk. Adogen 343 is made 24 hours per day, 7 days a week, 52 weeks per year. Approximately 6 operators will come into contact with Adogen 343 for a period of 1/2 hour per operator each day. 3 quality assurance chemists will be in contact with the product for 15 minutes each on a daily basis.

ENVIRONMENTAL DATA

We do not have any data on the amount of Adogen 343 that is released to the environment, but because it is limited to manufacturing sites, there is little opportunity for unexpected releases except during inter-plant transfers. Since Adogen 343 has a very low vapor pressure, fumes from a sudden release will not pollute the atmosphere, and since it is a solid at ambient conditions, it will not spread freely into ground water or the soil.

Fatty amines in general are toxic to fish, daphnia, and algae. They are biodegradable but the organisms may need to become acclimated. The fact that Adogen 343 is a solid at ambient conditions will reduce the immediate effect on water but it will be slower degrading than it would if it were liquid.

Sincerely,

Peggy J. Vince

Peggy J. Vince
Director,
Regulatory & Environmental Affairs

cc: R. McConnell



CERTIFICATE OF AUTHENTICITY

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