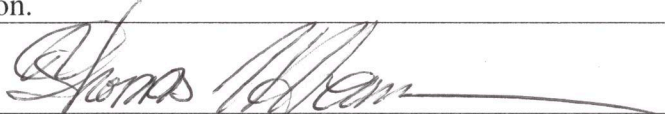


# HAZARDOUS MATERIALS GUIDANCE

<b>Issuance Date:</b> May 2018	<b>HM Guidance Number:</b> HMG-115
<b>Revision:</b> 2	<b>49 CFR Sections Affected:</b> 173.132
<b>Key Words:</b> Materials Poison by Inhalation.	
<b>Approved:</b> Thomas J. Herrmann Director, Office of Technical Oversight	

## Summary:

This Hazardous Materials Guidance document discusses the calculations that can be used to determine whether or not a material meets the poison-by-inhalation requirements of 49 CFR 173.132. As an illustration of these calculations, two safety data sheets (SDS) are analyzed.

## Discussion:

As an example, Chemical Company A ships a material under the proper shipping name "Corrosive Liquid NOS," which contains Diamylamines. Chemical Company B ships an analogous material under the proper shipping name "Toxic Liquids, Organic N.O.S." which has similar characteristics to Chemical Company A's product. Based on the SDSs supplied by the two manufacturers, the classification and proper shipping name of the two materials are determined as follows:

### Chemical Company A

Based on Chemical Company A's SDS, the LC50 value of Diamylamine is 66 ppm (based on a 4-hour exposure). The 4-hour exposure may be used to determine an acceptable 1-hour exposure by multiplying the value by 2.

$$\text{LC50 } 66 \text{ ppm} \times 2 = 132 \text{ ppm}$$

The vapor pressure of Diamylamine is 5 mm Hg at 20 C. Therefore, a saturated vapor concentration may be calculated using the formula:

$$\frac{\text{VP (in mm Hg)}}{760} \times 106 = \text{SVC (in ppm)}$$

Substituting 5 mm Hg for VP:

$$\frac{5 \text{ (in mm Hg)}}{760} \times 106 = 6578.9473 \text{ ppm SVC}$$

When the LC50 value is 1000 ppm (132 ppm in this example) or less and the saturated vapor concentration at 20 C is equal to or greater than ten times its LC50 value, then the material

would be considered to have an acute inhalation toxicity; subject to 49 CFR § 173.132 (a) and (b). As indicated below, Chemical Company A's material has a SVC nearly 50 times its LC50 value.

$$\frac{6578.95}{49.84} = 132$$

Chemical Company A's SDS indicates that the material "may cause chemical burns on skin." This does not indicate that it will cause irreversible alterations in skin, therefore, based on Chemical Company A's SDS the material should be classified as:

Toxic Liquids, Organic N.O.S.  
(Diamylamine)  
6.1, PGI,  
Zone A, UN 2810  
Inhalation Hazard

### **Chemical Company B**

The same analogy may be used to determine the proper shipping name and hazard class for Chemical Company B's material.

$$\text{LC50 } 58 \text{ ppm} \times 2 = 116 \text{ ppm}$$
$$\frac{3 \text{ (in mm Hg)}}{760} \times 106 = 3947.3684 \text{ ppm SVC}$$
$$\frac{3947.37}{34.02} = 116$$

As indicated above, Chemical Company B's material has a SVC nearly 34 times its LC50 value. Further, Chemical Company B's SDS indicates that the material "causes reversible redness and swelling." This does not indicate that it will cause irreversible alterations in skin. Consequently, the material should coincide with the classification accredited to Chemical Company A.

### **Conclusion**

Neither Chemical Company A's or Chemical Company B's SDS considers the material corrosive, therefore, the proper shipping name would be Toxic Liquids, Organic N.O.S. Based on the SDS supplied by both chemical companies, Diamylamine is also a material toxic by inhalation and subject to the special packaging requirements of 49 CFR § 173.3a(a).