

Appendix B

Supplemental Exposure Assessment Information

Table B-1. Adhesive Use Rates for Average and High Use Scenarios

Adhesive Type	Solids Content	Average Adhesive Use (gal/year)	High Adhesive Use (gal/year)
Methylene chloride	31%	2,475	24,750
Acetone	24%	3,197	31,969
Acetone/heptane	39%	1,967	19,673
n-Propyl bromide	26.7%	2,874	28,736
Water-based latex	63%	1,218	12,179
Water-based latex/synthetic	63%	1,218	12,179
Hot melt	99.9 %	768	7,680

Table B-2. Chemical Concentrations in Ambient Air, 100 Meters from the Facility

Adhesive Type / Chemical Ingredient ^a	Average Adhesive Use		High Adhesive Use	
	Emission Rate (g/sec)	Concentration in Air (mg/m ³)	Emission Rate (g/sec)	Concentration in Air (mg/m ³)
Methylene Chloride Adhesive				
Methylene chloride	1.07	1.20E-01	10.7	1.20E+00
Irganox 1010	0.0158	1.77E-03	0.158	1.77E-02
Acetone Adhesive				
Acetone	1.07	1.20E-01	10.7	1.20E+00
Irganox 1010	0.0143	1.60E-03	0.143	1.60E-02
Acetone/Heptane Adhesive				
Acetone	0.261	2.92E-02	2.61	2.92E-01
Heptane	0.261	2.92E-02	2.61	2.92E-01
Irganox 1010	0.0087	9.74E-04	0.087	9.74E-03

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Adhesive Type / Chemical Ingredient ^a	Average Adhesive Use		High Adhesive Use	
	Emission Rate (g/sec)	Concentration in Air (mg/m ³)	Emission Rate (g/sec)	Concentration in Air (mg/m ³)
n-Propyl Bromide Adhesive				
n-Propyl bromide	1.23	1.38E-01	12.3	1.38E+00
Irganox 1010	0.0181	2.03E-03	0.181	2.03E-02
1,3-Dioxolane	0.0543	6.08E-03	0.543	6.08E-02
1,2-Butylene oxide	0.0054	6.05E-04	0.054	6.05E-03
2-Bromopropane	0.0181	2.03E-03	0.181	2.03E-02
Water-Based Latex Adhesive				
Ammonia (from ammonium hydroxide) ^b	0.006	6.72E-04	0.06	6.72E-03
Chlorinated alkyl phosphates	0.031	3.47E-03	0.307	3.47E-02
Cyanox 2246	0.0031	3.47E-04	0.031	3.47E-03
Surfynol 440	0.0031	3.47E-04	0.031	3.47E-03
Water-Based Latex/Synthetic Adhesive				
Ammonia (from ammonium hydroxide) ^b	0.006	6.72E-04	0.06	6.72E-03
Chlorinated alkyl phosphates	0.031	3.47E-03	0.307	3.47E-02
Chloroprene	6.14E-06	6.89E-07	6.14E-05	6.89E-06
Cyanox 2246	0.0031	3.47E-04	0.031	3.47E-03
Surfynol 440	0.0031	3.47E-04	0.031	3.47E-03
Hot Melt Adhesive				
Irganox 1010	0.000397	4.44E-05	0.00397	4.44E-04

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Adhesive Type / Chemical Ingredient ^a	Average Adhesive Use		High Adhesive Use	
	Emission Rate (g/sec)	Concentration in Air (mg/m ³)	Emission Rate (g/sec)	Concentration in Air (mg/m ³)
Alternative Ingredients^c				
Hexane	0.261	2.92E-02	2.61	2.92E-01
TCE	0.453	5.07E-02	4.53	5.07E-01

^a Chemicals with vapor pressures over 0.001 torr included in the model

^b Ammonia, formed from ammonium hydroxide during spray application, is the volatile form that is released to workplace and outdoor air.

^c Alternative adhesive ingredients that may appear in some adhesive formulations in place of other constituents: hexane (acetone/heptane) and TCE (n-propyl bromide).

**Table B-3. Estimated Average Daily Doses (ADDs) for General Population
Inhalation Exposure at a Distance of 100 Meters**

Adhesive Type / Chemical Ingredient ^a	ADD (mg/kg-day)	
	Average Adhesive Use	High Adhesive Use
Methylene Chloride Adhesive		
Methylene chloride	4.67E-02	4.67E-01
Irganox 1010	6.90E-04	6.90E-03
Acetone Adhesive		
Acetone	4.67E-02	4.67E-01
Irganox 1010	6.25E-04	6.25E-03
Acetone/Heptane Adhesive		
Acetone	1.14E-02	1.14E-01
Heptane	1.14E-02	1.14E-01
Irganox 1010	3.80E-04	3.80E-03
n-Propyl Bromide Adhesive		
n-Propyl bromide	5.37E-02	5.37E-01
Irganox 1010	7.90E-04	7.90E-03
1,3-Dioxolane	2.37E-03	2.37E-02
1,2-Butylene oxide	2.36E-04	2.36E-03
2-Bromopropane	7.90E-04	7.90E-03

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Adhesive Type / Chemical Ingredient ^a	ADD (mg/kg-day)	
	Average Adhesive Use	High Adhesive Use
Water-Based Latex Adhesive		
Ammonia (from ammonium hydroxide) ^b	2.62E-04	2.62E-03
Chlorinated alkyl phosphates	1.34E-03	1.34E-02
Cyanox 2246	1.35E-04	1.35E-03
Surfynol 440	1.35E-04	1.35E-03
Water-Based Latex/Synthetic Adhesive		
Ammonia (from ammonium hydroxide) ^b	2.62E-04	2.62E-03
Chlorinated alkyl phosphates	1.34E-03	1.34E-02
Chloroprene	2.68E-07	2.68E-06
Cyanox 2246	1.35E-04	1.35E-03
Surfynol 440	1.35E-04	1.35E-03
Hot Melt Adhesive		
Irganox 1010	1.73E-05	1.73E-04
Additional Ingredients^c		
Hexane	5.84E-03	5.84E-02
TCE	1.02E-02	1.02E-01

^a Chemicals with vapor pressures over 0.001 torr included in the model

^b Ammonia, formed from ammonium hydroxide during spray application, is the volatile form that is released to workplace and outdoor air.

^c Alternative adhesive ingredients that may appear in some adhesive formulations in place of other constituents: hexane (acetone/heptane) and TCE (n-propyl bromide).

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Table B-4. Estimated ADDs for Workplace Inhalation by Ventilation and Adhesive Use Scenario

Adhesive Type / Chemical Ingredient ^a	ADD (mg/kg-day)			
	Average Adhesive Use and Average Ventilation	Average Adhesive Use and WTA Ventilation	High Adhesive Use and Average Ventilation	High Adhesive Use and WTA Ventilation
Methylene Chloride Adhesive				
Methylene chloride	1.52E+01	6.37E+01	1.52E+02	6.38E+02
Irganox 1010	2.19E-01	9.22E-01	2.23E+00	9.38E+00
Acetone Adhesive				
Acetone	1.53E+01	6.41E+01	1.52E+02	6.39E+02
Irganox 1010	2.00E-01	8.41E-01	2.03E+00	8.53E+00
Acetone/Heptane Adhesive				
Acetone	3.69E+00	1.55E+01	3.69E+01	1.55E+02
Heptane	3.69E+00	1.55E+01	3.69E+01	1.55E+02
Irganox 1010	1.24E-01	5.21E-01	1.23E+00	5.17E+00
n-Propyl Bromide Adhesive				
n-Propyl bromide	1.75E+01	7.33E+01	1.75E+02	7.34E+02
Irganox 1010	2.58E-01	1.08E+00	2.57E+00	1.08E+01
1,3-Dioxolane	7.73E-01	3.25E+00	7.71E+00	3.24E+01
1,2-Butylene oxide	7.63E-02	3.21E-01	7.73E-01	3.25E+00
2-Bromopropane	2.58E-01	1.08E+00	2.57E+00	1.08E+01
Water-Based Latex Adhesive				
Ammonia (from ammonium hydroxide) ^b	8.59E-02	3.61E-01	8.49E-01	3.57E+00
Chlorinated alkyl phosphates	4.39E-01	1.84E+00	4.35E+00	1.83E+01
Cyanox 2246	4.77E-02	2.00E-01	4.39E-01	1.84E+00
Surfynol 440	4.77E-02	2.00E-01	4.39E-01	1.84E+00

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Adhesive Type / Chemical Ingredient ^a	ADD (mg/kg-day)			
	Average Adhesive Use and Average Ventilation	Average Adhesive Use and WTA Ventilation	High Adhesive Use and Average Ventilation	High Adhesive Use and WTA Ventilation
Water-Based Latex/Synthetic Adhesive				
Ammonia (from ammonium hydroxide) ^b	8.59E-02	3.61E-01	8.49E-01	3.57E+00
Chlorinated alkyl phosphates	4.39E-01	1.84E+00	4.35E+00	1.83E+01
Chloroprene	9.54E-05	4.01E-04	8.59E-04	3.61E-03
Cyanox 2246	4.77E-02	2.00E-01	4.39E-01	1.84E+00
Surfynol 440	4.77E-02	2.00E-01	4.39E-01	1.84E+00
Hot Melt Adhesive				
Irganox 1010	9.54E-03	4.01E-02	5.72E-02	2.40E-01
Additional Ingredients^c				
Hexane	3.69E+00	1.55E+01	3.69E+01	1.55E+02
TCE	6.42E+00	2.70E+01	6.42E+01	2.70E+02

^a Chemicals with vapor pressures over 0.001 torr included in the model.

^b Ammonia, formed from ammonium hydroxide during spray application, is the volatile form that is released to workplace and outdoor air.

^c Alternative adhesive ingredients that may appear in some adhesive formulations in place of other constituents: hexane may be used in some acetone-blend formulations and TCE may be used in some n-propyl bromide formulations.

Notes: The numeric format used in these tables is a form of scientific notation, where the “E” replaces the “ x 10^x” in scientific notation. Scientific notation is typically used to present very large or very small numbers. For example, 1.2E-04 is the same as 1.2 x 10⁻⁴, which is the same as 0.00012 in common decimal notation.