

Dermal Case – Spraying of Butoxyethanol

Background

Part of a cleaning operation is the spraying of a cleaning product that contains in part, 2-butoxyethanol. The spraying is performed in a booth with moderate ventilation. The booth draws air up and to the left and so does not provide good capture or draw mist away from the worker. The worker wears gauntlet gloves but often has bare arms in warm weather. Does this pose a potential dermal absorption hazard?



The process only takes 10 minutes. Assume that the material is on the arms for 0.5 hours. Also assume that the loading on the arms represents 1 gram of butoxyethanol. Parts being sprayed are small and thin so there is very little splash back. Butoxyethanol is only a fraction of the product so this amount seems conservative.

The AIHA SkinPerm program was used to estimate potential dermal exposure.

Database SkinPerm User's

Butoxyethanol (111-76-2)

LogKow at skin pH 5.5 : **0.83**

2 Scenario parameters

Instantaneous deposition
 Deposition over time
 Vapor to skin scenario

add a new substance ...

Timing parameters

Start deposition: 0 hr
Duration of deposition: 0 hr
End time observation: 0.5 hr

4 Report parameters

Calculation intervals/hour: 10000
Report intervals/hour: 10

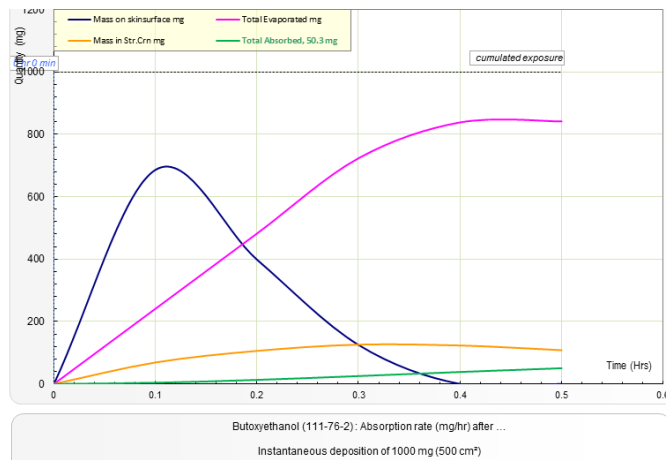
Instantaneous deposition dose	1000 mg
Affected skin area	500 cm ²
Maximum skin adherence solids	-1 mg/cm ²
Dermal deposition rate	1 mg/cm ² /hr
Air concentration	1 mg/m ³
Thickness of stagnant air	3 cm

Substance **Butoxyethanol (111-76-2)**

Deposition	Instantaneous	
Duration		
Tot. Deposition	1000 mg	
Fraction absorbed	5.0%	
Amount absorbed	50.289 mg	

	WATER	AIR	
Kp-lipids (vehicle water)	1.62E-3 cm/hr	2.61E+2 cm/hr	Kp-lipids (vehicle air)
Kp-keratins (vehicle water)	6.50E-5 cm/hr	1.05E+1 cm/hr	Kp-keratins (vehicle air)
Lag time stratum corneum	19.424 min		
Diffusivity of Stratum corneum	2.10E-6 cm ² /hr	9.62E+1 cm/hr	Kp-stagnant air layer
Skin/Water partition ratio	1.6377	264057	Skin/Air partition ratio

	WATER	AIR	
Permeation coefficient water	1.69E-3 cm/hr	7.11E+1 cm/hr	Permeation coefficient air
5th percentile water	1.22E-3 cm/hr	6.47E+1 cm/hr	5th percentile air
95th percentile water	2.32E-3 cm/hr	7.66E+1 cm/hr	95th percentile air



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The amount absorbed equates to about 8% of the amount absorbed by an airborne exposure at the allowable airborne concentration. Thus, the dermal exposure is modest and does not pose risk to the worker.