



## Calibration Factors And Time-and-Distance Guidelines For Use of Theatrical Fog Equipment

Vapour with Rosco Stage & Studio Fluid  
Vapour with Rosco Fog Fluid  
Vapour Plus with Rosco Stage & Studio Fluid  
Vapour Plus with Rosco Fog Fluid  
Mini V with Rosco Stage & Studio Fluid  
Mini V with Rosco Fog Fluid  
V-Hazer with V-Hazer Fluid

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# 1 Introduction

In 1997-99, at the request of Actors' Equity Association (AEA) and the League of American Theaters and Producers (LATP) and with the support of the Equity-League Pension and Health Trust Funds, investigators from the Mount Sinai School of Medicine (Mt. Sinai) and ENVIRON International Corporation (ENVIRON) conducted a study to evaluate whether the use of smoke, fog, haze, and pyrotechnics special effects in theatrical musical productions is associated with a negative health impact in actors. This effort was initiated in response to ongoing concerns by actors that the use of these theatrical effects may have an impact on their health. The results of this study were presented in the report *Health Effects Evaluation of Theatrical Smoke, Haze, and Pyrotechnics* (Mt. Sinai and ENVIRON 2000).

The results of the Mt. Sinai/ENVIRON study indicate that there are certain health effects associated with actors exposed to elevated or peak levels of glycol smoke/fog and mineral oil. However, as long as peak exposures are avoided, actors' health, vocal abilities, and careers should not be harmed. Pyrotechnics as used on Broadway at the time of the study did not have an observable effect on actors' health.

Mt. Sinai and ENVIRON recommended the following peak guidance levels with respect to glycols and mineral oil:

- The use of glycols should be such that an actor's exposure does not exceed **40 milligrams per cubic meter (mg/m<sup>3</sup>)**.
- Mineral oil should be used in a manner such that an actor's exposure does not exceed a peak concentration of **25 mg/m<sup>3</sup>**.
- For chronic exposures to mineral oil, the existing standards established for oil mists (**5 mg/m<sup>3</sup>** as an eight-hour time-weighted average) should also be protective for actors in theatrical productions.

Comparable guidance levels were developed for glycerol in a subsequent study (ENVIRON 2001b):

- Glycerol should be used in a manner such that an actor's exposure does not exceed a peak concentration of **50 mg/m<sup>3</sup>**.
- For chronic exposures to glycerol, the existing standards established for glycerin mists (**10 mg/m<sup>3</sup>** as an eight-hour TWA) should also be protective for actors in theatrical productions.

To ensure that peak smoke, fog, and haze levels are below these guidelines, one option available to productions is to conduct show-specific testing at their theatres using an aerosol monitor. In order to conduct this testing, calibration data must be developed for each equipment/fluid combination. These calibration data are necessary to convert the readings of the aerosol monitor to glycol, mineral oil, or glycerol concentrations. A compilation of calibration factors approved for use in evaluating compliance with the peak guidance levels is provided on the Actors Equity web site (<http://www.actorsequity.org/library/library.asp?cat=33>).

ENVIRON was retained by Rosco Laboratories to develop calibration factors and time-and-distance guidelines for the following equipment-fluid combinations:

- Vapour with Rosco Stage & Studio Fluid
- Vapour with Rosco Fog Fluid
- Vapour Plus with Rosco Stage & Studio Fluid
- Vapour Plus with Rosco Fog Fluid
- Mini-V with Rosco Stage & Studio Fluid
- Mini-V with Rosco Fog Fluid
- V-Hazer with V-Hazer Fluid



Vapour



Vapour Plus



Mini-V



V-Hazer

## 2 Testing Methodology

### 2.1 Sampling Equipment and Materials

Monitoring of short-term concentrations was performed using portable real-time aerosol monitors (*personal* DataRAM Model PDR-1000) manufactured by Monitoring Instruments for the Environment, Inc. (MIE). The PDR-1000 is a high sensitivity (i.e., photometric) monitor that uses a light scattering sensing chamber to measure the concentration of airborne particulate matter (liquid or solid), providing a direct and continuous readout as well as electronic logging of the data.

The PDR-1000 aerosol monitors as obtained are calibrated to Arizona road dust over a measurement range of 0.001 to 400 mg/m<sup>3</sup>. In order to be utilized to measure short-term glycol concentrations, the monitors were first calibrated for the smoke or haze machines and fluids being used. Calibration of the aerosol monitors was conducted by collecting simultaneous measurements with a series of sampling pumps and PDR-1000 aerosol monitors, mounted on tripods.

Gilian BDx-II sampling pumps were used to draw air through collection media. The fluids tested were all glycol based; therefore, OSHA Versatile Sampler (OVS) traps were used as the collection media, each containing two sections of XAD-7 resin (200-mg front section, 100-mg back section, separated by a polyurethane foam [PUF] plug). The XAD-7 resin was used to collect both the particulate and vapor phase of the glycol aerosol. A 13-mm glass fiber filter (GFF) plug precedes the front section and a PUF plug follows the back section. This sampling is based on a variation of NIOSH Method 5523 (NIOSH 1996; Pendergrass 1999). This calibration sampling was conducted in conjunction with operating the PDR-1000 aerosol monitor.

The testing was performed at a rented laboratory space in Groton, Massachusetts and Studio C of High Output, Inc. in Canton, Massachusetts

### 2.2 Aerosol Monitor Calibration Procedure

A series of tripod assemblies was used for calibrating the aerosol monitors, each consisting of a sampling pump, flexible tubing, sampling media (OVS trap), and an aerosol monitor. The height of the tripod was approximately five feet, corresponding with the breathing zone of a typical actor. The room ventilation fans were turned off during each run; no major movement occurred in the testing room during each run that would affect fog dispersion.

- a. The sampling pumps were calibrated to 2 liters per minute (LPM) using a BIOS DryCal pump calibrator. The aerosol monitor was zeroed, the data logging function of the aerosol monitor was turned on, and the data logging time for the aerosol monitors were synchronized.
- b. The fog machines were positioned on a table to allow a release of fog at a height of four to five feet. The tripods were placed at various distances from the smoke machine release nozzle to achieve a range of exposure concentrations.

- c. The sampling pumps were turned on, followed by the fog machines, allowing sustained fog generation to occur. After a period of approximately five to ten minutes, the machines and pumps were simultaneously turned off.
- d. The OVS traps were capped and labeled to identify the type of fog machine and glycol fluid, sampling location, and other sampling specifics. After being capped and labeled, the OVS traps were placed in a cooler with ice packs.
- e. Various fans were used between runs to clear residual aerosols from the testing area air by room ventilation.



**Figure 1.** Configuration for calibration factor procedure, consisting of the tripod assemblies with sampling pumps, OVS tubes for sampling glycols, and aerosol monitors.

The collection media and bulk fluid samples, along with appropriate field blanks, were submitted for analysis to Analytics Laboratory of Richmond, Virginia, an American Industrial Hygiene Association (AIHA) accredited laboratory.

### 2.3 Laboratory Analysis

All sample analyses were conducted by using validated analytical methodologies, as described in the ENVIRON Air Sampling Protocol (ENVIRON 2001a).

Samples were analyzed for glycols using a variation of NIOSH Method 5523, which involves the use of a gas chromatograph with a flame ionization detector (GC/FID). The NIOSH Method 5523 was extended to a validated level of quantification (LOQ) of 5.0 to 30.0 micrograms ( $\mu\text{g}$ ) of each individual glycol per sample.

## 2.4 Time-and-Distance Monitoring Procedure

To measure the levels of glycol present at different distances from the release point, a series of five tripods equipped with aerosol monitors positioned at breathing height (approx. 5ft above ground) were used. Each fog or haze machine was turned on for durations ranging from 5 to 120 seconds, allowing sustained fog generation to occur, and then turned off. The aerosol monitors collected logged data on the fog levels as the concentrations gradually dissipated.



**Figure 2.** Monitoring configuration consisting of tripod mounted aerosol monitors situated at various intervals from the fog machine.

### 3 Results and Discussion

#### 3.1 Aerosol Monitor Calibration

Total glycol concentrations were calculated from the analytical data. Only the glycol species measured in the bulk solution were included. For glycol species that were measured in the bulk solution, and were detected in the air sample but not above the LOQ, one half of the LOQ for that glycol species was conservatively used in calculating the total glycol concentration. To develop a calibration curve for each glycol fluid, the average aerosol monitor readings during the period of time in which air was drawn through the OVS trap for each air sample were calculated and plotted against the total glycol concentration data.

The glycol calibration curves for the seven equipment-fluid combinations tested are shown in Figures 3 through 9. First order regression curves are also shown on these figures. The calibration factors, calculated from the slopes of these regressions, are summarized in Table 1.

<b>Manufacturer</b>	<b>Machine</b>	<b>Fluid</b>	<b>Fluid Type</b>	<b>Calibration Factor</b>
Rosco	Vapour	Rosco Stage & Studio Fluid	Glycol	0.85
Rosco	Vapour	Rosco Fog Fluid	Glycol	0.44
Rosco	Vapour Plus	Rosco Stage & Studio Fluid	Glycol	0.78
Rosco	Vapour Plus	Rosco Fog Fluid	Glycol	0.82
Rosco	Mini-V	Rosco Stage & Studio Fluid	Glycol	0.85
Rosco	Mini-V	Rosco Fog Fluid	Glycol	0.55
Rosco	V-Hazer	V-Hazer Fluid	Glycol	0.68

#### 3.2 Use of Calibration Factors

The real-time aerosol monitor readings can be converted to glycol concentrations using the appropriate calibration factor for the fluid, as follows:

$$CONC = C \times PDR$$

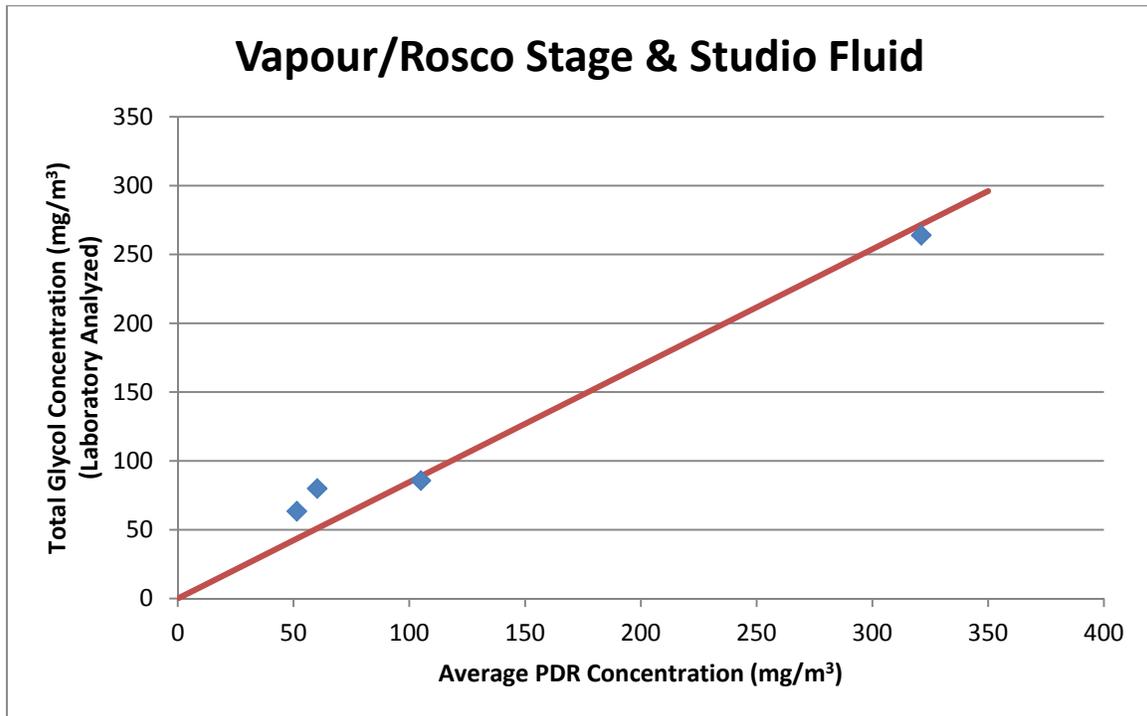
where:

*CONC* = air concentration of total glycols, mg/m<sup>3</sup>

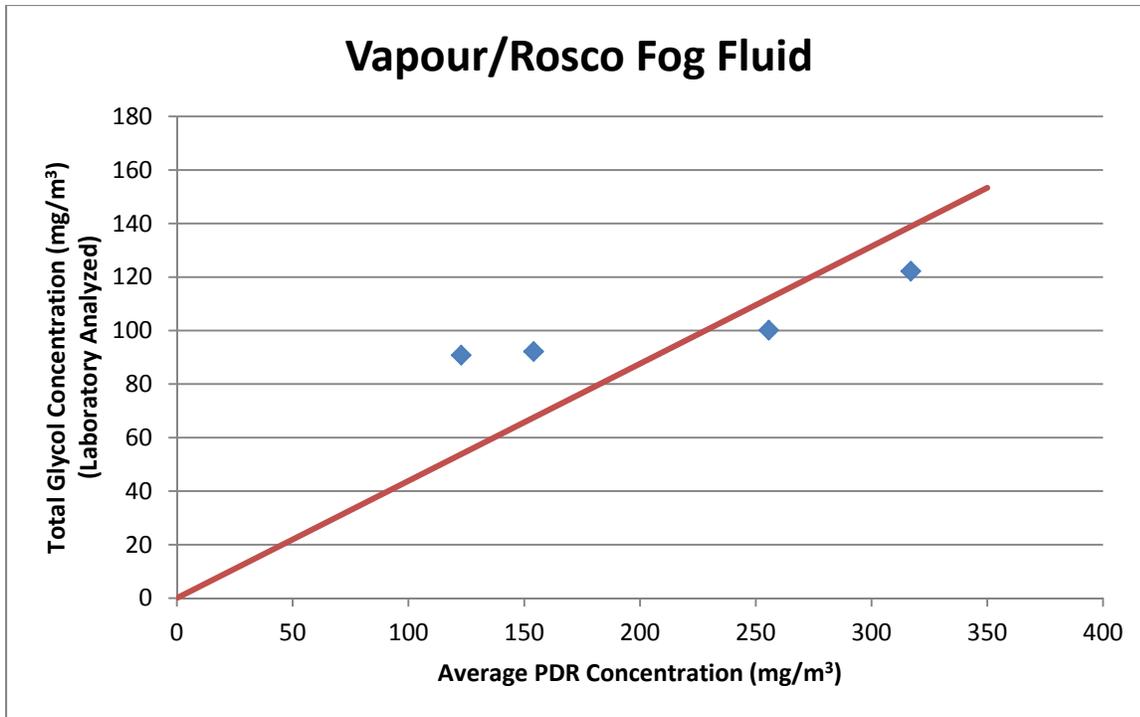
*C* = aerosol monitor calibration factor (mg/m<sup>3</sup>)/ (mg/m<sup>3</sup> aerosol)

$$PDR = \text{aerosol monitor reading, mg/m}^3 \text{ aerosol}$$

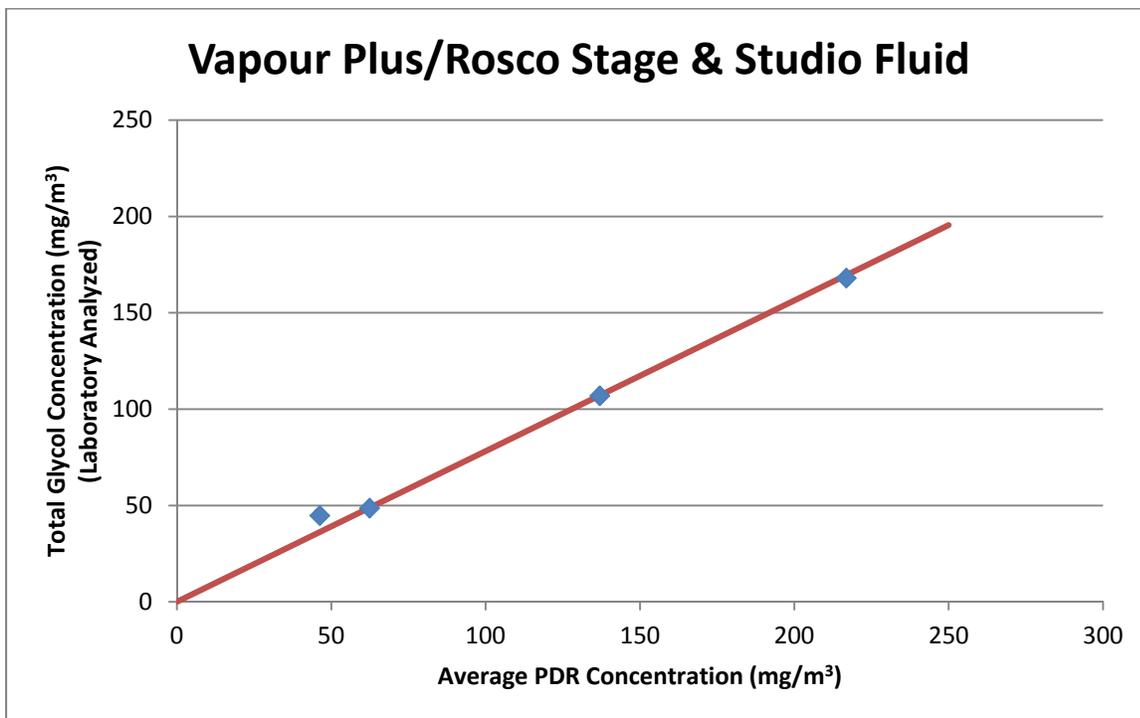
For example, an uncalibrated reading of 100 mg/m<sup>3</sup> on the aerosol monitor would correspond to a glycol concentration of 85 mg/m<sup>3</sup> for the Vapour / Rosco Stage and Studio Fluid combination. These calculated concentrations can then be compared with the peak guidance levels. The peak guidance level for glycols of 40 mg/m<sup>3</sup> would correspond to an uncalibrated aerosol monitor reading of 47.1 mg/m<sup>3</sup> for the Vapour / Rosco Stage and Studio Fluid combination.



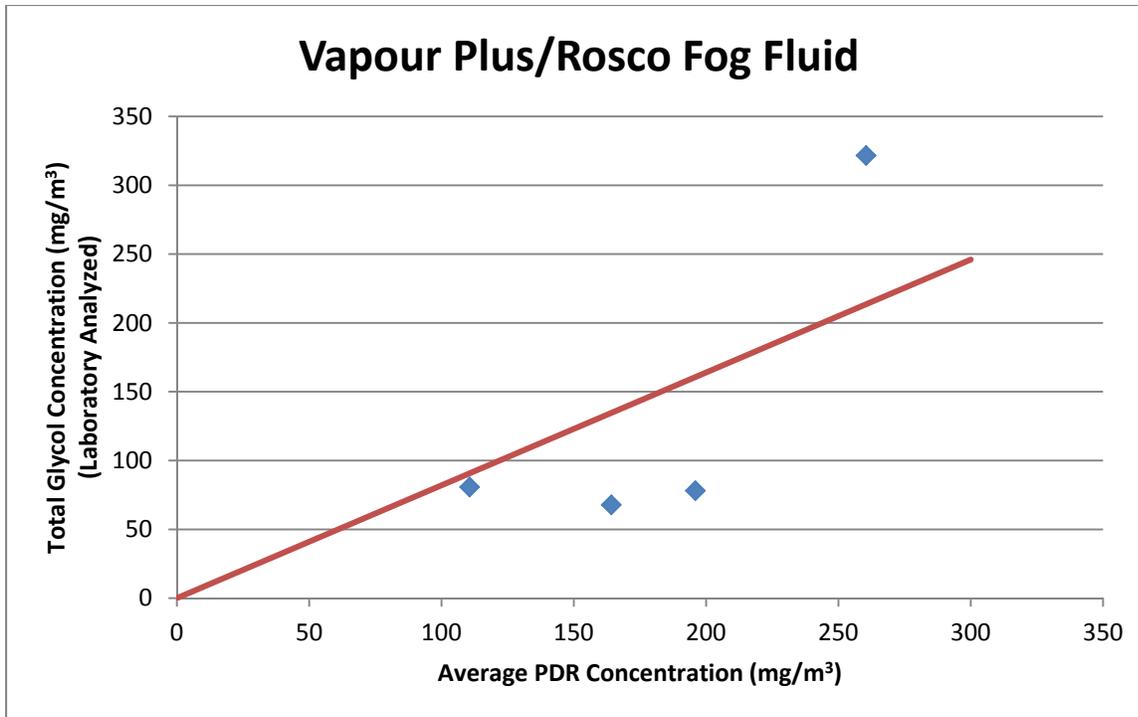
**Figure 3.** Calibration curve for Rosco Stage and Studio Fluid in the Vapour. Calibration factor, based on slope of curve, is 0.85 (mg/m<sup>3</sup> glycol)/ (mg/m<sup>3</sup> aerosol).



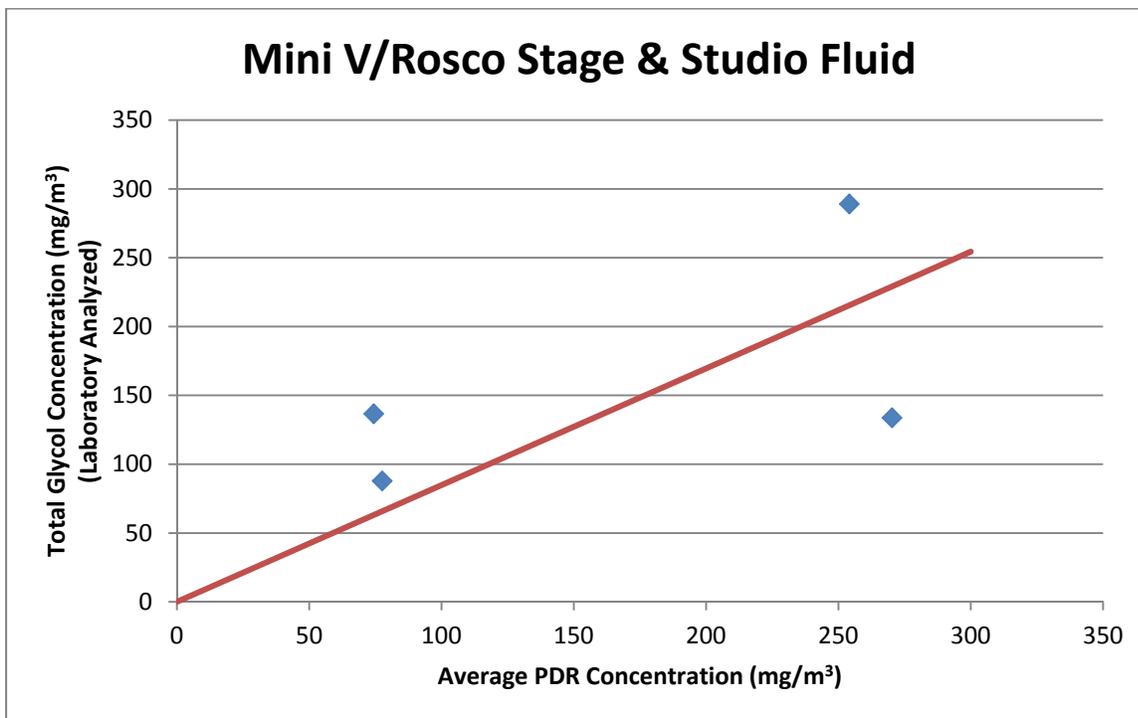
**Figure 4.** Calibration curve for Rosco Fog Fluid in the Vapour. Calibration factor, based on slope of curve, is  $0.44 \text{ (mg/m}^3 \text{ glycol) / (mg/m}^3 \text{ aerosol)}$ .



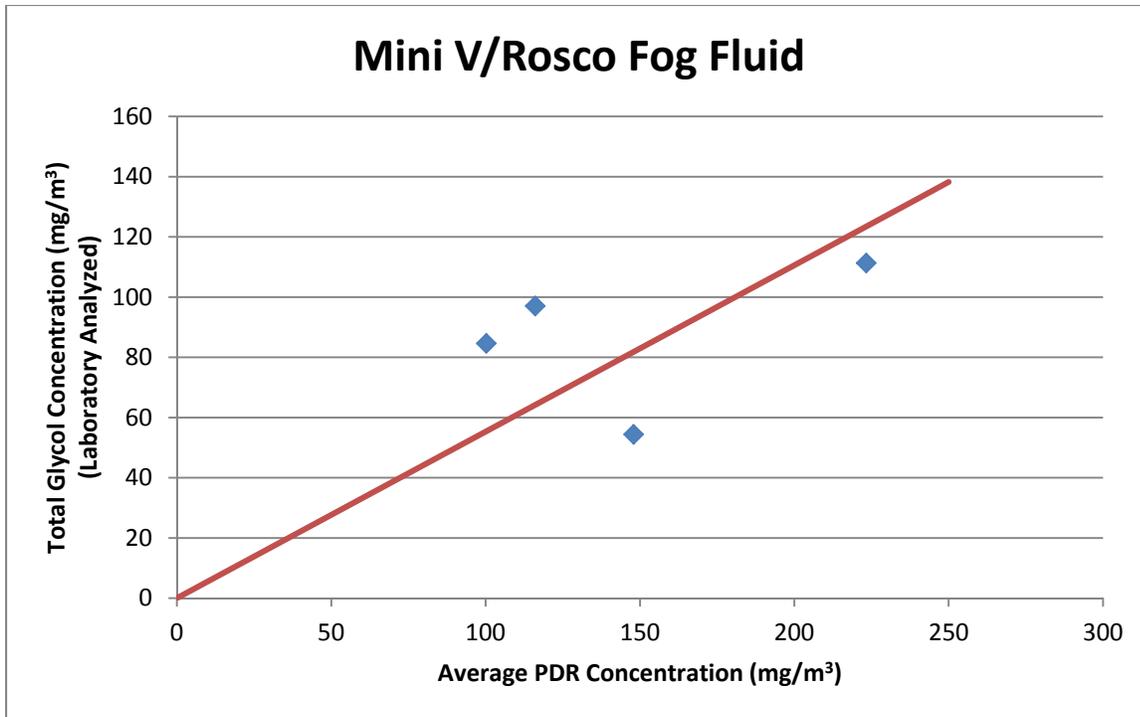
**Figure 5.** Calibration curve for Rosco Stage and Studio Fluid in the Vapour Plus. Calibration factor, based on slope of curve, is  $0.78 \text{ (mg/m}^3 \text{ glycol) / (mg/m}^3 \text{ aerosol)}$ .



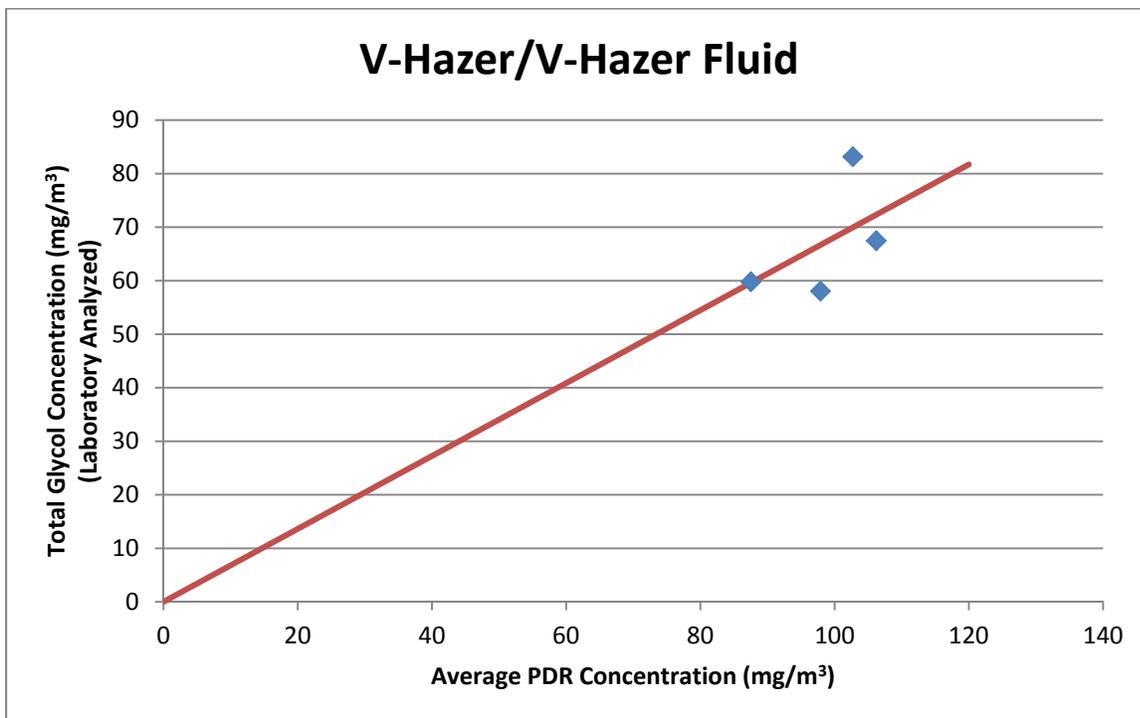
**Figure 6.** Calibration curve for Rosco Fog Fluid in the Vapour Plus. Calibration factor, based on slope of curve, is 0.82 (mg/m<sup>3</sup> glycol)/ (mg/m<sup>3</sup> aerosol).



**Figure 7.** Calibration curve for Rosco Stage and Studio Fluid in the Mini-V. Calibration factor, based on slope of curve, is 0.85 (mg/m<sup>3</sup> glycol)/ (mg/m<sup>3</sup> aerosol).



**Figure 8.** Calibration curve for Rosco Fog Fluid in the Mini-V. Calibration factor, based on slope of curve, is 0.55 (mg/m<sup>3</sup> glycol)/ (mg/m<sup>3</sup> aerosol).



**Figure 9.** Calibration curve for V-Hazer Fluid in the V-Hazer. Calibration factor, based on slope of curve, is 0.68 (mg/m<sup>3</sup> glycol)/ (mg/m<sup>3</sup> aerosol).

### 3.3 Time-and-Distance Guidelines

For various distances from the cue release point, Tables 2 through 8 provide the average time (in seconds) after the end of the cue release after which the glycol concentrations will have fallen below the guidance levels. Thus, in order to prevent peak exposures to actors, the blocking and choreography should be arranged such that actors are not situated within a particular distance from the front of the fog release point until the amount of time listed in Tables 2 through 8 has elapsed following the end of the cue. For example, if a production is using the Vapour with Rosco Stage and Studio Fluid operating at 100% fog output with 10-second cue duration, an actor should not be situated within eight feet from the front of the cue release point until at least 15 seconds following the end of the cue release.

It should be reiterated that the Time-and-Distance Guidelines provided in Tables 2 through 8 are intended to allow a production to use the Vapour, Vapour Plus, Mini-V, and V-Hazer without conducting monitoring. However, these Guidelines may not be appropriate for all productions. Tables 2 through 8 are based on the fog machine being positioned approximately three feet above the ground, and being operated to achieve 5 to 120 seconds of continuous fog generation. Productions may want to use different configurations for positioning the machine (e.g., different heights), provide on-stage ventilation, or generate fog for a shorter or longer period of time. In addition, many productions may have other stage-specific conditions (e.g., on-stage activities and props that enhance dispersion) that would allow actors to be present in areas that are restricted under these Guidelines but which, in fact, do not exceed the guidance levels. In those cases, production-specific monitoring would be recommended to determine whether peak exposure may occur.

TABLE 2 Summary of Time-and-Distance Guidelines for Fog Generation Vapour with Rosco Stage and Studio Fluid						
Release Duration (secs)	Time (in sec) After Which Air Concentrations Are Below Guidance Level (40 mg/m <sup>3</sup> )					
	Machine Setting	8 ft	11 ft	15 ft	20 ft	25 ft
5	100%	10	10	10	0	0
10	100%	15	10	10	0	0
30	100%	15	10	10	0	0
60	100%	25	10	10	0	0
120	100%	30	10	10	0	0
5	75%	10	0	0	0	0
10	75%	15	10	0	0	0
30	75%	15	10	0	0	0
60	75%	15	10	0	0	0
120	75%	30	10	0	0	0
5	50%	10	0	0	0	0
10	50%	15	0	0	0	0
30	50%	15	0	0	0	0
60	50%	15	0	0	0	0
120	50%	20	0	0	0	0
5	25%	0	0	0	0	0

<b>TABLE 2</b> <b>Summary of Time-and-Distance Guidelines for Fog Generation</b> <b>Vapour with Rosco Stage and Studio Fluid</b>						
<b>Release Duration (secs)</b>	<b>Time (in sec) After Which Air Concentrations Are Below Guidance Level (40 mg/m<sup>3</sup>)</b>					
	<b>Machine Setting</b>	<b>8 ft</b>	<b>11 ft</b>	<b>15 ft</b>	<b>20 ft</b>	<b>25 ft</b>
10	25%	10	0	0	0	0
30	25%	10	0	0	0	0
60	25%	15	0	0	0	0
120	25%	15	0	0	0	0

<b>TABLE 3</b> <b>Summary of Time-and-Distance Guidelines for Fog Generation</b> <b>Vapour with Rosco Fog Fluid</b>							
<b>Release Duration (secs)</b>	<b>Machine Setting</b>	<b>Time (in sec) After Which Air Concentrations Are Below Guidance Level (40 mg/m<sup>3</sup>)</b>					
		<b>5 ft</b>	<b>8 ft</b>	<b>10-12 ft</b>	<b>15-16 ft</b>	<b>20 ft</b>	<b>25 ft</b>
5	100%	-	80	40	0	0	0
15	100%	-	80	40	0	0	0
30	100%	-	80	40	0	0	0
60	100%	-	80	40	10	0	0
5	75%	-	50	50	0	0	0
15	75%	-	60	50	0	0	0
30	75%	-	60	50	0	0	0
60	75%	-	90	50	30	10	0
5	50%	60	-	50	0	0	0
15	50%	60	-	50	0	0	0
30	50%	60	-	50	0	0	0
60	50%	60	-	50	20	0	0
120	50%	-	10	0	0	0	0
5	25%	50	-	0	0	0	0
15	25%	50	-	0	0	0	0
30	25%	60	-	0	0	0	0
60	25%	60	-	0	0	0	0
120	25%	60	-	0	0	0	0

<b>TABLE 4</b> <b>Summary of Time-and-Distance Guidelines for Fog Generation</b> <b>Vapour Plus with Rosco Stage and Studio Fluid</b>						
<b>Release Duration (secs)</b>	<b>Time (in sec) After Which Air Concentrations Are Below Guidance Level (40 mg/m<sup>3</sup>)</b>					
	<b>Machine Setting</b>	<b>8 ft</b>	<b>11 ft</b>	<b>15 ft</b>	<b>20 ft</b>	<b>25 ft</b>
5	100%	35	15	15	15	0
10	100%	35	20	15	15	0

<b>TABLE 4</b>						
<b>Summary of Time-and-Distance Guidelines for Fog Generation Vapour Plus with Rosco Stage and Studio Fluid</b>						
<b>Release Duration (secs)</b>	<b>Time (in sec) After Which Air Concentrations Are Below Guidance Level (40 mg/m<sup>3</sup>)</b>					
	<b>Machine Setting</b>	<b>8 ft</b>	<b>11 ft</b>	<b>15 ft</b>	<b>20 ft</b>	<b>25 ft</b>
30	100%	35	25	25	15	15
60	100%	35	30	30	30	30
120*	100%	240	240	160	160	105
5	75%	35	15	15	0	0
10	75%	35	20	15	10	0
30	75%	35	25	25	10	0
60	75%	35	30	30	25	25
120*	75%	240	240	160	160	105
5	50%	20	15	15	0	0
10	50%	20	15	15	10	0
30	50%	30	20	20	10	0
60	50%	35	30	30	15	15
120	50%	240	240	160	95	90
5	25%	20	0	0	0	0
10	25%	20	0	0	0	0
30	25%	20	0	0	0	0
60	25%	20	5	0	0	0
120	25%	45	5	0	0	0

\* Machine shut off two times for approximately 30 seconds total within the 120-second testing timespan

<b>TABLE 5</b>							
<b>Summary of Time-and-Distance Guidelines for Fog Generation Vapour Plus with Rosco Fog Fluid</b>							
<b>Release Duration (secs)</b>	<b>Time (in sec) After Which Air Concentrations Are Below Guidance Level (40 mg/m<sup>3</sup>)</b>						
	<b>Machine Setting</b>	<b>5 ft</b>	<b>8 ft</b>	<b>12 ft</b>	<b>16 ft</b>	<b>20 ft</b>	<b>25 ft</b>
5	100%	-	80	80	80	80	70
15	100%	-	100	100	100	100	70
30	100%	-	100	100	100	100	90
60	100%	-	180	100	100	100	90
5	75%	-	70	70	60	40	10
15	75%	-	100	100	100	100	50
30	75%	-	100	100	100	100	90
60	75%	-	100	100	100	100	90
5	50%	70	-	50	0	0	0
15	50%	70	-	50	30	0	0
30	50%	70	-	50	30	0	0
60	50%	90	-	50	30	0	0
5	25%	0	-	0	0	0	0

TABLE 5 Summary of Time-and-Distance Guidelines for Fog Generation Vapour Plus with Rosco Fog Fluid							
Release Duration (secs)	Time (in sec) After Which Air Concentrations Are Below Guidance Level (40 mg/m <sup>3</sup> )						
	Machine Setting	5 ft	8 ft	12 ft	16 ft	20 ft	25 ft
15	25%	0	-	0	0	0	0
30	25%	0	-	0	0	0	0
60	25%	0	-	0	0	0	0

TABLE 6 Summary of Time-and-Distance Guidelines for Fog Generation Mini-V with Rosco Stage and Studio Fluid						
Release Duration (secs)	Time (in sec) After Which Air Concentrations Are Below Guidance Level (40 mg/m <sup>3</sup> )					
	Machine Setting	8 ft	11 ft	15 ft	20 ft	25 ft
5	On	15	0	0	0	0
10	On	15	15	0	0	0
30	On	15	15	0	0	0
60	On	15	15	0	0	0
120	On	20	15	0	0	0

TABLE 7 Summary of Time-and-Distance Guidelines for Fog Generation Mini-V with Rosco Fog Fluid						
Release Duration (secs)	Time (in sec) After Which Air Concentrations Are Below Guidance Level (40 mg/m <sup>3</sup> )					
	Machine Setting	5 ft	10 ft	15 ft	20 ft	25 ft
S5	On	40	0	0	0	0
15	On	80	30	0	0	0
30	On	80	30	0	0	0
60	On	80	40	0	0	0
120	On	80	40	0	0	0

TABLE 8 Summary of Time-and-Distance Guidelines for Fog Generation V-Hazer with V-Hazer Fluid						
Release Duration (secs)	Time (in sec) After Which Air Concentrations Are Below Guidance Level (40 mg/m <sup>3</sup> )					
	Machine Setting	5 ft	10 ft	15 ft	20 ft	25 ft
5	100%	0	0	0	0	0
10	100%	0	0	0	0	0
30	100%	0	0	0	0	0
60	100%	0	0	0	0	0
120	100%	0	0	0	0	0

<b>TABLE 8</b>						
<b>Summary of Time-and-Distance Guidelines for Fog Generation V-Hazer with V-Hazer Fluid</b>						
<b>Release Duration (secs)</b>	<b>Time (in sec) After Which Air Concentrations Are Below Guidance Level (40 mg/m<sup>3</sup>)</b>					
	<b>Machine Setting</b>	<b>5 ft</b>	<b>10 ft</b>	<b>15 ft</b>	<b>20 ft</b>	<b>25 ft</b>
5	75%	0	0	0	0	0
10	75%	0	0	0	0	0
30	75%	0	0	0	0	0
60	75%	0	0	0	0	0
120	75%	0	0	0	0	0
5	50%	0	0	0	0	0
10	50%	0	0	0	0	0
30	50%	0	0	0	0	0
60	50%	0	0	0	0	0
120	50%	0	0	0	0	0
5	25%	0	0	0	0	0
10	25%	0	0	0	0	0
30	25%	0	0	0	0	0
60	25%	0	0	0	0	0
120	25%	0	0	0	0	0

## 4 References

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- ENVIRON International Corporation (ENVIRON). 2001b. Theatrical Haze and Fog Testing for Mamma Mia!, Winter Garden Theatre. Prepared for Mamma Mia! Broadway and Nina Lannan Associates. November 12.
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## **Appendix A: Safety Data Sheets**



**ROSCO STAGE & STUDIO FLUID**

MSDS No.: ROS007

MSDS Preparation Date: April 15, 2012

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## MATERIAL SAFETY DATA SHEET

### SECTION 1 - PRODUCT AND COMPANY IDENTIFICATION

**Product Name** : **ROSCO STAGE & STUDIO FLUID**

**Product Use** : Fog fluid

**Chemical Family** : Aqueous glycol solution

**Supplier's name and address:**

**Rosco Laboratories Inc.**

52 Harbor View Avenue  
 Stamford, CT, United States  
 06902

**24 Hr. Emergency Tel #** : (800) 424-9300

**HMIS Rating** : \* - Chronic hazard 0 - Minimal 1 - Slight 2 - Moderate 3 - Serious 4 - Severe

*Health:* 1      *Flammability:* 0      *Reactivity:* 0

**WHMIS Classes:**



Unregulated

### SECTION 2 - COMPOSITION/INFORMATION ON INGREDIENTS

<u>Ingredients</u>	<u>CAS #</u>	<u>% (weight)</u>	<u>ACGIH TLV</u>		<u>OSHA PEL</u>	
			<u>TWA</u>	<u>STEL</u>	<u>PEL</u>	<u>STEL</u>
Propylene glycol	57-55-6	N/Av	10 mg/m3	N/Av	50 ppm(total) ; 10 mg/m3 (aerosol)	N/Av
Deionized water	N/Av	N/Av	N/Av	N/Av	N/Av	N/Av

\* Note: The ACGIH TLV listed above for the following ingredient(s) is an AIHA WEEL: Propylene glycol.

### SECTION 3 - HAZARDS IDENTIFICATION

#### EMERGENCY OVERVIEW

Clear, colorless liquid. Faint odor. No special hazards exist with this product. As with any chemical substance, caution and care will prevent unnecessary accidents and safety problems. Read instructions on label before use. **HEALTH CAUTION: Fog from this fluid, like any other common material in an aerosolized state, may be irritating to or cause allergic symptoms in some persons with allergenic sensitivity. Persons with active asthma should limit their exposure to the fog.**

#### \*\*\*POTENTIAL HEALTH EFFECTS\*\*\*

**Target organs** : None reported by the manufacturer.

**Routes of exposure** : *Inhalation:* YES    *Skin Absorption:* NO    *Skin & Eyes:* YES    *Ingestion:* YES

**Potential acute health effects** :

*Eyes:* May cause mild transient irritation.

*Skin:* Not a hazard under normal conditions of use.

*Inhalation:* Inhalation problems are not anticipated. Persons suffering from asthma or reactive airway disorders may experience asthma-like effects from exposure to this material.

*Ingestion:* Not an expected route of entry. Ingestion of large amounts may cause nausea, vomiting, diarrhea, as well as depression of the central nervous system.



**ROSCO STAGE & STUDIO FLUID**

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**Potential chronic health effects**

: None reported by the manufacturer.

**Medical conditions aggravated by overexposure**

: Persons suffering from asthma or reactive airway disorders may experience asthma-like effects from exposure to this material.

**Additional health hazards**

: None reported by the manufacturer.

**Potential environmental effects**

: None reported by the manufacturer.

**SECTION 4 - FIRST AID MEASURES**

**Inhalation**

: Inhalation problems are not anticipated. Remove exposed person to fresh air if adverse effects, such as breathing difficulty arise. If irritation persists, seek prompt medical attention.

**Skin contact**

: Flush skin with large amounts of water. Wash affected areas with soap and water. Remove and wash contaminated clothing before re-use. Obtain medical attention if symptoms develop and persist.

**Eye contact**

: Flush with plenty of water. Lift upper and lower lids during flushing to ensure complete removal of chemical. If irritation persists, seek prompt medical attention.

**Ingestion**

: Ingestion of large amounts may be harmful. Keep at rest. Seek immediate medical attention/advice.

**Notes For Physician**

: Low degree of toxicity. Treat symptomatically.

**SECTION 5 - FIRE FIGHTING MEASURES**

**Fire hazards/conditions of flammability**

: Not flammable under normal conditions of handling.

**Flammability classification (OSHA 29 CFR 1910.1200)**

: Not flammable.

**Flash point**

: Not available.

**Flash point Method**

: Not available.

**Auto-ignition temperature** : Not available.

**Lower flammable limit (% by vol.)**

: Not available.

**Upper flammable limit (% by vol.)**

: Not available.

**Suitable extinguishing media**

: Extinguishing media - large fires: Non-flammable aqueous liquid, all-purpose foam  
Extinguishing media - small fires: Carbon dioxide (CO<sub>2</sub>), Dry chemical.

**Explosion data: Sensitivity to mechanical impact / static discharge**

: Not expected to be sensitive to mechanical impact or static discharge.

**Special fire-fighting procedures/equipment**

: None reported by the manufacturer.

**Hazardous combustion products**

: Oxides of carbon.

**Oxidizing properties**

: None known or reported by the manufacturer.

**SECTION 6 - ACCIDENTAL RELEASE MEASURES**

**Personal precautions**

: Wear suitable protective clothing (see Section 8).

**Environmental precautions**

: No special environmental precautions required.

**Spill response/cleanup**

: Evacuate personnel to safe areas. Restrict access to area until completion of clean-up. Recover free liquid or cover with inert absorbent material and place into appropriate container for disposal. Dispose in accordance with all applicable federal, state, provincial and local regulations. Contact your local, state, provincial or federal environmental agency for specific rules.

**Containment**

: Recover free liquid or cover with inert absorbent material and place into appropriate container for disposal. Dispose in accordance with all applicable federal, state, provincial and local regulations. Contact your local, state, provincial or federal environmental agency for specific rules.



### SECTION 7 - HANDLING AND STORAGE

- Safe Handling procedures** : Do not ingest. Do not inhale aerosol. Avoid contact with skin and eyes. Keep containers tightly closed when not in use. Use with adequate ventilation. Avoid breathing vapors.
- Storage requirements** : Store in a cool, dry, well-ventilated area. Inspect periodically for damage or leaks. Do not freeze. Keep container tightly closed when not in use.
- Incompatible materials** : None known or reported by the manufacturer.
- Special packaging materials** : Liquid-proof glass, plastic or non-corrodible metal containers are recommended.

### SECTION 8 - EXPOSURE CONTROLS AND PERSONAL PROTECTION

- Ventilation and engineering measures** : General mechanical ventilation is sufficient for use with this product.
- Respiratory protection** : None required under normal conditions.
- Skin protection** : None required under normal conditions. Gloves of natural rubber or polyvinyl chloride-coated gloves are recommended.
- Eye / face protection** : None required under normal conditions. If splashing might occur, wear eye protection such as safety glasses with side shields.
- Other protective equipment** : Emergency showers and eyewash facilities should be nearby.
- General hygiene considerations** : Wash hands before breaks and immediately after handling the product. Wash hands before breaks and at the end of workday.

### SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

- |   |   |
|---|---|
| <b>Physical state</b> : Liquid.   | <b>Appearance</b> : Clear, colorless liquid.                  |
| <b>Odor</b> : Faint odor.   | <b>Odor threshold</b> : Not available.                        |
| <b>pH</b> : 7.0 (approximately)   | <b>Specific gravity</b> : 1.02(approximately)                 |
| <b>Boiling point</b> : 100-188 °C   | <b>Coefficient of water/oil distribution</b> : Not available. |
| <b>Melting/Freezing point</b> : Not available.                            | <b>Solubility in water</b> : soluble                          |
| <b>Vapor pressure (mmHg @ 20° C / 68° F)</b> : Not available.             | <b>Evaporation rate (n-Butyl acetate = 1)</b> : Less than 1   |
| <b>Vapor density (Air = 1)</b> : 1.3 (approximately)                      | <b>Volatiles (% by weight)</b> : Not available.               |
| <b>Volatile organic Compounds (VOC's) (lbs/gal; g/l)</b> : Not available. |   |
| <b>Viscosity</b> : Not available.   |   |
- Special Remarks On Fire Hazards** : Not flammable under normal conditions of use.

### SECTION 10 - REACTIVITY AND STABILITY DATA

- Stability and reactivity** : Stable under normal conditions.
- Hazardous polymerization** : Will not occur.
- Conditions to avoid** : None known or reported by the manufacturer.
- Materials To Avoid And Incompatibility** : None known or reported by the manufacturer.
- Hazardous decomposition products** : None.



**ROSCO STAGE & STUDIO FLUID**

MSDS No.: ROS007

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**SECTION 11 - TOXICOLOGICAL INFORMATION**

<u>Ingredients</u>	<u>LC<sub>50</sub>(4hr)</u> <u>inh, rat</u>	<u>LD<sub>50</sub></u>	
		<u>oral</u>	<u>dermal</u>
Propylene glycol	N/Av	20,000 mg/kg (rat)	20,800 mg/kg (rabbit)
Deionized water	N/Av	>90 mL/kg (rat)	N/Av

- Toxicological data** : Low order of toxicity for normal industrial handling.
- Carcinogenic status** : No components are listed as carcinogens by ACGIH, IARC, OSHA or NTP.
- Reproductive effects** : Not expected to have other reproductive effects.
- Teratogenicity** : Not expected to be a teratogen.
- Mutagenicity** : Not expected to be mutagenic in humans.
- Reproductive Effects** : Not expected to have other reproductive effects.
- Irritancy** : Prolonged skin contact may cause skin irritation.
- Sensitization to material** : Not expected to be a sensitizer.
- Synergistic materials** : None reported by the manufacturer.

**SECTION 12 - ECOLOGICAL INFORMATION**

- Environmental effects** : None known or reported by the manufacturer. However, it is recommended not to allow the material to enter the environment.
- Important environmental characteristics** : None known or reported by the manufacturer.
- Ecotoxicological** : No data is available on the product itself.

**SECTION 13 - DISPOSAL CONSIDERATIONS**

- Handling for Disposal** : See Section 7 (Handling and Storage) section for further details.
- Methods of Disposal** : Contact waste disposal services. Dispose in accordance with all applicable federal, state, provincial and local regulations. Contact your local, state, provincial or federal environmental agency for specific rules.

**SECTION 14 - TRANSPORTATION INFORMATION**

Regulatory Information	UN Number	Shipping Name	Class	Packing Group	Label
TDG	None	Not regulated.	Not regulated	-None-	
<b>TDG Additional information</b>	None.				
49CFR/DOT	None	Not regulated.	Not regulated	-None-	
<b>49CFR/DOT Additional information</b>	None.				
ICAO/IATA	None	Not regulated.	Not regulated	-None-	
<b>ICAO/IATA Additional information</b>	None.				



April 15, 2012

**ROSCO STAGE & STUDIO FLUID**

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IMDG	None	Not regulated.	Not regulated	-None-	
<b>IMDG Additional information</b>	None.				

**SECTION 15 - REGULATORY INFORMATION**

**US Federal Information:**

TSCA: All listed ingredients appear on the Toxic Substances Control Act (TSCA) inventory.  
 SARA Section 313: This material is not subject to SARA notification requirements, since it does not contain any Toxic Chemical Constituents above de minimus concentrations.

**US State Right to Know Laws:**

California Proposition 65: To the best of our knowledge, this product does not contain any chemicals known to the State of California to cause cancer or reproductive harm.

**Canadian Regulations:**

Canadian Environmental Protection Act (CEPA) information: All ingredients listed appear on the Domestic Substances List (DSL).

Canadian WHMIS Classification: Not regulated.

***This product has been classified according to the hazard criteria of the CPR and the MSDS contains all of the information required by the CPR.***

**SECTION 16 - OTHER INFORMATION**

- Legend** : ACGIH: American Conference of Governmental Industrial Hygienists  
 IARC: International Agency for Research on Cancer  
 N/Ap: not applicable  
 N/Av: not available  
 NIOSH: National Institute of Occupational Safety and Health  
 NTP: National Toxicology Program  
 OSHA: Occupational Safety and Health Administration
- References** : Information obtained from sources including original supplier's Material Safety Data Sheet, and references including RTECS and CCOHS Cheminfo.

<p><b><u>Prepared for:</u></b>          Rosco Laboratories Inc.          52 Harbor View Avenue          Stamford, CT, USA, 06902          Phone: (203) 708 8900  <a href="http://www.rosco.com/">http://www.rosco.com/</a></p>	
<p><b><u>Prepared by:</u></b>          ICC The Compliance Center Inc.          Canada: 1-888-977-4834          USA: 1-888-442-9628  <a href="http://www.thecompliancecenter.com">http://www.thecompliancecenter.com</a></p>	

**DISCLAIMER OF LIABILITY**

Every effort has been made to ensure that the safety information on this sheet is accurate, but because Rosco Laboratories, Inc. has no control over the conditions under which the product will be used, liability is limited exclusively to replacement or refund of the purchase price of this product. Except as stated herein, there are no express or implied warranties, including implied warranties of merchantability or fitness for a particular purpose. Rosco Laboratories, Inc. assumes no liability for injury or incidental or consequential damages arising out of storage, handling or use of this product.

Preparation Date:

**END OF DOCUMENT**



**ROSCO FOG FLUID & ROSCO SMOKE SIMULATION FLUID**

MSDS No.: ROS002

MSDS Preparation Date: April 15, 2012

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**MATERIAL SAFETY DATA SHEET**

**SECTION 1 - PRODUCT AND COMPANY IDENTIFICATION**

**Product Name** : **ROSCO FOG FLUID & ROSCO SMOKE SIMULATION FLUID**

**Product Use** : Fog fluid

**Chemical Family** : Aqueous glycol solution

**Supplier's name and address:**

**Rosco Laboratories Inc.**

52 Harbor View Avenue  
Stamford, CT, United States  
06902

**24 Hr. Emergency Tel #** : (800) 424-9300

**HMIS Rating** : \* - Chronic hazard 0 - Minimal 1 - Slight 2 - Moderate 3 - Serious 4 - Severe

*Health:* 1 *Flammability:* 0 *Reactivity:* 0

**WHMIS Classes:**



Unregulated

**SECTION 2 - COMPOSITION/INFORMATION ON INGREDIENTS**

<u>Ingredients</u>	<u>CAS #</u>	<u>% (weight)</u>	<u>ACGIH TLV</u>		<u>OSHA PEL</u>	
			<u>TWA</u>	<u>STEL</u>	<u>PEL</u>	<u>STEL</u>
Triethylene glycol	112-27-6	N/Av	N/Av	N/Av	N/Av	N/Av
1,3-Butylene glycol	107-88-0	N/Av	N/Av	N/Av	N/Av	N/Av
Propylene glycol	57-55-6	N/Av	10 mg/m3	N/Av	50 ppm(total) ; 10 mg/m3 (aerosol)	N/Av
Deionized water	N/Av	N/Av	N/Av	N/Av	N/Av	N/Av

\* Note: The ACGIH TLV listed above for the following ingredient(s) is an AIHA WEEL: Propylene glycol.

**SECTION 3 - HAZARDS IDENTIFICATION**

**EMERGENCY OVERVIEW**

Green liquid. Faint odor. No special hazards exist with this product. As with any chemical substance, caution and care will prevent unnecessary accidents and safety problems. Read instructions on label before use. **HEALTH CAUTION: Fog from this fluid, like any other common material in an aerosolized state, may be irritating to or cause allergic symptoms in some persons with allergic sensitivity. Persons with active asthma should limit their exposure to the fog.**

**\*\*\*POTENTIAL HEALTH EFFECTS\*\*\***

**Target organs** : None reported by the manufacturer.

**Routes of exposure** : *Inhalation:* YES *Skin Absorption:* NO *Skin & Eyes:* YES *Ingestion:* YES

**Potential acute health effects** :

*Eyes:* May cause mild transient irritation.

*Skin:* May cause irritation.



**ROSCO FOG FLUID & ROSCO SMOKE SIMULATION FLUID**

MSDS No.: ROS002

MSDS Preparation Date: April 15, 2012

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*Inhalation:* Can cause irritation of the respiratory tract. Persons suffering from asthma or reactive airway disorders may experience asthma-like effects from exposure to this material.

*Ingestion:* Not an expected route of entry. Ingestion of large amounts may cause nausea, vomiting, diarrhea, as well as depression of the central nervous system.

**Potential chronic health effects**

: None reported by the manufacturer.

**Medical conditions aggravated by overexposure**

: Pre-existing skin and respiratory disorders.

**Additional health hazards**

: None reported by the manufacturer.

**Potential environmental effects**

: None reported by the manufacturer.

**SECTION 4 - FIRST AID MEASURES**

**Inhalation** : Inhalation problems are not anticipated. Remove exposed person to fresh air if adverse effects, such as breathing difficulty arise. If irritation persists, seek prompt medical attention.

**Skin contact** : Flush skin with large amounts of water. Wash affected areas with soap and water. Remove and wash contaminated clothing before re-use. Obtain medical attention if symptoms develop and persist.

**Eye contact** : If in eyes, rinse with water for 15 minutes. Lift upper and lower lids during flushing to ensure complete removal of chemical. If irritation persists, seek prompt medical attention.

**Ingestion** : Ingestion of large amounts may be harmful. Keep at rest. Seek immediate medical attention/advice.

**Notes For Physician** : Low degree of toxicity. Treat symptomatically.

**SECTION 5 - FIRE FIGHTING MEASURES**

**Fire hazards/conditions of flammability**

: Not flammable under normal conditions of handling.

**Flammability classification (OSHA 29 CFR 1910.1200)**

: Not flammable.

**Flash point**

: Not available.

**Flash point Method**

: Not available.

**Auto-ignition temperature** : Not available.

**Lower flammable limit (% by vol.)**

: Not available.

**Upper flammable limit (% by vol.)**

: Not available.

**Suitable extinguishing media**

: Extinguishing media - large fires: Non-flammable aqueous liquid, all-purpose foam  
Extinguishing media - small fires: Carbon dioxide (CO<sub>2</sub>), Dry chemical.

**Explosion data: Sensitivity to mechanical impact / static discharge**

: Not expected to be sensitive to mechanical impact or static discharge.

**Special fire-fighting procedures/equipment**

: None reported by the manufacturer.

**Hazardous combustion products**

: Oxides of carbon.

**Oxidizing properties**

: None known or reported by the manufacturer.

**SECTION 6 - ACCIDENTAL RELEASE MEASURES**

**Personal precautions** : Wear suitable protective clothing (see Section 8).

**Environmental precautions** : No special environmental precautions required.

**Spill response/clean-up** : Evacuate personnel to safe areas. Restrict access to area until completion of clean-up. Recover free liquid or cover with inert absorbent material and place into appropriate container for disposal. Dispose in accordance with all applicable federal, state, provincial and local regulations. Contact your local, state, provincial or federal environmental agency for specific rules.



**ROSCO FOG FLUID & ROSCO SMOKE SIMULATION FLUID**

MSDS No.: ROS002

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**Containment** : Recover free liquid or cover with inert absorbent material and place into appropriate container for disposal. Dispose in accordance with all applicable federal, state, provincial and local regulations. Contact your local, state, provincial or federal environmental agency for specific rules.

**SECTION 7 - HANDLING AND STORAGE**

**Safe Handling procedures** : Do not ingest. Do not inhale aerosol. Avoid contact with skin and eyes. Keep containers tightly closed when not in use. Use with adequate ventilation. Avoid breathing vapors.

**Storage requirements** : Store in a cool, dry, well-ventilated area. Inspect periodically for damage or leaks. Do not store near any incompatible materials (see Section 10). Do not freeze. Keep container tightly closed when not in use.

**Incompatible materials** : Strong oxidizing agents and acids.

**Special packaging materials** : Liquid-proof glass, plastic or non-corrodible metal containers are recommended.

**SECTION 8 - EXPOSURE CONTROLS AND PERSONAL PROTECTION**

**Ventilation and engineering measures**

: General mechanical ventilation is sufficient for use with this product.

**Respiratory protection** : None required under normal conditions.

**Skin protection** : None required under normal conditions. Gloves of natural rubber or polyvinyl chloride-coated gloves are recommended.

**Eye / face protection** : None required under normal conditions. If splashing might occur, wear eye protection such as safety glasses with side shields.

**Other protective equipment** : Emergency showers and eyewash facilities should be nearby.

**General hygiene considerations** : Wash hands before breaks and immediately after handling the product. Wash hands before breaks and at the end of workday.

**SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES**

<b>Physical state</b> : Liquid.	<b>Appearance</b> : Green liquid.
<b>Odor</b> : Faint odor.	<b>Odor threshold</b> : Not available.
<b>pH</b> : 7.0 (approximately)	
<b>Boiling point</b> : 100-243 °C	<b>Specific gravity</b> : 1.12 (approximately)
<b>Melting/Freezing point</b> : Not available.	<b>Coefficient of water/oil distribution</b> : Not available.
<b>Vapor pressure (mmHg @ 20° C / 68° F)</b> : 8.4 (approximately)	<b>Solubility in water</b> : soluble
<b>Vapor density (Air = 1)</b> : 2.9	<b>Evaporation rate (n-Butyl acetate = 1)</b> : 0.01
<b>Volatile organic Compounds (VOC's) (lbs/gal; g/l)</b> : Not available.	<b>Volatiles (% by weight)</b> : Not available.
<b>Viscosity</b> : Not available.	

**Special Remarks On Fire Hazards** : Not flammable under normal conditions of use.

**SECTION 10 - REACTIVITY AND STABILITY DATA**

**Stability and reactivity** : Stable under normal conditions.

**Hazardous polymerization** : Will not occur.

**Conditions to avoid** : Combination with strong oxidizers and/or acids may cause explosive decomposition.

**Materials To Avoid And Incompatibility** : Strong oxidizing agents and acids.

**Hazardous decomposition products**



**ROSCO FOG FLUID & ROSCO SMOKE SIMULATION FLUID**

MSDS No.: ROS002

MSDS Preparation Date: April 15, 2012

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: None.

**SECTION 11 - TOXICOLOGICAL INFORMATION**

<u>Ingredients</u>	<u>LC<sub>50</sub>(4hr)</u> <u>inh, rat</u>	<u>LD<sub>50</sub></u>	
		<u>oral</u>	<u>dermal</u>
Triethylene glycol	N/Av	12,800 mg/kg (rat)	22,460 mg/kg (rabbit)
1,3-Butylene glycol	N/Av	18610 mg/kg (rat)	> 20000 mg/kg (rabbit)
Propylene glycol	N/Av	20,000 mg/kg (rat)	20,800 mg/kg (rabbit)
Deionized water	N/Av	>90 mL/kg (rat)	N/Av

- Toxicological data** : Low order of toxicity for normal industrial handling.  
**Carcinogenic status** : No components are listed as carcinogens by ACGIH, IARC, OSHA or NTP.  
**Reproductive effects** : Not expected to have other reproductive effects.  
**Teratogenicity** : Not expected to be a teratogen.  
**Mutagenicity** : Not expected to be mutagenic in humans.  
**Reproductive Effects** : Not expected to have other reproductive effects.  
**Irritancy** : Direct contact may cause mild eye irritation. Possible inhalation irritant. Irritating to skin.  
**Sensitization to material** : Not expected to be a sensitizer.  
**Synergistic materials** : None reported by the manufacturer.

**SECTION 12 - ECOLOGICAL INFORMATION**

- Environmental effects** : None known or reported by the manufacturer. However, it is recommended not to allow the material to enter the environment.  
**Important environmental characteristics** : None known or reported by the manufacturer.  
**Ecotoxicological** : No data is available on the product itself.

**SECTION 13 - DISPOSAL CONSIDERATIONS**

- Handling for Disposal** : See Section 7 (Handling and Storage) section for further details.  
**Methods of Disposal** : Contact waste disposal services. Dispose in accordance with all applicable federal, state, provincial and local regulations. Contact your local, state, provincial or federal environmental agency for specific rules.

**SECTION 14 - TRANSPORTATION INFORMATION**

<b>Regulatory Information</b>	<b>UN Number</b>	<b>Shipping Name</b>	<b>Class</b>	<b>Packing Group</b>	<b>Label</b>
TDG	None	Not regulated.	Not regulated	-None-	
<b>TDG Additional information</b>	None.				
49CFR/DOT	None	Not regulated.	Not regulated	-None-	
<b>49CFR/DOT Additional information</b>	None.				



**ROSCO FOG FLUID & ROSCO SMOKE SIMULATION FLUID**

MSDS No.: ROS002

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ICAO/IATA	None	Not regulated.	Not regulated	-None-	
<b>ICAO/IATA Additional information</b>	None.				
IMDG	None	Not regulated.	Not regulated	-None-	
<b>IMDG Additional information</b>	None.				

**SECTION 15 - REGULATORY INFORMATION**

**US Federal Information:**

TSCA: All listed ingredients appear on the Toxic Substances Control Act (TSCA) inventory.  
 SARA Section 313: This material is not subject to SARA notification requirements, since it does not contain any Toxic Chemical Constituents above de minimus concentrations.

**US State Right to Know Laws:**

California Proposition 65: To the best of our knowledge, this product does not contain any chemicals known to the State of California to cause cancer or reproductive harm.

**Canadian Regulations:**

Canadian Environmental Protection Act (CEPA) information: All ingredients listed appear on the Domestic Substances List (DSL).  
 Canadian WHMIS Classification: Not regulated.

***This product has been classified according to the hazard criteria of the CPR and the MSDS contains all of the information required by the CPR.***

**SECTION 16 - OTHER INFORMATION**

- Legend**
- : ACGIH: American Conference of Governmental Industrial Hygienists
  - IARC: International Agency for Research on Cancer
  - N/Ap: not applicable
  - N/Av: not available
  - NIOSH: National Institute of Occupational Safety and Health
  - NTP: National Toxicology Program
  - OSHA: Occupational Safety and Health Administration
- References**
- : Information obtained from sources including original supplier's Material Safety Data Sheet, and references including RTECS and CCOHS Cheminfo.

<p><b>Prepared for:</b>          Rosco Laboratories Inc.          52 Harbor View Avenue          Stamford, CT, USA, 06902          Phone: (203) 708 8900  <a href="http://http://www.rosco.com/">http://http://www.rosco.com/</a></p>	
<p><b>Prepared by:</b>          ICC The Compliance Center Inc.          Canada: 1-888-977-4834          USA: 1-888-442-9628  <a href="http://www.thecompliancecenter.com">http://www.thecompliancecenter.com</a></p>	



**Rosco Laboratories Inc.**

52 Harbor View Avenue  
Stamford, CT, USA, 06902  
Phone: (203) 708 8900

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**ROSCO FOG FLUID & ROSCO SMOKE SIMULATION FLUID**

MSDS No.:ROS002

**MSDS Preparation Date:** April 15, 2012

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**DISCLAIMER OF LIABILITY**

Every effort has been made to ensure that the safety information on this sheet is accurate, but because Rosco Laboratories, Inc. has no control over the conditions under which the product will be used, liability is limited exclusively to replacement or refund of the purchase price of this product. Except as stated herein, there are no express or implied warranties, including implied warranties of merchantability or fitness for a particular purpose. Rosco Laboratories, Inc. assumes no liability for injury or incidental or consequential damages arising out of storage, handling or use of this product.

**Preparation Date:**

**END OF DOCUMENT**



**ROSCO V-HAZER FLUID**

MSDS No.: ROS046

MSDS Preparation Date: May 28, 2014

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## MATERIAL SAFETY DATA SHEET

### SECTION 1 - PRODUCT AND COMPANY IDENTIFICATION

**Product Name** : **V-HAZER FLUID Series 20008800xxxx**

**Product Use** : Haze fluid

**Chemical Family** : Aqueous glycol solution

**Supplier's name and address:**

**Rosco Laboratories Inc.**

52 Harbor View Avenue  
 Stamford, CT, United States  
 06902

**24 Hr. Emergency Tel #** : (800) 424-9300

**HMIS Rating** : \* - Chronic hazard 0 - Minimal 1 - Slight 2 - Moderate 3 - Serious 4 - Severe

*Health:* 1      *Flammability:* 0      *Reactivity:* 0

**WHMIS Classes:**



Unregulated

### SECTION 2 - COMPOSITION/INFORMATION ON INGREDIENTS

<u>Ingredients</u>	<u>CAS #</u>	<u>% (weight)</u>	<u>ACGIH TLV</u>		<u>OSHA PEL</u>	
			<u>TWA</u>	<u>STEL</u>	<u>PEL</u>	<u>STEL</u>
Water	7732-18-5	N/Av	N/Av	N/Av	N/Av	N/Av
Triethylene glycol	112-27-6	N/Av	N/Av	N/Av	N/Av	N/Av
Propylene glycol	57-55-6	N/Av	10 mg/m3	N/Av	50 ppm(total) ; 10 mg/m3 (aerosol)	N/Av

\* Note: The ACGIH TLV listed above for the following ingredient(s) is an AIHA WEEL: Propylene glycol

### SECTION 3 - HAZARDS IDENTIFICATION

#### EMERGENCY OVERVIEW

Clear, colorless liquid. No odor. No special hazards exist with this product. As with any chemical substance, caution and care will prevent unnecessary accidents and safety problems. Read instructions on label before use. **HEALTH CAUTION: Fog from this fluid, like any other common material in an aerosolized state, may be irritating to or cause allergic symptoms in some persons with allergenic sensitivity. Persons with active asthma should limit their exposure to the fog.**

#### \*\*\*POTENTIAL HEALTH EFFECTS\*\*\*

**Target organs** : None reported by the manufacturer.

**Routes of exposure** : *Inhalation:* YES    *Skin Absorption:* NO    *Skin & Eyes:* YES    *Ingestion:* YES

**Potential acute health effects** :

*Eyes:* May cause mild transient irritation.

*Skin:* Not a hazard under normal conditions of use.



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*Inhalation:* Inhalation problems are not anticipated. Prolonged exposure to high vapor or aerosol concentrations may cause: Possible transient irritation. Persons suffering from asthma or reactive airway disorders may experience asthma-like effects from exposure to this material.

*Ingestion:* Not an expected route of entry. Ingestion of large amounts may cause nausea, vomiting, diarrhea, as well as depression of the central nervous system.

**Potential chronic health effects**

: None reported by the manufacturer.

**Medical conditions aggravated by overexposure**

: Pre-existing skin and respiratory disorders.

**Additional health hazards**

: None reported by the manufacturer.

**Potential environmental effects**

: None reported by the manufacturer.

**SECTION 4 - FIRST AID MEASURES**

- Inhalation** : Inhalation problems are not anticipated. Remove exposed person to fresh air if adverse effects, such as breathing difficulty arise. If irritation persists, seek prompt medical attention.
- Skin contact** : Flush skin with large amounts of water. Take off contaminated clothing and shoes immediately. Wash affected areas with soap and water. Wash clothing and decontaminate shoes before reuse. Obtain medical attention if symptoms develop and persist.
- Eye contact** : Rinse immediately with plenty of water for at least 15 minutes. Lift upper and lower lids during flushing to ensure complete removal of chemical. If irritation persists, seek prompt medical attention.
- Ingestion** : Do NOT induce vomiting. Call a physician or Poison Control Centre immediately. Never give anything by mouth to an unconscious person. Drink 1 or 2 glasses of water. Keep at rest.
- Notes For Physician** : Low degree of toxicity. Treat symptomatically.

**SECTION 5 - FIRE FIGHTING MEASURES**

**Fire hazards/conditions of flammability**

: Not flammable under normal conditions of handling.

**Flammability classification (OSHA 29 CFR 1910.1200)**

: Not flammable.

**Flash point**

: Not available.

**Flash point Method**

: Not available.

**Auto-ignition temperature** : Not available.

**Lower flammable limit (% by vol.)**

: Not available.

**Upper flammable limit (% by vol.)**

: Not available.

**Suitable extinguishing media**

: Dry chemical, alcohol foam, carbon dioxide, or water spray. Halogenated compounds.

**Explosion data: Sensitivity to mechanical impact / static discharge**

: Not expected to be sensitive to mechanical impact or static discharge.

**Special fire-fighting procedures/equipment**

: Firefighters should wear full-face, self-contained breathing apparatus (MSHA / NIOSH approved or the equivalent) and impervious clothing.

**Hazardous combustion products**

: Carbon dioxide, carbon monoxide and other unidentified organic compounds.

**Oxidizing properties**

: None known or reported by the manufacturer.

**SECTION 6 - ACCIDENTAL RELEASE MEASURES**

- Personal precautions** : Wear suitable protective clothing (see Section 8).
- Environmental precautions** : If necessary, dike well ahead of the spill to prevent runoff into drains, sewers, or any natural waterway or drinking supply.



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- Spill response/cleanup** : Evacuate personnel to safe areas. Restrict access to area until completion of clean-up. Contain spilled material. Recover free liquid or cover with inert absorbent material and place into appropriate container for disposal. Dispose in accordance with all applicable federal, state, provincial and local regulations. Contact your local, state, provincial or federal environmental agency for specific rules.
- Containment** : Recover free liquid or cover with inert absorbent material and place into appropriate container for disposal. Dispose in accordance with all applicable federal, state, provincial and local regulations. Contact your local, state, provincial or federal environmental agency for specific rules.

**SECTION 7 - HANDLING AND STORAGE**

- Safe Handling procedures** : Do not ingest. Do not inhale aerosol. Avoid contact with skin and eyes. Keep containers tightly closed when not in use. Use with adequate ventilation. Avoid breathing vapors.
- Storage requirements** : Store in a cool, dry, well-ventilated area. Inspect periodically for damage or leaks. Do not store near any incompatible materials (see Section 10). Do not freeze. Keep container tightly closed when not in use. Keep away from children. Do not store near food, foodstuffs, drugs, or potable water supplies.
- Incompatible materials** : Strong oxidizing agents and acids.
- Special packaging materials** : Liquid-proof glass, plastic or non-corrodible metal containers are recommended.

**SECTION 8 - EXPOSURE CONTROLS AND PERSONAL PROTECTION**

- Ventilation and engineering measures** : General mechanical ventilation is sufficient for use with this product. Local ventilation is recommended if the product is misted or used in a confined space, or if the TLV is exceeded.
- Respiratory protection** : None required under normal conditions. If the TLV is exceeded, a NIOSH/MSHA-approved respirator is advised.
- Skin protection** : None required under normal conditions. Gloves of natural rubber or polyvinyl chloride-coated gloves are recommended.
- Eye / face protection** : None required under normal conditions. If splashing might occur, wear eye protection such as safety glasses with side shields.
- Other protective equipment** : Emergency showers and eyewash facilities should be nearby.
- General hygiene considerations** : Wash hands before breaks and immediately after handling the product. Wash hands before breaks and at the end of workday.

**SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES**

- |  |   |   |                            |
|--|---|---|----------------------------|
| <b>Physical state</b>                                    | : Liquid.                                       | <b>Appearance</b>                             | : Clear, colorless liquid. |
| <b>Odor</b>  | : No odor.                                      | <b>Odor threshold</b>                         | : Not available.           |
| <b>pH</b>  | : 7.0 (approximately)                           |   |                            |
| <b>Boiling point</b>                                     | : 100-243.3 °C                                  | <b>Specific gravity</b>                       | : 1.12(approximately)      |
| <b>Melting/Freezing point</b>                            | : Not available.                                | <b>Coefficient of water/oil distribution</b>  | : Not available.           |
| <b>Vapor pressure (mmHg @ 20° C / 68° F)</b>             | : 8.40  | <b>Solubility in water</b>                    | : soluble                  |
| <b>Vapor density (Air = 1)</b>                           | : Not available.                                | <b>Evaporation rate (n-Butyl acetate = 1)</b> | : 0.01                     |
| <b>Volatile organic Compounds (VOC's) (lbs/gal; g/l)</b> | : Not available.                                | <b>Volatiles (% by weight)</b>                | : Not available.           |
| <b>Viscosity</b>   | : Not available.                                |   |                            |
| <b>Special Remarks On Fire Hazards</b>                   | : Not flammable under normal conditions of use. |   |                            |



**SECTION 10 - REACTIVITY AND STABILITY DATA**

- Stability and reactivity** : Stable under normal conditions.
- Hazardous polymerization** : Will not occur.
- Conditions to avoid** : Combination with strong oxidizers and/or acids may cause explosive decomposition.
- Materials To Avoid And Incompatibility** : Strong oxidizing agents and acids.
- Hazardous decomposition products** : Carbon monoxide, carbon dioxide, aldehydes, ketones, and hydrocarbons.

**SECTION 11 - TOXICOLOGICAL INFORMATION**

<u>Ingredients</u>	<u>LC<sub>50</sub>(4hr)</u> <u>inh, rat</u>	<u>LD<sub>50</sub></u>	
		<u>oral</u>	<u>dermal</u>
Water	N/Av	>90 mL/kg (rat)	N/Av
Triethylene glycol	N/Av	12,800 mg/kg (rat)	22,460 mg/kg (rabbit)
Propylene glycol	N/Av	20,000 mg/kg (rat)	20,800 mg/kg (rabbit)

- Toxicological data** : Low order of toxicity for normal industrial handling.
- Carcinogenic status** : No components are listed as carcinogens by ACGIH, IARC, OSHA or NTP.
- Reproductive effects** : Not expected to have other reproductive effects.
- Teratogenicity** : Not expected to be a teratogen.
- Mutagenicity** : Not expected to be mutagenic in humans.
- Reproductive Effects** : Not expected to have other reproductive effects.
- Irritancy** : Direct contact may cause mild eye irritation. Possible inhalation irritant.
- Sensitization to material** : Not expected to be a sensitizer.
- Synergistic materials** : None reported by the manufacturer.

**SECTION 12 - ECOLOGICAL INFORMATION**

- Environmental effects** : None known or reported by the manufacturer. However, it is recommended not to allow the material to enter the environment.
- Important environmental characteristics** : Expected to be ultimately biodegradable
- Ecotoxicological** : Not expected to be harmful to aquatic organisms. The bioconcentration potential is low.

**SECTION 13 - DISPOSAL CONSIDERATIONS**

- Handling for Disposal** : See Section 7 (Handling and Storage) section for further details.
- Methods of Disposal** : Contact waste disposal services. Dispose in accordance with all applicable federal, state, provincial and local regulations. Contact your local, state, provincial or federal environmental agency for specific rules. Do not reuse container except for storage and shipment of the original product.

**SECTION 14 - TRANSPORTATION INFORMATION**

<b>Regulatory Information</b>	<b>UN Number</b>	<b>Shipping Name</b>	<b>Class</b>	<b>Packing Group</b>	<b>Label</b>
TDG	None	Not regulated.	Not regulated	-None-	



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<b>TDG Additional information</b>	None.				
49CFR/DOT	None	Not regulated.	Not regulated	-None-	
<b>49CFR/DOT Additional information</b>	None.				
ICAO/IATA	None	Not regulated.	Not regulated	-None-	
<b>ICAO/IATA Additional information</b>	None.				
IMDG	None	Not regulated.	Not regulated	-None-	
<b>IMDG Additional information</b>	None.				

**SECTION 15 - REGULATORY INFORMATION**

**US Federal Information:**

TSCA: All listed ingredients appear on the Toxic Substances Control Act (TSCA) inventory.  
 SARA Section 313: This material is not subject to SARA notification requirements, since it does not contain any Toxic Chemical Constituents above de minimus concentrations.

**US State Right to Know Laws:**

California Proposition 65: To the best of our knowledge, this product does not contain any chemicals known to the State of California to cause cancer or reproductive harm.

**Canadian Regulations:**

Canadian Environmental Protection Act (CEPA) information: All ingredients listed appear on the Domestic Substances List (DSL).  
 Canadian WHMIS Classification: Not regulated.

***This product has been classified according to the hazard criteria of the CPR and the MSDS contains all of the information required by the CPR.***

**SECTION 16 - OTHER INFORMATION**

- Legend** : ACGIH: American Conference of Governmental Industrial Hygienists  
 IARC: International Agency for Research on Cancer  
 N/Ap: not applicable  
 N/Av: not available  
 NIOSH: National Institute of Occupational Safety and Health  
 NTP: National Toxicology Program  
 OSHA: Occupational Safety and Health Administration
- References** : Information obtained from sources including original supplier's Material Safety Data Sheet, and references including RTECS and CCOHS Cheminfo.



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**Preparation Date:** May 28, 2014

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