

ANALYSIS AND TOXICOLOGICAL EVALUATION OF AVS FLUID

Client:

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1 INTRODUCTION

AVS ELECTRONICS made the request of the analysis and toxicological evaluation of the liquid AVS Fluid which is used in the fog machine FOGGY as fog fluid.

AVS Fluid is supplied by _____ and is characterized in its material safety data sheet (MSDS) as follows:

Commercial name:	AVS Fluid
Chemical name:	2,2'-Ethylenedioxyethanol
CAS number:	112-27-6
EC number:	203-953-2
Percentage:	>70%

2 ANALYSIS OF "AVS Fluid"

2.1 *Sample description*

Clear, odorless liquid

2.2 *Analysis*

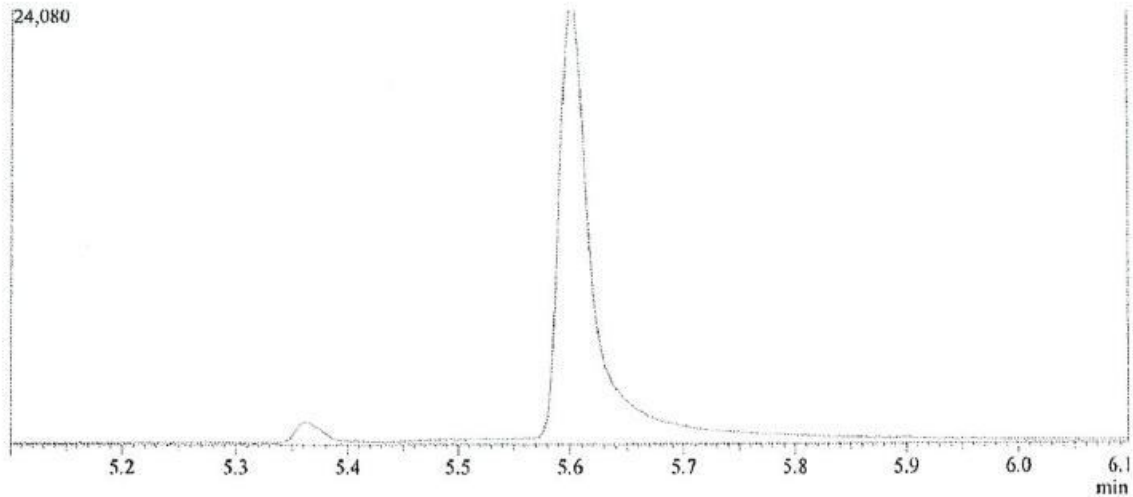
2.2.1 *GC/MS*

The sample was subjected to GC/MS analysis to verify the composition and concentration indicated by the manufacturer _____.

GC/MS: GCMS-QP2010 Plus (Shimadzu)

Column: SLB-5ms (Sulpelco), fused silica capillary column, 30 m x 0.25 mm x 0.25 mm film thickness

Ramp: 25 °C/min (60°C → 325 °C)

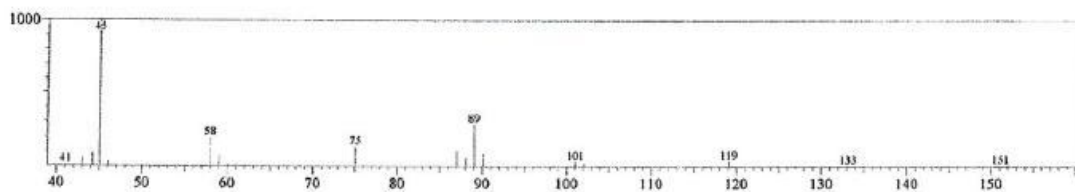


Quantitative Result Table

ID#	R. Time	m/z	Area	Conc. Conc. Un	Name
1	5.601	45.00	39583	68.9%	Trietilene glicole

Figure 1 - Chromatogram of AVS Fluid

As displayed in figure 1, the chromatogram of AVS Fluid consists of one relevant peak (retention time: 5.6 min, area: 68.9 %). The latter is confirmed to be triethyleneglycole by taking a look at the fragmentation of AVS Fluid (figure 2). The latter shows the mass peak of 151 which corresponds to $[M+H]^+$ of triethyleneglycole and as the major fragment the $[M-H]^+$ peak at 45 of ethanol.


Figure 2 - Fragmentation of AVS Fluid

2.2.2 Determination of density

For future quality control analysis the density of AVS Fluid was determined and resulted 1.059 g/L.

3 EVALUATION OF TOXICITY AND POTENTIAL HAZARD OF 2,2'-ETHYLENEDIOXYETHANOLⁱ

3.1 Acute Toxicity:

LD₅₀ oral ratⁱⁱ: 17 g/kg

LD₅₀ dermal rabbitⁱⁱⁱ: 22,5 g/kg

3.2 Ecotoxicity:

LC₅₀ fish (96 h)^{iv}: min. 59,9 g/l

Max. 92,5 g/l

Med. 73,8 g/l

LC₅₀ Crustaceans (48 hours): min. 39,3 g/l

max. 52,4 g/l

med. 45,9 g/l

Not a dangerous substance according to GHS.^v

3.3 Potential hazard

Not classified as a hazardous substance according to EC criteria.

4 CONCLUSION

Summarizing the above given information and the results of the analysis of AVS Fluid at our laboratory we draw the following conclusions:

AVS Fluid is a mixture of 2,2'-Ethylenedioxyethanol (70%) in water and is not considered as a potential hazardous or dangerous substance. Nevertheless, when handling the product, sufficient eye and body protection (gloves) should be worn.

Bolzano, 22/09/2011



Dr. Erich Bernard
N. 117

The stamp is circular with the text "ORDINE DEI CHIMICI - CHEMICAL ANALYSTS" around the perimeter. Inside the circle, it reads "Dott. ERICH BERNARD" and "N. 117". The name "Dr. Erich Bernard" is written in blue ink below the stamp.

ⁱ GESTIS substance database, Institut für Arbeitsschutz der deutschen gesetzlichen Unfallversicherung

ⁱⁱ Journal of Industrial Hygiene and Toxicology 28, 1946, 40.

ⁱⁱⁱ Toxicology of Drugs and Chemicals, Deichmann, W.B., New York, Academic Press, Inc., 1969, 731.

^{iv} Geiger, D.L.; Call, D.J.; Brooke L.T. Acute Toxicities of Organic Chemicals to Fathead Minnows (Pimephales promelas) Volume IV. Ctr. for Lake Superior Environ.Stud., Volume 4, Univ. of Wisconsin-Superior, Superior, WI :355, 1988.

^v Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006