United States
Environmental Protection Agency

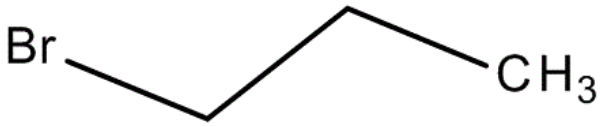
Office of Chemical Safety and
Pollution Prevention

Final Risk Evaluation for 1-Bromopropane (*n*-Propyl Bromide)

Systematic Review Supplemental File:

Data Quality Evaluation of Environmental Release and Occupational Exposure Data

CASRN: 106-94-5



August 2020

This document is a compilation of tables for the data extraction and evaluation for 1-Bromopropane. Each table shows the data point or set or information element that was extracted and evaluated from a data source in accordance with Appendix D of the Application of Systematic Review in TSCA Risk Evaluations. If the source contains more than one data set or information element, the review provides an overall confidence score for each data set or information element that is found in the source. Therefore, it is possible that a source may have more than one overall quality/confidence score.

The document includes sources that contain environmental release data that were evaluated by EPA. However, environmental release data for the air pathway were not integrated because this pathway was determined to be out of scope during development of the risk evaluation. See Section 1.4 of the final Risk Evaluation for further explanation.

Table of Contents

Explanatory Notes

These explanatory notes provide context to understand the short comments in the data evaluation tables.

Domain	Metric	Description of Comments Field
Reliability	Methodology	Indicates the sampling/analytical methodology, estimation method, or type of publication
Representativeness	Geographic Scope	Indicates the country of the study, publication, or underlying data
	Applicability	Indicates whether the data are for a condition of use within scope of the Risk Evaluation
	Temporal Representativeness	Provides the year of study, publication, or underlying data
	Sample Size	Describes the distribution of the sample or underlying data
Accessibility / Clarity	Metadata Completeness	Describes the completeness of the metadata
Variability and Uncertainty	Metadata Completeness	Indicates if study or publication addresses variability and uncertainty of the data or information

Releases to the Environment

Source Citation:	Japanese Ministry of, Environment. 2017. 1-Bromopropane.
Type of Data Source	Releases to the Environment; Environmental Release Data;
Hero ID	3980936

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Environmental Media:	Air (majority, 93.7-99 percent), 160 t to waste, 0.23 t to sewage
Annual Release Quantity (kg/yr):	1,300 t in 2011 under PRTR (5,000 t production and import)

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Medium	× 1	2	Methodology not well described but the source is a trusted govt publication
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	EU
	Metric 3:	Applicability	High	× 2	2	Uses are within scope
	Metric 4:	Temporal Representativeness	High	× 2	2	2011 estimates
	Metric 5:	Sample Size	Low	× 1	3	Only a single data point
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Low	× 1	3	Metadata limited
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not discussed
Overall Quality Determination†			Medium		1.9	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Camp, Inc. 2000. Final report: Beyond pollution prevention: Removal of organochlorines from industrial feedstocks and processes in the Great Lakes Basin.
Type of Data Source	Releases to the Environment; Environmental Release Data;
Hero ID	3981054

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Various solvent uses
Annual Release Quantity (kg/yr):	1.5 MM lb in 2000 (Great Lakes Region)

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	Estimation methodology well described in doc
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US (Great Lakes)
	Metric 3:	Applicability	High	× 2	2	Uses are within scope
	Metric 4:	Temporal Representativeness	Medium	× 2	4	2000 estimate
	Metric 5:	Sample Size	Low	× 1	3	Only a single data point
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Contains some metadata
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not discussed
Overall Quality Determination†			Medium		1.8	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	CARB. 2011. Development of updated ARB solvent cleaning emissions inventories. Final Report: Agreement No. 06-322.
Type of Data Source	Releases to the Environment; Environmental Release Data;
Hero ID	2991110

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Vapor Degreasing
Release Source:	Batch-loaded vapor degreaser, aerosol surface preparation process, aerosol cleaning process
Environmental Media:	Air
Release or Emission Factor:	10.43 lb/employee-yr
Release Estimation Method:	Emission inventory
Number of Sites:	213

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	Release data methodology is well described and expected to be accurate for the selected facilities
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US data (CA)
	Metric 3:	Applicability	High	× 2	2	Release data are for OES within scope (with uncertainty on the sub-category of degreaser)
	Metric 4:	Temporal Representativeness	Medium	× 2	4	2001 report
	Metric 5:	Sample Size	Medium	× 1	2	Emission inventory with over 200 samples, but distribution characterized only by average and std dev. Values
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Low	× 1	3	Study provides air emission factor without other metadata
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not discussed
Overall Quality Determination†			Medium		1.8	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Trinity Consultants. 2015. Emission Report, NPB Response Addendum.
Type of Data Source	Releases to the Environment; Environmental Release Data;
Hero ID	5018570

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Dry Cleaning, Vapor Degreasing, Spray Adhesive
Environmental Media:	Air
Release Estimation Method:	Solvent inventory or similar data
Annual Release Quantity (kg/yr):	Variable depending on use, facility, and year
Number of Sites:	1 or more for each use

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	Release data methodology is well described and expected to be accurate for the selected facilities
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US data
	Metric 3:	Applicability	High	× 2	2	Release data are for OES within scope
	Metric 4:	Temporal Representativeness	High	× 2	2	2009 - 2014 data
	Metric 5:	Sample Size	Medium	× 1	2	Facility-level annual emission estimates provided for multiple years, but unclear whether selected facilities are representative
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Low	× 1	3	Study provides air emission estimates without other metadata
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not discussed
Overall Quality Determination†			High		1.6	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	U.S. EPA. 1981. AP-42. Compilation of air pollutant emission factors. Chapter 4. 6: Solvent degreasing.
Type of Data Source	Releases to the Environment; Environmental Release Data;
Hero ID	3045012

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Vapor Degreasing
Release Source:	Waste solvent evaporation, solvent carryout, solvent bath evaporation, spray evaporation, and agitation
Environmental Media:	Air
Release or Emission Factor:	Cold cleaning VOC emissions are 3.2 - 57.1 percent of emissions compared to OTVDs (see document for emission factor in kg/yr-unit)
Release Estimation Method:	Solvent purchase records

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	Estimation methodology is described, AP-42 is a well established document
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US data
	Metric 3:	Applicability	High	× 2	2	Release data are for OES within scope
	Metric 4:	Temporal Representativeness	Low	× 2	6	1981 publication
	Metric 5:	Sample Size	Low	× 1	3	EF estimates not characterized by statistics
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Low	× 1	3	EF are provided without other metadata
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not discussed
Overall Quality Determination†			Medium		2.1	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Newmoa,. 2001. Pollution prevention technology profile - Closed loop vapor degreasing.
Type of Data Source	Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3044986

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Vapor Degreasing
P2 Control & percent Efficiency:	98 percent when switching from OTVD to closed-loop degreaser

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Low	× 1	3	Estimation method not specified
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US data
	Metric 3:	Applicability	High	× 2	2	Estimate is for a use within scope
	Metric 4:	Temporal Representativeness	Medium	× 2	4	2001 publication
	Metric 5:	Sample Size	Low	× 1	3	No statistics provided; single point estimate only
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Low	× 1	3	Underlying data sources are not trasparent
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not discussed
Overall Quality Determination†			Medium		2.1	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Wadden, R. A.,Scheff, P. A.,Franke, J. E.. 1989. Emission Factors for Trichloroethylene Vapor Degreasers. American Industrial Hygiene Association Journal.
Type of Data Source	Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3051984

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Vapor Degreasing
P2 Control & percent Efficiency:	90 percent emission reduction for OTVD with LEV

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Low	× 1	3	Estimation method not specified
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US data
	Metric 3:	Applicability	High	× 2	2	Estimate is for a use within scope
	Metric 4:	Temporal Representativeness	Low	× 2	6	Data more than 20 years old
	Metric 5:	Sample Size	Low	× 1	3	Only a single estimate without additional information on distribution/statistics
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Low	× 1	3	No metadata provided
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not discussed
Overall Quality Determination†			Low		2.3	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Occupational Exposure

Source Citation:	Toraason, M.,Lynch, D. W.,Debord, D. G.,Singh, N.,Nemhauser, J.. 2003. Assessment of DNA strand breaks in leukocytes of workers occupationally exposed to 1-bromopropane. Toxicological Sciences.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	1733747

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Spray Adhesive
Physical Form:	Liquid
Route of Exposure:	Inhalation
Exposure Concentration (Unit):	0.2 - 271 ppm (site 1)4 - 42.7 ppm (site 2)[Individual data points not available; only range reported]
Number of Samples:	41 workers (site 1) and 22 workers (site 2)
Number of Sites:	2
Type of Measurement or Method:	8-hr TWA
Worker Activity:	Sprayers and other activities
Number of Workers:	41 workers (site 1) and 22 workers (site 2)
Type of Sampling:	Personal
Sampling Location:	worker breathing zone

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	Data from HHE, but no description in this source (1 page summary only). Assumes a NIOSH method is used.
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US - because the data came from HHE, these sites would be U.S. sites
	Metric 3:	Applicability	High	× 2	2	Applies to condition of use within scope of risk eval
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Document published March 2003; date of sampling unknown
	Metric 5:	Sample Size	Low	× 1	3	63 samples. No statistics provided.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Low	× 1	3	Specifies data are PBZ TWA samples, but contains no other metadata

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Source Citation:	Toraason, M.,Lynch, D. W.,Debord, D. G.,Singh, N.,Nemhauser, J.. 2003. Assessment of DNA strand breaks in leukocytes of workers occupationally exposed to 1-bromopropane. Toxicological Sciences.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	1733747

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments
Domain 4: Variability and Uncertainty					
	Metric 7: Metadata Completeness	Low	× 1	3	Does not address variability/uncertainty
Overall Quality Determination†		Medium		1.9	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Niosh,. 2007. Workers' exposures to n-propyl bromide at a printed electronics circuit assembly manufacturer.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3355604

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Vapor Degreasing
Physical Form:	Liquid
Route of Exposure:	Inhalation
Exposure Concentration (Unit):	1.3 - 14 ppm (day 1)1.6 - 21 ppm (day 2)[individual data points not available]
Number of Samples:	5
Number of Sites:	1
Type of Measurement or Method:	PBZ,full-shift TWA
Worker Activity:	Operating vapor degreaser
Number of Workers:	5
Type of Sampling:	Personal
Sampling Location:	worker breathing zone
Exposure Frequency:	when operating vapor degreaser on as-needed basis
Engineering Control & percent Exposure Reduction:	6" refrigerated cooling coil. No LEV on vapor degreaser, but room has canopy exhaust ventilation
PPE:	Safety glasses and safety shoes
Analytic Method:	NIOSH method 1025

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	Study was conducted by Hanley. Describes use of GC-FID via NIOSH method 1025, LOD of 0.5 ug
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Applies to condition of use within scope of risk eval
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Study conducted 8/16-18, 2004
	Metric 5:	Sample Size	Medium	× 1	2	5 samples. Range and average are reported, other statistics not provided

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Source Citation:	Niosh,. 2007. Workers' exposures to n-propyl bromide at a printed electronics circuit assembly manufacturer.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3355604

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments
Domain 3: Accessibility/Clarity					
	Metric 6: Metadata Completeness	Medium	× 1	2	Monitoring data include critical information about sample type and exposure, but lacks additional metadata
Domain 4: Variability and Uncertainty					
	Metric 7: Metadata Completeness	Low	× 1	3	Does not address variability/uncertainty
Overall Quality Determination†		Medium		1.7	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Niosh,. 2007. Workers' exposures to n-propyl bromide at a hydraulic power control component manufacturer.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3355621

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Vapor Degreasing
Physical Form:	Liquid
Route of Exposure:	Inhalation
Exposure Concentration (Unit):	0.078 - 2 ppm (PBZ)0.33 - 4 ppm (in-respirator)0.05 - 0.23 ppm (pre-shift, exhaled)0.053 - 0.55 ppm (post-shift, exhaled)[individual data points not available]
Number of Samples:	4
Number of Sites:	1
Type of Measurement or Method:	PBZ,full-shift TWA
Worker Activity:	Operating vapor degreaser, maintenance of equipment (removing solvents)
Number of Workers:	4
Type of Sampling:	Personal
Sampling Location:	worker breathing zone; in-mask
Exposure Frequency:	when operating vapor degreaser on as-needed basis
Engineering Control & percent Exposure Reduction:	Refrigerated cooling coil, 14" freeboard height, chamber cover, no LEV on degreaser but room maintained under negative pressure with general exhaust ventilation
PPE:	Half-mask air purifying respirator with combination organic vapor cartridges and HEPA filter, full face APF respirator with organic vapor cartridge, PVA gloves, safety glasses, safety shoes
Analytic Method:	NIOSH method 1025

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments
Domain 1: Reliability					
Metric 1:	Methodology	High	× 1	1	Study was conducted by Hanley. Describes use of GC-FID via NIOSH method 1025
Domain 2: Representative					
Metric 2:	Geographic Scope	High	× 1	1	US

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Source Citation:	Niosh,. 2007. Workers' exposures to n-propyl bromide at a hydraulic power control component manufacturer.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3355621

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
	Metric 3:	Applicability	High	× 2	2	Applies to condition of use within scope of risk eval
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Study conducted in 2004
	Metric 5:	Sample Size	Medium	× 1	2	4 samples. Range and average values reported, but distribution not fully described
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Monitoring data include critical metadata
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Does not address variability/uncertainty
Overall Quality Determination†			Medium		1.7	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Moon, H. I. l,Shin, S.,Byeon, S. H.. 2015. Exposure Monitoring and Health Risk Assessment of 1-Bromopropane as a Cleaning Solvent in the Workplace. Human and Ecological Risk Assessment.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3576615

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Unknown Solvent Cleaning (automotive/electronic parts)
Physical Form:	Liquid
Route of Exposure:	Inhalation
Exposure Concentration (Unit):	central tendency - 82.1 mg/m3max - 214.8 mg/m3[provides only ranges/ GM at each workplace; individual data point not given]
Number of Samples:	50
Number of Sites:	10
Type of Sampling:	Unknown - Likely area
Engineering Control & percent Exposure Reduction:	LEV (most workplaces)
PPE:	None (for most workers)
Analytic Method:	NIOSH method 1025

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	Study conducted using NIOSH method
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	Study conducted in Korea
	Metric 3:	Applicability	High	× 2	2	Use is within scope of RE
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Study conducted in 2005
	Metric 5:	Sample Size	Medium	× 1	2	50 samples. Range and geometric mean reported for each data set, but distribution not fully described
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Low	× 1	3	Appear to be PBZ samples but includes no other metadata
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Does not address variability/uncertainty

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Source Citation:	Moon, H. I. l,Shin, S.,Byeon, S. H.. 2015. Exposure Monitoring and Health Risk Assessment of 1-Bromopropane as a Cleaning Solvent in the Workplace. Human and Ecological Risk Assessment.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3576615

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments
Overall Quality Determination†		Medium		1.9	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Atsdr,. 2016. Draft toxicological profile for1-bromopropane.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3827325

EXTRACTION

Parameter	Data
Life Cycle Stage:	Multiple
Life Cycle Description (Subcategory of Use):	Manufacturing - Use (various)
Physical Form:	Liquid
Route of Exposure:	Inhalation
Exposure Concentration (Unit):	[summarizes results from other sources w/out providing individual data points]Mfg: 0.9 - 170.5 ppm PBZUse: see source
Number of Sites:	1
Number of Workers:	37
Type of Sampling:	Personal, area

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Low	× 1	3	Unknown method used in the source cited
Domain 2: Representative						
	Metric 2:	Geographic Scope	Low	× 1	3	Exposure monitoring data for 1-BP mfg factory in China
	Metric 3:	Applicability	High	× 2	2	Use is within scope of RE
	Metric 4:	Temporal Representativeness	High	× 2	2	2017 ATSDR report
	Metric 5:	Sample Size	Low	× 1	3	37 samples. Data described as a range without further statistics
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Low	× 1	3	Monitoring data are PBZ samples but provides no other metadata
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Does not address variability/uncertainty
Overall Quality Determination†			Medium		2.1	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Cdc,. 2016. Criteria for a recommended standard: Occupational exposure to 1-bromopropane.
Type of Data Source	Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3827326

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Vapor Degreasing, Spray Adhesive
Number of Workers:	3,320 - 69,100 workers (8,300-40,300 workers for vapor degreaser, 400-9,800 workers for foam mfg)

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	Cites a 2007 EPA source
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US data
	Metric 3:	Applicability	High	× 2	2	Data for vapor degreasing and foam mfg
	Metric 4:	Temporal Representativeness	Medium	× 2	4	2016 document, but worker data from 2007
	Metric 5:	Sample Size	Low	× 1	3	Unknown sample distribution
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Low	× 1	3	Cites a 2007 EPA source, provides a range only without other metadata
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Does not address variability/uncertainty
Overall Quality Determination†			Medium		1.9	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	2014. Report on carcinogens: 1-Bromopropane.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3860561

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Multiple
Life Cycle Description (Subcategory of Use):	Manufacture, Adhesives, Drycleaning, Aerosol Degreasing, Vapor Degreasing, Other
Route of Exposure:	Inhalation, dermal
Exposure Concentration (Unit):	ND - 380 ppm (adhesive use is highest, vapor degreasing lowest) [individual data points not provided]

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Low	× 1	3	Unknown method used in the source cited
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US data (primarily)
	Metric 3:	Applicability	High	× 2	2	Use is within scope of RE
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Data mostly 10-20 years old
	Metric 5:	Sample Size	Low	× 1	3	Unknown sample distribution
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Low	× 1	3	Appear to be PBZ samples but includes no other metadata
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Does not address variability/uncertainty
Overall Quality Determination†			Medium		2.1	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	1999. Nomination of 1-bromopropane (1-BP) and 2-bromopropane (2-BP) for testing by the national toxicology program.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3860562

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Exposure Concentration (Unit):	0.05 - 135 ppm (OSHA) [individual data points not provided]
Number of Samples:	30
Type of Measurement or Method:	PBZ, 2-4 hr TWA
Type of Sampling:	Personal

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Low	× 1	3	Unknown method used in the source cited
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US data
	Metric 3:	Applicability	High	× 2	2	Use is within scope of RE
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Data from 1999 publication
	Metric 5:	Sample Size	Low	× 1	3	Unknown sample distribution
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Low	× 1	3	Data are PBZ short-term TWA, but provides no other metadata
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Does not address variability/uncertainty
Overall Quality Determination†			Medium		2.1	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	2013. Report on carcinogens: monograph of 1-bromopropane.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3860563

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Multiple
Life Cycle Description (Subcategory of Use):	Manufacture, Adhesives, Drycleaning, Aerosol Degreasing, Vapor Degreasing, Other
Route of Exposure:	Inhalation, dermal
Exposure Concentration (Unit):	ND - 380 ppm (adhesive use is highest, vapor degreasing lowest) [individual data points not provided]
Type of Measurement or Method:	PBZ, 8- to 12-hr TWA

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Low	× 1	3	Unknown method used in the source cited
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US data (primarily)
	Metric 3:	Applicability	High	× 2	2	Use is within scope of RE
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Data mostly 10-20 years old
	Metric 5:	Sample Size	Low	× 1	3	Unknown sample distribution
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Includes only critical metadata
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Does not address variability/uncertainty
Overall Quality Determination†			Medium		2.0	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Osha,. 2010. Input received through web forum for identifying hazardous chemicals for which OSHA should develop exposure reduction strategies.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3978176

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Dry cleaning
Route of Exposure:	Inhalation
Exposure Concentration (Unit):	40 ppm (avg), cites Blando study

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Low	× 1	3	Unknown method used in the source cited
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US study
	Metric 3:	Applicability	High	× 2	2	Use is within scope of RE
	Metric 4:	Temporal Representativeness	High	× 2	2	Blando study cited appears to be within 10 yr
	Metric 5:	Sample Size	Low	× 1	3	Unknown sample distribution
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Low	× 1	3	No description of metadata
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Does not address variability/uncertainty
Overall Quality Determination†			Medium		1.9	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Dhhs,. 2017. Skin Notation (SK) Profile 1-Bromopropane.
Type of Data Source	Occupational Exposure; Published Models for Exposures or Releases;
Hero ID	3986431

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Multiple
Life Cycle Description (Subcategory of Use):	Various
Physical Form:	Liquid
Route of Exposure:	Dermal
Exposure Concentration (Unit):	skin permeation coefficient - 0.00904575 cm/hr, water solubility 2.45 mg/cm3
Type of Measurement or Method:	Experimental measurement
Worker Activity:	Experimental dermal dosing (Frasch et al. 2011) to simulate splash exposure and occluded exposure, indicating substantial dermal penetration

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	Methodology of experimental data well described
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US study
	Metric 3:	Applicability	High	× 2	2	Use is within scope of RE
	Metric 4:	Temporal Representativeness	High	× 2	2	Frasch study conducted in 2011
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Provides metadata
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Does not address variability/uncertainty
Overall Quality Determination†			High		1.3	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Hanley, K. W.,Petersen, M.,Curwin, B. D.,Sanderson, W. T.. 2006. Urinary bromide and breathing zone concentrations of 1-bromopropane from workers exposed to flexible foam spray adhesives. Annals of Occupational Hygiene.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	607476

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Spray Adhesive
Physical Form:	Liquid
Route of Exposure:	Inhalation
Exposure Concentration (Unit):	0.6 - 200 ppm TWA
Number of Samples:	30
Number of Sites:	2
Type of Measurement or Method:	Full shift TWA
Worker Activity:	Sprayer and non-sprayer
Number of Workers:	30
Type of Sampling:	Personal
Sampling Location:	Breathing zone
Exposure Duration:	Full shift
Analytic Method:	NIOSH method 1025

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	Methodology of experimental data well described
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US study
	Metric 3:	Applicability	High	× 2	2	Use is within scope of RE
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Study published in 2006
	Metric 5:	Sample Size	Medium	× 1	2	30 samples. Range and mean are reported, but distribution not fully characterized
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Monitoring data includes most critical info such as sample/ exposure type and some descriptive worker activity info, but lacks other metadata

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Source Citation:	Hanley, K. W.,Petersen, M.,Curwin, B. D.,Sanderson, W. T.. 2006. Urinary bromide and breathing zone concentrations of 1-bromopropane from workers exposed to flexible foam spray adhesives. Annals of Occupational Hygiene.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	607476

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments
Domain 4: Variability and Uncertainty					
	Metric 7: Metadata Completeness	Medium	× 1	2	Discuss variability between different worker activity
Overall Quality Determination†		High		1.6	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Harney, J. M.,Nemhauser, J. B.,Reh, C. M.,Trout, D.,Schrader, S.. 2003. NIOSH Health Hazard Evaluation Report: HETA No. 99-0260-2906, Marx Industries, Inc., Sawmills, North Carolina.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	1379492

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Spray Adhesive
Physical Form:	Liquid
Route of Exposure:	Inhalation
Exposure Concentration (Unit):	0.1-160 ppm
Number of Samples:	29
Number of Sites:	1
Type of Measurement or Method:	TWA
Worker Activity:	58-68.5 percent 1-BP
Number of Workers:	60
Type of Sampling:	Personal and area
Sampling Location:	Various
Exposure Duration:	Full shift
PPE:	some respirator/glove use
Analytic Method:	NIOSH draft method for 1-BP

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	Methodology of experimental data well described
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US study
	Metric 3:	Applicability	High	× 2	2	Use is within scope of RE
	Metric 4:	Temporal Representativeness	Medium	× 2	4	2003
	Metric 5:	Sample Size	High	× 1	1	29 samples. Individual data points provided to allow characterization of full distribution
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Provides metadata

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Source Citation:	Harney, J. M.,Nemhauser, J. B.,Reh, C. M.,Trout, D.,Schrader, S.. 2003. NIOSH Health Hazard Evaluation Report: HETA No. 99-0260-2906, Marx Industries, Inc., Sawmills, North Carolina.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	1379492

EVALUATION

Domain	Metric	Rating	MWF⋆	Score	Comments
Domain 4: Variability and Uncertainty					
	Metric 7: Metadata Completeness	Medium	× 1	2	Discuss variability between different worker activity
Overall Quality Determination†		High		1.3	

⋆ MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Hanley, K. W.,Petersen, M. R.,Cheever, K. L.,Luo, L.. 2010. Bromide and N-acetyl-S-(n-propyl)-L-cysteine in urine from workers exposed to 1-bromopropane solvents from vapor degreasing or adhesive manufacturing. International Archives of Occupational and Environmental Health.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	1689090

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Multiple
Life Cycle Description (Subcategory of Use):	Vapor Degreasing; Adhesive Formulation
Physical Form:	Liquid
Route of Exposure:	Inhalation
Exposure Concentration (Unit):	0.07 - 18.9 ppm (range provided only)
Number of Samples:	42
Number of Sites:	6
Type of Measurement or Method:	Full shift TWA (8-10 hr)
Worker Activity:	"size, shape, and capacities of the vapor degreasers varied" heavy aerospace components required large semi-automatic degreasers equipped with LEV, smaller parts such as optical or electronic components were cleaned with small manual units without mechanical hoists and LEV"also see description for adhesive manufacturing
Number of Workers:	42
Type of Sampling:	Personal
Sampling Location:	Breathing zone
Exposure Duration:	Full shift
Analytic Method:	NIOSH method 1025

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	Methodology of experimental data well described
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US study
	Metric 3:	Applicability	High	× 2	2	Use is within scope of RE
	Metric 4:	Temporal Representativeness	High	× 2	2	2010
	Metric 5:	Sample Size	Medium	× 1	2	42 samples. Range and mean are provided, but distribution not fully characterized

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Source Citation:	Hanley, K. W.,Petersen, M. R.,Cheever, K. L.,Luo, L.. 2010. Bromide and N-acetyl-S-(n-propyl)-L-cysteine in urine from workers exposed to 1-bromopropane solvents from vapor degreasing or adhesive manufacturing. International Archives of Occupational and Environmental Health.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	1689090

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments
Domain 3: Accessibility/Clarity					
	Metric 6: Metadata Completeness	Medium	× 1	2	Monitoring data includes most critical info such as sample/ exposure type and some descriptive worker activity info, but lacks other metadata
Domain 4: Variability and Uncertainty					
	Metric 7: Metadata Completeness	Medium	× 1	2	Discuss variability between different worker activity
Overall Quality Determination†		High		1.3	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Hanley, K. W.,Petersen, M. R.,Cheever, K. L.,Luo, L.. 2009. N-acetyl-S-(n-propyl)-l-cysteine in urine from workers exposed to 1-bromopropane in foam cushion spray adhesives. Annals of Occupational Hygiene.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	1689272

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Spray Adhesive
Physical Form:	Liquid
Route of Exposure:	Inhalation
Exposure Concentration (Unit):	0.635 - 121 ppm (range only)
Number of Samples:	30
Number of Sites:	2
Type of Measurement or Method:	Full shift TWA
Worker Activity:	Includes some worker description such as sprayers, non-sprayers, seamtresses
Number of Workers:	30
Type of Sampling:	Personal
Sampling Location:	Breathing zone
Exposure Duration:	Full shift
Analytic Method:	NIOSH method 1025

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	Methodology of experimental data well described
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US study
	Metric 3:	Applicability	High	× 2	2	Use is within scope of RE
	Metric 4:	Temporal Representativeness	High	× 2	2	2009
	Metric 5:	Sample Size	Medium	× 1	2	30 samples. Range and mean are reported, but distribution not fully characterized
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Sample type, exposure type and some worker activity are known, but not all metadata are provided

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Source Citation:	Hanley, K. W.,Petersen, M. R.,Cheever, K. L.,Luo, L.. 2009. N-acetyl-S-(n-propyl)-l-cysteine in urine from workers exposed to 1-bromopropane in foam cushion spray adhesives. Annals of Occupational Hygiene.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	1689272

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments
Domain 4: Variability and Uncertainty					
	Metric 7: Metadata Completeness	Medium	× 1	2	Discuss variability between different worker activity
Overall Quality Determination†		High		1.3	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Ichihara, G.,Li, W.,Ding, X.,Peng, S.,Yu, X.,Shibata, E.,Yamada, T.,Wang, H.,Itohara, S.,Kanno, S.,Sakai, K.,Ito, H.,Kanefusa, K.,Takeuchi, Y.. 2004. A survey on exposure level, health status, and biomarkers in workers exposed to 1-bromopropane. American Journal of Industrial Medicine.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	1717475

EXTRACTION

Parameter	Data
Life Cycle Stage:	Manufacture
Life Cycle Description (Subcategory of Use):	Manufacture
Physical Form:	Liquid
Route of Exposure:	Inhalation
Exposure Concentration (Unit):	0.9 - 106.8 ppm
Number of Samples:	37
Number of Sites:	1
Type of Measurement or Method:	TWA
Worker Activity:	Operators manually poured materials into reaction pots, checked temperature, and poured distilled solution into 20L plastic containers. They were also responsible for mixing the solvent with sodium hydrogen carbonate. 1-BP was 96.74 percent purity
Number of Workers:	37
Type of Sampling:	Personal
Sampling Location:	Breathing zone
Exposure Duration:	Full shift
Analytic Method:	GS-MS

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	Methodology of experimental data well described
Domain 2: Representative						
	Metric 2:	Geographic Scope	Low	× 1	3	China
	Metric 3:	Applicability	High	× 2	2	Use is within scope of RE
	Metric 4:	Temporal Representativeness	Medium	× 2	4	2003
	Metric 5:	Sample Size	High	× 1	1	37 samples. Individual data points provided to allow characterization of distribution

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Source Citation:	Ichihara, G.,Li, W.,Ding, X.,Peng, S.,Yu, X.,Shibata, E.,Yamada, T.,Wang, H.,Itohara, S.,Kanno, S.,Sakai, K.,Ito, H.,Kanefusa, K.,Takeuchi, Y.. 2004. A survey on exposure level, health status, and biomarkers in workers exposed to 1-bromopropane. American Journal of Industrial Medicine.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	1717475

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments
Domain 3: Accessibility/Clarity					
	Metric 6: Metadata Completeness	High	× 1	1	Provides metadata
Domain 4: Variability and Uncertainty					
	Metric 7: Metadata Completeness	Medium	× 1	2	Discuss variability between different worker activity
Overall Quality Determination†		High		1.6	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Kawai, T.,Takeuchi, A.,Miyama, Y.,Sakamto, K.,Zhang, Z. W.,Higashikawa, K.,Ikeda, M.. 2001. Biological monitoring of occupational exposure to 1-bromopropane by means of urinalysis for 1-bromopropane and bromide ion. Biomarkers.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	1733873

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Metal Surface Cleaning and Painting
Physical Form:	Liquid
Route of Exposure:	Inhalation
Exposure Concentration (Unit):	1.42 ppm (GM) (actual data points not provided)
Number of Samples:	33
Number of Sites:	1
Worker Activity:	metal surface preparation
Number of Workers:	33
Type of Sampling:	Personal
Sampling Location:	Breathing zone
PPE:	gloves
Analytic Method:	GC

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	Methodology of experimental data well described
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	Japan
	Metric 3:	Applicability	High	× 2	2	Use is within scope of RE
	Metric 4:	Temporal Representativeness	Medium	× 2	4	2000
	Metric 5:	Sample Size	Medium	× 1	2	33 samples. Mean and max values reported, but distribution not fully characterized
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Low	× 1	3	Study is for PBZ sampling, but no other metadata provided
Domain 4: Variability and Uncertainty						

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Source Citation:	Kawai, T.,Takeuchi, A.,Miyama, Y.,Sakamto, K.,Zhang, Z. W.,Higashikawa, K.,Ikeda, M.. 2001. Biological monitoring of occupational exposure to 1-bromopropane by means of urinalysis for 1-bromopropane and bromide ion. Biomarkers.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	1733873

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments
	Metric 7: Metadata Completeness	Medium	× 1	2	Discuss variability between different worker activity
Overall Quality Determination†		Medium		1.8	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Eisenberg, J.,Ramsey, J.. 2010. Evaluation of 1-Bromopropane Use in Four New Jersey Commercial Dry Cleaning Facilities.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	1737891

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Drycleaning
Physical Form:	Liquid
Route of Exposure:	Inhalation
Exposure Concentration (Unit):	17-40 ppm
Number of Samples:	7
Number of Sites:	4
Type of Measurement or Method:	Full shift TWA
Worker Activity:	Operator; cashier
Number of Workers:	7
Type of Sampling:	Personal
Sampling Location:	Breathing zone
Exposure Duration:	Full shift
PPE:	None
Analytic Method:	NIOSH method 1025

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	Methodology of experimental data well described
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US study
	Metric 3:	Applicability	High	× 2	2	Use is within scope of RE
	Metric 4:	Temporal Representativeness	High	× 2	2	2010
	Metric 5:	Sample Size	High	× 1	1	7 samples. Individual data points allow characterization of full distribution
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Provides metadata
Domain 4: Variability and Uncertainty						

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Source Citation:	Eisenberg, J.,Ramsey, J.. 2010. Evaluation of 1-Bromopropane Use in Four New Jersey Commercial Dry Cleaning Facilities.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	1737891

EVALUATION

Domain	Metric	Rating	MWF⋆	Score	Comments
	Metric 7: Metadata Completeness	Medium	× 1	2	Discuss variability between different worker activity
Overall Quality Determination†		High		1.1	

⋆ MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Reh, C. M.,Mortimer, V. D.,Nemhauser, J. B.,Trout, D.. 2002. NIOSH Health Hazard Evaluation Report: HETA No. 98-0153-2883, Custom Products, Inc. Mooresville, NC.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	1737898

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Spray Adhesive
Physical Form:	Liquid
Route of Exposure:	Inhalation
Exposure Concentration (Unit):	60 - 381.2 ppm
Number of Samples:	80
Number of Sites:	1
Type of Measurement or Method:	Full shift TWA
Worker Activity:	Highest exposure was in the Covers dept, followed by Assembly dept and Saw dept; adhesive contains 60-70 percent 1-BP
Number of Workers:	70
Type of Sampling:	Personal
Sampling Location:	Breathing zone
Exposure Duration:	Full shift
Engineering Control & percent Exposure Reduction:	spray booth

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	Methodology of experimental data well described
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US study
	Metric 3:	Applicability	High	× 2	2	Use is within scope of RE
	Metric 4:	Temporal Representativeness	Medium	× 2	4	2002
	Metric 5:	Sample Size	High	× 1	1	80 samples. Distribution fully characterized
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Provides metadata

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Source Citation:	Reh, C. M.,Mortimer, V. D.,Nemhauser, J. B.,Trout, D.. 2002. NIOSH Health Hazard Evaluation Report: HETA No. 98-0153-2883, Custom Products, Inc. Mooresville, NC.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	1737898

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments
Domain 4: Variability and Uncertainty					
	Metric 7: Metadata Completeness	Medium	× 1	2	Discuss variability between different worker activity
Overall Quality Determination†		High		1.3	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Osha,. 2013. OSHA/NIOSH hazard alert: 1-bromopropane.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	2347177

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Various
Physical Form:	Liquid
Route of Exposure:	Inhalation
Exposure Concentration (Unit):	0.08 - 254 ppm (range only)
Number of Samples:	122
Number of Sites:	6
Type of Measurement or Method:	Full shift TWA
Worker Activity:	Ref. multiple other studies

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Low	× 1	3	Cites other sources for exposure data; methodology unknown
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US study
	Metric 3:	Applicability	High	× 2	2	Use is within scope of RE
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Age of data ranging from 2003 - 2010
	Metric 5:	Sample Size	Medium	× 1	2	122 samples, only range of values are reported
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Low	× 1	3	Full-shift monitoring data, other metadata not provided
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Medium	× 1	2	Discuss variability between different worker activity
Overall Quality Determination†			Medium		1.9	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Hsia,. 2010. Petition to add n-propyl bromide to list of hazardous air pollutants regulate under section 112 of the Clean Air Act [with cover letter date 10/28/2010].
Type of Data Source	Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3045668

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Various
Physical Form:	Liquid
Route of Exposure:	Inhalation
Exposure Concentration (Unit):	up to 150 ppm (no actual data points, but has description of data ranges for various uses incl. hand wiping, aerosol solvents, etc – see p.23/31)

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Low	× 1	3	Cites other sources for exposure data; methodology unknown
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US study
	Metric 3:	Applicability	High	× 2	2	Use is within scope of RE
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Report is dated 2010, but actual age of monitoring data is unclear - appears to be between 10-20 years
	Metric 5:	Sample Size	Medium	× 1	2	Contains a range of statistics without actual data points.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Data sources are cited and generally described, but not fully transparent
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Medium	× 1	2	Limited discussion of variability
Overall Quality Determination†			Medium		1.8	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Osha,. 2017. Hazard alert: 1-Bromopropane.
Type of Data Source	Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3978174

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Various
Physical Form:	Liquid
Route of Exposure:	Inhalation
Exposure Concentration (Unit):	Cites various Hanley, NIOSH, and Blando studies and references a range of exposure concentration in those studies
Engineering Control & percent Exposure Reduction:	Discusses various controls such as isolation, ventilation, etc.
PPE:	Indicates that polyvinyl alcohol or multiple-layer laminates glove should be used

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Low	× 1	3	Cites other sources for exposure data; methodology unknown
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US study
	Metric 3:	Applicability	High	× 2	2	Use is within scope of RE
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Age of data ranging from 2003 - 2010
	Metric 5:	Sample Size	Medium	× 1	2	122 samples, only range of values are reported
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Low	× 1	3	Full-shift monitoring data, other metadata not provided
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Medium	× 1	2	Discuss variability between different worker activity
Overall Quality Determination†			Medium		1.9	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Harney, J. M.,Hess, J.,Reh, C. M.,Trout, D.. 2002. Health hazard evaluation report no. HETA 2000-0410-2891, STN Cusion company, Thomasville, North Carolina.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3970574

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Spray Adhesive
Physical Form:	Liquid
Route of Exposure:	Inhalation
Exposure Concentration (Unit):	1st visit: 41.3 - 143 ppm for sprayers2nd visit: 7.7 - 34.9 ppm for sprayersAdditional data for other workers
Number of Samples:	32
Number of Sites:	1
Type of Measurement or Method:	Full shift TWA
Worker Activity:	HHE describes worker activities at STN Cushion Company. Cushion is assembled by gluing together and hand pressing pieces of cut flexible foam. Adhesive is spray-applied using a compressed air spray gun. Adhesive is Whisper Spray (Imperial Adhesives, Cincinnati, OH) which contains 55 percent 1-BP by weight.
Number of Workers:	84 (32 participated in survey)
Type of Sampling:	Full shift TWA
Sampling Location:	Spray stations and other locations
Exposure Duration:	Full shift
Engineering Control & percent Exposure Reduction:	Enclosure of spray tables
Analytic Method:	NIOSH draft method for 1-BP

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	NIOSH publication
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US study
	Metric 3:	Applicability	High	× 2	2	Use is within scope of RE
	Metric 4:	Temporal Representativeness	Medium	× 2	4	HHE conducted in 2000

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Source Citation:	Harney, J. M.,Hess, J.,Reh, C. M.,Trout, D.. 2002. Health hazard evaluation report no. HETA 2000-0410-2891, STN Cusion company, Thomasville, North Carolina.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3970574

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments
	Metric 5: Sample Size	High	× 1	1	32 samples. Distribution fully characterized
Domain 3: Accessibility/Clarity					
	Metric 6: Metadata Completeness	High	× 1	1	Provides metadata
Domain 4: Variability and Uncertainty					
	Metric 7: Metadata Completeness	Medium	× 1	2	Discuss variability between different worker activity
Overall Quality Determination†		High		1.3	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Eisenberg, J.,Ramsey, J.. 2010. Health hazard evaluation report no. HETA 2008-0175-3111, Evaluation of 1-Bromopropane use in four New Jersey commercial dry cleaning facilities.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3970603

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Drycleaning
Physical Form:	Liquid
Route of Exposure:	Inhalation
Exposure Concentration (Unit):	17 - 40 ppm (full shift TWA); short-term data also available
Number of Samples:	7
Number of Sites:	4
Type of Measurement or Method:	Full shift TWA
Worker Activity:	See study for description of machine type and worker activities at each of 4 facilities visited
Number of Workers:	7
Type of Sampling:	Full shift TWA
Sampling Location:	Breathing zone of operators and cashiers
Exposure Duration:	Full shift
Engineering Control & percent Exposure Reduction:	None
PPE:	None used
Analytic Method:	NIOSH method 1025

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	NIOSH publication
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US study
	Metric 3:	Applicability	High	× 2	2	Use is within scope of RE
	Metric 4:	Temporal Representativeness	High	× 2	2	HHE conducted in 2008
	Metric 5:	Sample Size	High	× 1	1	7 samples. Individual data points allow characterization of full distribution
Domain 3: Accessibility/Clarity						

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Source Citation:	Eisenberg, J.,Ramsey, J.. 2010. Health hazard evaluation report no. HETA 2008-0175-3111, Evaluation of 1-Bromopropane use in four New Jersey commercial dry cleaning facilities.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3970603

EVALUATION

Domain	Metric	Rating	MWF⋆	Score	Comments
	Metric 6: Metadata Completeness	High	× 1	1	Provides metadata
Domain 4: Variability and Uncertainty					
	Metric 7: Metadata Completeness	Medium	× 1	2	Discuss variability between different worker activity
Overall Quality Determination†		High		1.1	

⋆ MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Hanley, K. W.,Petersen, M.,Curwin, B. D.,Sanderson, W. T.. 2006. Urinary bromide and breathing zone concentrations of 1-bromopropane from workers exposed to flexible foam spray adhesives, Part3. Annals of Occupational Hygiene.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3974876

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Spray Adhesive
Physical Form:	Liquid
Route of Exposure:	Inhalation
Exposure Concentration (Unit):	sprayers: 92 ppm (geometric mean)other jobs: 11 ppm (geometric mean)(only ranges and GM provided)
Number of Samples:	30
Number of Sites:	2
Type of Measurement or Method:	Full shift TWA
Worker Activity:	Sprayers constructed polyurethane foam furniture cushions using spray adhesives. Non-sprayers included glue lilne leads, sewing machine operators, wrappers, pillow stuffers, and foam and cloth cutters. Exposure among non-sprayers occurred as a result of overspray and solvent drift.
Number of Workers:	30 (13 sprayers, 17 non-sprayers)
Type of Sampling:	Full shift TWA
Sampling Location:	Breathing zone
Exposure Duration:	Full shift
Analytic Method:	NIOSH method 1025

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	Methodology of experimental data well described
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US study
	Metric 3:	Applicability	High	× 2	2	Use is within scope of RE
	Metric 4:	Temporal Representativeness	Medium	× 2	4	2005 data
	Metric 5:	Sample Size	Medium	× 1	2	30 samples. Range and mean are reported, but distribution not fully characterized

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Source Citation:	Hanley, K. W.,Petersen, M.,Curwin, B. D.,Sanderson, W. T.. 2006. Urinary bromide and breathing zone concentrations of 1-bromopropane from workers exposed to flexible foam spray adhesives, Part3. Annals of Occupational Hygiene.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3974876

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments
Domain 3: Accessibility/Clarity					
	Metric 6: Metadata Completeness	Medium	× 1	2	Full-shift TWA data with some worker activity info, but not all metadata are provided
Domain 4: Variability and Uncertainty					
	Metric 7: Metadata Completeness	Medium	× 1	2	Discuss variability between different worker activity
Overall Quality Determination†		High		1.6	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	OSHA. 2013. 1-Bromopropane Manufacturing Site Visit Report " Company A. Draft " Final. Prepared by Project Enhancement Corporation.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	5018532

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Manufacture
Life Cycle Description (Subcategory of Use):	Manufacture
Physical Form:	Liquid
Route of Exposure:	Inhalation
Exposure Concentration (Unit):	ND - 2.61 ppm
Number of Samples:	18
Number of Sites:	1
Type of Measurement or Method:	PBZ short-term and TWA
Worker Activity:	Product loading, sampling
Number of Workers:	3
Type of Sampling:	Personal
Sampling Location:	Breathing zone
Exposure Duration:	Short-term and Full shift
Exposure Frequency:	Approx. once per shift during product loading and/or sampling
Engineering Control & percent Exposure Reduction:	Richter and Dopak samplers; smart hose for truck loading; laboratory fume hood or nitrogen purge dry box
PPE:	Respirator worn during product loading
Analytic Method:	PV2061

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	Sampling method is approved by OSHA
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US facility
	Metric 3:	Applicability	High	× 2	2	Mfg is within scope of RE
	Metric 4:	Temporal Representativeness	High	× 2	2	2013 data
	Metric 5:	Sample Size	High	× 1	1	Limited number of samples, but all individual data points are provided to allow characterization of distribution

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Source Citation:	OSHA. 2013. 1-Bromopropane Manufacturing Site Visit Report " Company A. Draft " Final. Prepared by Project Enhancement Corporation.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	5018532

EVALUATION

Domain	Metric	Rating	MWF⋆	Score	Comments
Domain 3: Accessibility/Clarity					
	Metric 6: Metadata Completeness	High	× 1	1	Monitoring data includes metadata such as sample type, duration, etc.
Domain 4: Variability and Uncertainty					
	Metric 7: Metadata Completeness	Low	× 1	3	Does not address variability/uncertainty
Overall Quality Determination†		High		1.2	

⋆ MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	OSHA. 2013. 1-Bromopropane, Inspection/Case File Summary.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	5018566

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Vapor Degreasing, Spot Cleaning, Spray Adhesive, Cold Cleaning
Physical Form:	Liquid
Route of Exposure:	Inhalation
Exposure Concentration (Unit):	Varies, depends on inspected facility
Number of Samples:	Multiple
Number of Sites:	19
Type of Measurement or Method:	Full shift TWA
Worker Activity:	Varies for each inspected facility
Number of Workers:	Multiple
Type of Sampling:	Personal and area
Sampling Location:	Breathing zone; facility area
Exposure Duration:	Full shift
Exposure Frequency:	Varies
Engineering Control & percent Exposure Reduction:	Varies
PPE:	Varies
Analytic Method:	Not known

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	OSHA document
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US facilities
	Metric 3:	Applicability	High	× 2	2	Use is within scope of RE
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Inspection date ranges from 1998 - 2011
	Metric 5:	Sample Size	High	× 1	1	Individual data points are provided, which allow characterization of distribution
Domain 3: Accessibility/Clarity						

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Source Citation:	OSHA. 2013. 1-Bromopropane, Inspection/Case File Summary.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	5018566

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments
	Metric 6: Metadata Completeness	Medium	× 1	2	Monitoring data includes only critical metadata, e.g. sample type and exposure type
Domain 4: Variability and Uncertainty					
	Metric 7: Metadata Completeness	Low	× 1	3	Does not address variability/uncertainty
Overall Quality Determination†		High		1.6	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	U.S. EPA. 2006. Significant new alternatives policy (SNAP) - Risk screen on substitutes for ozone depleting substances for adhesive, aerosol solvent, and solvent cleaning applications. Proposed substitute: n-Propyl bromide.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	2991016

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Vapor Degreasing, Aerosol Degreasing
Physical Form:	Liquid
Route of Exposure:	Inhalation
Exposure Concentration (Unit):	Varies, depends on source of data
Number of Samples:	Multiple
Number of Sites:	Multiple
Type of Measurement or Method:	TWA and short-term
Worker Activity:	Varies for each facility; sometimes not specified
Number of Workers:	Multiple
Type of Sampling:	Personal and area
Sampling Location:	Breathing zone; facility area
Exposure Duration:	Full shift
Exposure Frequency:	Varies
Engineering Control & percent Exposure Reduction:	Varies
PPE:	Varies
Analytic Method:	Not known

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Low	× 1	3	Sampling and analytical method used by individual company not specified
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US facilities
	Metric 3:	Applicability	High	× 2	2	Use is within scope of RE
	Metric 4:	Temporal Representativeness	Low	× 2	6	Date of data appears to vary, many are prior to 2003, some aerosol degreasing data are from 1998
	Metric 5:	Sample Size	High	× 1	1	Individual data points are provided, which allow characterization of distribution

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Source Citation:	U.S. EPA. 2006. Significant new alternatives policy (SNAP) - Risk screen on substitutes for ozone depleting substances for adhesive, aerosol solvent, and solvent cleaning applications. Proposed substitute: n-Propyl bromide.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	2991016

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments
Domain 3: Accessibility/Clarity					
	Metric 6: Metadata Completeness	Medium	× 1	2	Monitoring data includes only critical metadata, e.g. sample type and exposure type
Domain 4: Variability and Uncertainty					
	Metric 7: Metadata Completeness	Low	× 1	3	Does not address variability/uncertainty
Overall Quality Determination†		Medium		2.0	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	NIOSH. 2001. Evaluation of Solvent Exposures from the Degreaser. Trilthic Inc., IN.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3044962

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Vapor Degreasing
Physical Form:	Liquid
Route of Exposure:	Inhalation
Exposure Concentration (Unit):	0.01 - 0.63 ppm
Number of Samples:	27
Number of Sites:	1
Type of Measurement or Method:	Full shift TWA
Worker Activity:	Placing parts in metal wire basket, lower basket into degreasing solution, raising basket and allow it to dry
Number of Workers:	75 - 85
Type of Sampling:	Personal and area
Sampling Location:	Breathing zone; facility area
Exposure Duration:	Full shift
Exposure Frequency:	Varies
Engineering Control & percent Exposure Reduction:	Room enclosure, LEV
PPE:	Nitrile gloves and splash-proof goggles
Analytic Method:	NIOSH draft method for 1-BP

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	NIOSH publication
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US facilities
	Metric 3:	Applicability	High	× 2	2	Use is within scope of RE
	Metric 4:	Temporal Representativeness	Medium	× 2	4	2000 data
	Metric 5:	Sample Size	High	× 1	1	Individual data points are provided, which allow characterization of distribution
Domain 3: Accessibility/Clarity						

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Source Citation:	NIOSH. 2001. Evaluation of Solvent Exposures from the Degreaser. Trilthic Inc., IN.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3044962

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments
	Metric 6: Metadata Completeness	Medium	× 1	2	Monitoring data includes only critical metadata, e.g. sample type and exposure type
Domain 4: Variability and Uncertainty					
	Metric 7: Metadata Completeness	Low	× 1	3	Does not address variability/uncertainty
Overall Quality Determination†		High		1.6	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	OSHA. 2018. OSHA CEHD Monitoring Data provided by Stephen Schayer to Greg Macek on 6/21/2018.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	5018565

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Vapor Degreasing
Physical Form:	Liquid
Route of Exposure:	Inhalation
Exposure Concentration (Unit):	Scored at project level?
Number of Samples:	50
Number of Sites:	15
Type of Measurement or Method:	TWA
Worker Activity:	Not described; some job titles include "parts washer/vapor degreaser"
Type of Sampling:	Personal
Sampling Location:	Breathing zone
Exposure Duration:	TWA and short-term

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	OSHA samples
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US facilities
	Metric 3:	Applicability	High	× 2	2	Use is within scope of RE based on job title description
	Metric 4:	Temporal Representativeness	High	× 2	2	2013 - 2016 data
	Metric 5:	Sample Size	High	× 1	1	Individual data points are provided, which allow characterization of distribution
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Monitoring data includes only critical metadata, e.g. sample type and exposure type
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Does not address variability/uncertainty

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Source Citation:	OSHA. 2018. OSHA CEHD Monitoring Data provided by Stephen Schayer to Greg Macek on 6/21/2018.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	5018565

EVALUATION

Domain	Metric	Rating	MWF⋆	Score	Comments
Overall Quality Determination†		High		1.3	

⋆ MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Blando, J. D.,Schill, D. P.,De La Cruz, M. P.,Zhang, L.,Zhang, J.. 2010. Preliminary study of propyl bromide exposure among New Jersey dry cleaners as a result of a pending ban on perchloroethylene. Journal of the Air and Waste Management Association.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	1619253

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Drycleaning
Physical Form:	Liquid
Route of Exposure:	Inhalation
Exposure Concentration (Unit):	ND - 54.55 ppm
Number of Samples:	26
Number of Sites:	4
Type of Measurement or Method:	8-hr TWA
Worker Activity:	Operator, clerk, seamstress
Number of Workers:	2/shop
Type of Sampling:	Personal and Area
Sampling Location:	Breathing Zone; shop areas
Exposure Duration:	Full shift
Exposure Frequency:	Varies
Engineering Control & percent Exposure Reduction:	None
PPE:	None
Analytic Method:	NIOSH 1025

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	NIOSH publication
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US facilities
	Metric 3:	Applicability	High	× 2	2	Use is within scope of RE
	Metric 4:	Temporal Representativeness	High	× 2	2	2010 study; data may have been collected in 2008
	Metric 5:	Sample Size	High	× 1	1	Limited number of samples, but individual data points allow characterization of distribution

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Source Citation:	Blando, J. D.,Schill, D. P.,De La Cruz, M. P.,Zhang, L.,Zhang, J.. 2010. Preliminary study of propyl bromide exposure among New Jersey dry cleaners as a result of a pending ban on perchloroethylene. Journal of the Air and Waste Management Association.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	1619253

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments
Domain 3: Accessibility/Clarity					
	Metric 6: Metadata Completeness	Medium	× 1	2	Monitoring data includes only critical metadata, e.g. sample type and exposure type
Domain 4: Variability and Uncertainty					
	Metric 7: Metadata Completeness	High	× 1	1	Discuss uncertainty in sampling and variability in the observed data
Overall Quality Determination†		High		1.1	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Miller, B.. 2019. Comment submitted by Bob Miller, Jr., Senior Director, Global Product Stewardship, Albemarle Corporation regarding 1-Bromopropane. Docket ID: EPA-HQ-OPPT-2019-0235-0029. Docket ID: EPA-HQ-OPPT-2019-0235-0029.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	5915210

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Vapor Degreasing
Physical Form:	Liquid
Route of Exposure:	Inhalation
Exposure Concentration (Unit):	ND (0.2 ppm or 0.3 ppm)
Number of Samples:	167
Number of Sites:	1
Type of Measurement or Method:	TWA
Worker Activity:	Degreaser machine operator; other employees who perform on work stations located 10 - 65 ft away from the mid-point of two degreasers
Number of Workers:	59
Type of Sampling:	Personal
Sampling Location:	Breathing zone
Exposure Duration:	Full shift
Exposure Frequency:	Varies
Engineering Control & percent Exposure Reduction:	Ventilation (AC units) with superior air exchange rate of 7.7 air exchange per hour
PPE:	None
Analytic Method:	NIOSH 1025

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	Analytical method is a NIOSH method
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US facility
	Metric 3:	Applicability	High	× 2	2	Use is within scope of RE
	Metric 4:	Temporal Representativeness	High	× 2	2	Monitoring data collected in 2018
	Metric 5:	Sample Size	High	× 1	1	Individual data points are provided, which allow characterization of distribution

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Source Citation:	Miller, B.. 2019. Comment submitted by Bob Miller, Jr., Senior Director, Global Product Stewardship, Albemarle Corporation regarding 1-Bromopropane. Docket ID: EPA-HQ-OPPT-2019-0235-0029. Docket ID: EPA-HQ-OPPT-2019-0235-0029.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	5915210

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments
Domain 3: Accessibility/Clarity					
	Metric 6: Metadata Completeness	High	× 1	1	Monitoring data include associated metadata, such as sample types, sample duration, and work activitiy
Domain 4: Variability and Uncertainty					
	Metric 7: Metadata Completeness	Medium	× 1	2	Study provides limited discussion of variability and uncertainty in the exposure estimates
Overall Quality Determination†		High		1.1	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Enviro Tech International. 2020. Comment submitted by Richard G. Morford, General Counsel on behalf of Enviro Tech International Inc. RE: Formulation Facility Exposure Testing Report November 2019, Docket EPA-HQ-OPPT-2016-0741.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	6465296

EXTRACTION

Parameter	Data
Life Cycle Stage:	Processing
Life Cycle Description (Subcategory of Use):	Formulation of various 1-BP based products
Physical Form:	Liquid
Route of Exposure:	Inhalation
Exposure Concentration (Unit):	ND - 7.2 ppm
Number of Samples:	11 personal, 15 area
Number of Sites:	1
Type of Measurement or Method:	8-hr TWA
Worker Activity:	Mixing room operator unloads a tanker of neat 1-BP into the system, adds other necessary commpounds and decants finished product into packaging. Other employees work in other areas of the facility (see report for more details).
Number of Workers:	11
Type of Sampling:	Personal and Area
Sampling Location:	Breathing Zone; other facility areas
Exposure Duration:	Full shift
Exposure Frequency:	Varies
Engineering Control & percent Exposure Reduction:	Facility ventilation /exhaust fans (10 air exchange/hr in Area A)
PPE:	Viton or nitrile gloves, 3M Rugged Comfort Quick Latch Half Facepiece Reusable Respirator Model 6503 (APF 10)
Analytic Method:	ACS SOP II-62 based on NIOSH 1011, OSHA

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments
Domain 1: Reliability					
	Metric 1: Methodology	Medium	× 1	2	Anallytical method ACS SOP II-62 based on NIOSH 1011, OSHA PV-2061 with diffuse sampler. Monitoring badges meet OSHA requirements and analysis conducted in ACGIH-accredited laboratory
Domain 2: Representative					

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Source Citation:	Enviro Tech International. 2020. Comment submitted by Richard G. Morford, General Counsel on behalf of Enviro Tech International Inc. RE: Formulation Facility Exposure Testing Report November 2019, Docket EPA-HQ-OPPT-2016-0741.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	6465296

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments
	Metric 2: Geographic Scope	High	× 1	1	US facility
	Metric 3: Applicability	High	× 2	2	Use is within scope of RE
	Metric 4: Temporal Representativeness	High	× 2	2	Monitoring data collected in 2019
	Metric 5: Sample Size	High	× 1	1	Individual data points are provided, which allow characterization of distribution
Domain 3: Accessibility/Clarity					
	Metric 6: Metadata Completeness	High	× 1	1	Monitoring data include associated metadata, such as sample types, sample duration, and work activitiy
Domain 4: Variability and Uncertainty					
	Metric 7: Metadata Completeness	Medium	× 1	2	Study provides limited discussion of variability and uncertainty in the exposure estimates
Overall Quality Determination†		High		1.2	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Facility

Source Citation:	Niosh,. 2007. Workers' exposures to n-propyl bromide at a printed electronics circuit assembly manufacturer.
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3355604

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Vapor Degreasing
Process Description:	Small capacity open-top vapor degreaser used on as-needed basis for soldering and potting activities to clean flexible and rigid parts of PCB. Degreaser contains a hand actuated spray wand and nozzle to supplement the vapor cleaning (Pioneer Circuits Inc. in santa Ana, CA)

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	NIOSH HHE
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Use is within scope
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Study conducted 8/16-18, 2004
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Data source, assessment method, results and assumptions are clearly described.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Does not address variability/uncertainty
Overall Quality Determination†			High		1.5	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Niosh,. 2007. Workers' exposures to n-propyl bromide at a hydraulic power control component manufacturer.
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3355621

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Vapor Degreasing
Process Description:	1 vapor degreaser shared by a dozen workers in Teflon and Refurbishing dept. and is used on as-needed basis. A medium capacity open-top vapor degreasing is located in a small ventilated room. An additional iquid solvent wash tank is located outside in a chemical shed.
Chemical Concentration:	94 percent

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	NIOSH HHE
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Use is within scope
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Study conducted in 2004
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Data source, assessment method, results and assumptions are clearly described.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Does not address variability/uncertainty
Overall Quality Determination†			High		1.5	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Atsdr,. 2016. Draft toxicological profile for1-bromopropane.
Type of Data Source	Facility; Completed Exposure or Risk Assessments;
Hero ID	3827325

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Manufacture
Life Cycle Description (Subcategory of Use):	Manufacture and Import
Process Description:	Mfg via dehydration of propanol with bromine or hydrogen bromide
Total Annual U.S. Volume (and percent of PV):	5,000 mt produced in US in 2006, growing 15-20 percent per yrImport - 10.9 and 10.3MM lb in 2007 and 2011, respectively (total brominated derivatives of acryclic hydrocarbons)

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	ATSDR report
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Use is within scope
	Metric 4:	Temporal Representativeness	Medium	× 2	4	2017 report, but data are from 2006-2007
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Low	× 1	3	underlying data/sources not well described
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Does not address variability/uncertainty
Overall Quality Determination†			Medium		1.8	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Cdc,. 2016. Criteria for a recommended standard: Occupational exposure to 1-bromopropane.
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3827326

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Vapor Degreasing, Spray Adhesive
Number of Sites:	2,540 - 9,280 businesses (vapor degreaser - 500-2,500; foam mfg - 100-280)

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	Cites a 2007 EPA source
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Use is within scope
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Data from 2007
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Low	× 1	3	underlying data/sources not well described
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Does not address variability/uncertainty
Overall Quality Determination†			Medium		1.8	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	2017. PubChem: 1-Bromopropane.
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3860484

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Manufacture
Life Cycle Description (Subcategory of Use):	Manufacture and Import
Process Description:	Mfg by treatment of hydroxyl compound with a bromide and sulfuric acid
Total Annual U.S. Volume (and percent of PV):	2002: 1-10MM lb (IUR)
Number of Sites:	41 chemical vendors

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	Process description from Kirk-Othmer; PV from IUR
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Mfg is within scope
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Data from 2006
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Clearly cites the source of information
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Does not address variability/uncertainty
Overall Quality Determination†			High		1.5	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	2014. Report on carcinogens: 1-Bromopropane.
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3860561

EXTRACTION

Parameter	Data
Life Cycle Stage:	Manufacture
Life Cycle Description (Subcategory of Use):	Manufacture and Import
Process Description:	Describes possible use as spot remover in textile industry
Total Annual U.S. Volume (and percent of PV):	2012 - 15.3 MM lb. 2013 - 9.2 MM lb import, 15.6MM lb export (CDR)
Number of Sites:	21 mfg world-wide, incl. at least 1 in US (SRI, 2012)

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	Info from CDR and SRI
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Mfg is within scope
	Metric 4:	Temporal Representativeness	High	× 2	2	Data from 2012-2013
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Clearly cites the source of information
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Does not address variability/uncertainty
Overall Quality Determination†			High		1.3	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	1999. Nomination of 1-bromopropane (1-BP) and 2-bromopropane (2-BP) for testing by the national toxicology program.
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3860562

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Manufacture
Life Cycle Description (Subcategory of Use):	Manufacture and Import
Total Annual U.S. Volume (and percent of PV):	1 mfg est. an additional 2.5MM lb may be used/yr as cleaning agent
Number of Sites:	1

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	OSHA publication
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Mfg is within scope
	Metric 4:	Temporal Representativeness	Medium	× 2	4	1999
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Low	× 1	3	Underlying data/sources not well described
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Does not address variability/uncertainty
Overall Quality Determination†			Medium		1.8	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	2013. Report on carcinogens: monograph of 1-bromopropane.
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3860563

EXTRACTION

Parameter	Data
Life Cycle Stage:	Manufacture
Life Cycle Description (Subcategory of Use):	Manufacture and Import
Process Description:	1-BP is produced by reacting n-propyl alcohol with hydrogen bromide and then removing the water that forms"
Total Annual U.S. Volume (and percent of PV):	mfg: 1-10MM lb (2006)Import: 10.3MM lb (2011) (CDR data)
Number of Sites:	At least 1 US mfg in 2012 (SRI, 2012)

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	Info from CDR and SRI
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Mfg is within scope
	Metric 4:	Temporal Representativeness	High	× 2	2	Data from 2012
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Clearly cites the source of information
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Does not address variability/uncertainty
Overall Quality Determination†			High		1.3	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Echa,. 2014. Draft results of the 6th prioritisation of the SVHCs on the Candidate List with the objective to recommend priority substances for inclusion in Annex XIV.
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3970684

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Manufacture
Life Cycle Description (Subcategory of Use):	Manufacture and Import
Process Description:	Some volume used as an intermediate in mfg of chemicals. May also be used in some laboratory analyses.
Total Annual U.S. Volume (and percent of PV):	1,000 ton/yr in EU.

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Medium	× 1	2	ECHA document, but methodology not well described
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	EU
	Metric 3:	Applicability	High	× 2	2	Mfg and uses within scope
	Metric 4:	Temporal Representativeness	Low	× 2	6	Year of data unknown
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Low	× 1	3	Source of info unknown
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Does not address variability/uncertainty
Overall Quality Determination†			Low		2.3	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Oehha,. 2007. Occupational health hazard risk assessment project for California: Identification of chemicals of concern, possible risk assessment methods, and examples of health protective occupational air concentrations.
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3982225

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Manufacture
Life Cycle Description (Subcategory of Use):	Manufacture and Import
Total Annual U.S. Volume (and percent of PV):	1-10M lb in 2004

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	Data appear to come from IUR
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Mfg is within scope
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Data from 2004
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Only some metadata
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Does not address variability/uncertainty
Overall Quality Determination†			High		1.6	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Dhhs,. 2017. Skin Notation (SK) Profile 1-Bromopropane.
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3986431

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Degreasing
Chemical Concentration:	95.5 percent (degreasing solvent) (Sclar, 1999)

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	Concentration came from one specific site visit
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Use is within scope
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Data from 1999
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Low	× 1	3	Little to no metadata
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Does not address variability/uncertainty
Overall Quality Determination†			Medium		1.8	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Cdph,. 2017. 1-Bromopropane.
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3969295

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Aerosol degreasing, other misc. uses
Process Description:	Indicates potential use of 1-BP in coatings for pipes and other fixtures, and use of spray aerosols containing 1-BP to clean auto parts. Source also lists a number of products containing 1-BP

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Low	× 1	3	Source of data and methodology unclear
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Use is within scope
	Metric 4:	Temporal Representativeness	High	× 2	2	2016 publication
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Low	× 1	3	Little to no metadata
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Does not address variability/uncertainty
Overall Quality Determination†			Medium		1.8	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	U.S, E. P. A.. 2001. Guide to industrial assessments for pollution prevention and energy efficiency.
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3827322

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Degreasing
Process Description:	Source describes cold cleaning and vapor degreasing, generation of solvent waste stream, recycling of cleaning medium (see Section 5)

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	EPA document
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Use is within scope
	Metric 4:	Temporal Representativeness	Medium	× 2	4	2001 publication
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Low	× 1	3	Little to no metadata
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Does not address variability/uncertainty
Overall Quality Determination†			Medium		1.8	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	The Massachusetts Toxics Use Reduction Institute, University of Massachusetts Lowell. 2006. Five chemicals alternatives assessment study.
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3981053

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Degreasing
Process Description:	1-BP is the most widely used alternative to PERC for vapor degreasing. 1-BP has lower surface tension thatn PERC which makes it favorable for cleaning complex geometric parts. nPB cost $13/gal, 3 times as much as PERC.

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	TURA document
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Use is within scope
	Metric 4:	Temporal Representativeness	High	× 2	2	2006 publication
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	N/A		N/A	N/A - qualitative information
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	N/A		N/A	N/A - qualitative information
Overall Quality Determination†			High		1.0	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	The Massachusetts Toxics Use Reduction Institute, University of Massachusetts Lowell. 2006. Five chemicals alternatives assessment study.
Type of Data Source	Facility; Published Models for Exposures or Releases;
Hero ID	3981053

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Dry cleaning
Process Description:	Dry cleaning machine load capacity: 35-65 lb (avg: 50 lb) in CA, and 45-60 lb (avg: 53 lb) in MA. In most forms of dry cleanings, spotting agents are usually used before dry cleaning takes place. Source also indicates recycling of dry cleaning solvent via a distillation unit.

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	TURA document
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Use is within scope
	Metric 4:	Temporal Representativeness	High	× 2	2	2006 publication
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	N/A		N/A	N/A - qualitative information
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	N/A		N/A	N/A - qualitative information
Overall Quality Determination†			High		1.0	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Echa,. 2015. Background document for 1-bromopropane.
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3970681

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Misc.
Process Description:	1-BP may be used in some laboratory analyses

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	ECHA document
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	EU
	Metric 3:	Applicability	High	× 2	2	Use is within scope
	Metric 4:	Temporal Representativeness	High	× 2	2	2015 publication
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	N/A		N/A	N/A - qualitative information
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	N/A		N/A	N/A - qualitative information
Overall Quality Determination†			High		1.2	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	U.S, E. P. A.. 1995. Guidance document for the halogenated solvent cleaner NESHAP.
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3827323

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Degreasing
Process Description:	Describes batch v. in-line machine configurations and emission controls relating to NESHAP compliance (not 1-BP specific)

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	EPA document
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Use is within scope
	Metric 4:	Temporal Representativeness	Low	× 2	6	1995 document
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	N/A		N/A	N/A - qualitative information
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	N/A		N/A	N/A - qualitative information
Overall Quality Determination†			Medium		1.7	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Hsia,. 2011. Model rule for solvent defreasing.
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3982145

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Degreasing
Process Description:	"TCE is typically recycled as part of a controlled process, leaving only filters and sludge to be disposed of. Aqueous systems require much greater water usage and produce large amounts of contaminated wastewater" Airless degreasers have major operational disadvantages...and are not an option in many applications. A number of companies in PA clean the narrow tubes they mfg in large (40-50 feet) custom-built equipment. No airless system is available that meets such requirements."

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	HSIA
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Use is within scope
	Metric 4:	Temporal Representativeness	High	× 2	2	2011 document
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	N/A		N/A	N/A - qualitative information
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	N/A		N/A	N/A - qualitative information
Overall Quality Determination†			High		1.0	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Hesis,. 2016. 1-bromopropane (n-propyl bromide): Health hazard alert.
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3982242

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Misc.
Process Description:	Indicates use of 1-BP when applying "coatings to pipes or other fixtures" and in "spray aerosols used to clean auto parts". Source identifies commercial products containing 1-BP (adhesives, cleaners and degreasers, and other solvents)

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	California Dept of Public Health
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Use is within scope
	Metric 4:	Temporal Representativeness	High	× 2	2	2016 document
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	N/A		N/A	N/A - qualitative information
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	N/A		N/A	N/A - qualitative information
Overall Quality Determination†			High		1.0	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Echa,. 2011. Comments on Annex XV Dossier for identification of a substance as SVHC and response to these comments.
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3970682

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Misc.
Process Description:	U.S. aerospace industry identifies the use of 1-BP in solvents, vapor degreasing and cleaning. A company in the Netherlands identifies majority of 1-BP used as an intermediate. Enviro Tech and several other companies in UK indicate current use of 1-BP as direct replacement for TCE in vapor degreasing equipment (in use for several years). 1 co. in Germany indicates use in closed loop cleaning system with short cleaning times and usage of 3-4 LT per day. Most customers of PPC in France use their products as intermediates in pharmaceutical or agrochemical industries. They have very few customers for 1-BP, all of which are in pharmaceutical industry. 1-BP is produced in well-closed equipment at PPC and monitoring data within past 5 years were all below 10 ppm. Based on information collected by REACH Consortium for Brominated substances, 69 percent of 1-BP is used for intermediate purposes. One UK company states that stabilized 1-BP is also "used in asphalt testing as a replacement for TCE. This is a laboratory test whereby 1-BP dissolves the bitumen out of asphalt to separate it from the aggregate and the solvent then distilled off and collected for re-use."

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Medium	× 1	2	ECHA comment summary document; comments submitted by various companies in Europe
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	Europe
	Metric 3:	Applicability	High	× 2	2	Use is within scope
	Metric 4:	Temporal Representativeness	High	× 2	2	2011 document
	Metric 5:	Sample Size	N/A		N/A	No Comment.

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Source Citation:	Echa,. 2011. Comments on Annex XV Dossier for identification of a substance as SVHC and response to these comments.
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3970682

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments
Domain 3: Accessibility/Clarity					
	Metric 6: Metadata Completeness	N/A		N/A	N/A - qualitative information
Domain 4: Variability and Uncertainty					
	Metric 7: Metadata Completeness	N/A		N/A	N/A - qualitative information
Overall Quality Determination†		High		1.3	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Echa,. 2015. Opinion of the Member State Committee on the sixth draft recommendation of the priority substances and Annex XIV entries.
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3970683

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Misc.
Process Description:	Source indicates 1-BP does not have consumer uses, and is primarily used as intermediates in the EU

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Medium	× 1	2	ECHA comment summary document; comments submitted by various companies in Europe
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	Europe
	Metric 3:	Applicability	High	× 2	2	Use is within scope
	Metric 4:	Temporal Representativeness	High	× 2	2	2015 document
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	N/A		N/A	N/A - qualitative information
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	N/A		N/A	N/A - qualitative information
Overall Quality Determination†			High		1.3	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Raymond, L. W.,Ford, M. D.. 2007. Severe illness in furniture makers using a new glue: 1-bromopropane toxicity confounded by arsenic. Journal of Occupational and Environmental Medicine.
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	1025819

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Spray adhesive
Process Description:	Glue was applied by spraying in aerosol form and directly by hand and by brush
Operating Days per Year and Batches per Day:	8 hr/day, 5 day/wk
Possible Physical Form:	Liquid
Chemical Concentration:	70 percent

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	published journal article
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Use is within scope
	Metric 4:	Temporal Representativeness	Medium	× 2	4	2007 study
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	N/A		N/A	N/A - qualitative information
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	N/A		N/A	N/A - qualitative information
Overall Quality Determination†			High		1.3	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Ntp, Cerhr. 2003. NTP-CERHR monograph on the potential human reproductive and developmental effects of 1-bromopropane.
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	1519109

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Manufacture
Life Cycle Description (Subcategory of Use):	Manufacture and Import
Process Description:	Mfg by reacting n-propyl alcohol with hydrogen bromide and removing the water that forms. Also can be produced by dehydration of propanol with bromine or hydrogen bromide in presence of sulfur catalyst. Cites other sources on exposure concentration ranges
Total Annual U.S. Volume (and percent of PV):	1.5 MM lb in 2000 produced, 2.8 MM lb imported

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	US govt publication
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Use is within scope
	Metric 4:	Temporal Representativeness	Medium	× 2	4	2003 publication, but data are older
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	N/A		N/A	N/A - qualitative information
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	N/A		N/A	N/A - qualitative information
Overall Quality Determination†			High		1.3	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Niosh,. 1997. Control of health and safety hazards in commercial drycleaners: chemical exposures, fire hazards, and ergonomic risk factors.
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3044963

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Dry cleaning
Process Description:	70 percent dry cleaning shops have 1-4 employees, 17 percent have 5-9 employees. Typical process begins when garments are brought to the shop. They are initially tagged for identification. Prior to spotting or being loaded into machines, they are inspected and sorted. See source for detailed process description.

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	US govt publication
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Use is within scope
	Metric 4:	Temporal Representativeness	Low	× 2	6	1997
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	N/A		N/A	N/A - qualitative information
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	N/A		N/A	N/A - qualitative information
Overall Quality Determination†			Medium		1.7	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Hsia,. 2010. Petition to add n-propyl bromide to list of hazardous air pollutants regulate under section 112 of the Clean Air Act [with cover letter date 10/28/2010].
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3045668

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Various
Process Description:	General use information as aerosol solvents (incl. lubricants, coatings), adhesives, and vapor degreasing.
Total Annual U.S. Volume (and percent of PV):	use of a solvent - growing at 15-20 percent /yr in US (5,000 metric tonnes)

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Medium	× 1	2	Unknown methodology
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Use is within scope
	Metric 4:	Temporal Representativeness	Medium	× 2	4	PV data appears to be for 2007
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	N/A		N/A	N/A - qualitative information
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	N/A		N/A	N/A - qualitative information
Overall Quality Determination†			High		1.5	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	U.S, E. P. A.. 2017. Preliminary Information on Manufacturing, Processing, Distribution, Use, and Disposal: 1-Bromopropane. Support document for Docket EPA-HQ-OPPT-2016-0741.
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3827328

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Various
Process Description:	Use Dossier provides indication of various uses
Total Annual U.S. Volume (and percent of PV):	Use Dossier indicates 2015 PV to be 25.8 MM lb (2016 CDR)
Chemical Concentration:	See Use Dossier for concentration for each product

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	EPA publication
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Use is within scope
	Metric 4:	Temporal Representativeness	High	× 2	2	2016 CDR data
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	N/A		N/A	N/A - qualitative information
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	N/A		N/A	N/A - qualitative information
Overall Quality Determination†			High		1.0	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	2017. Chemical data reporting: 1-bromo-propane.
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3860454

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Various
Process Description:	Chemview data, provides specific names of companies that manufacture or import 1-BP from 2012 CDR
Total Annual U.S. Volume (and percent of PV):	Based on 2012 CDR data, national aggregate PV is 15 MM lb

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	EPA publication
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Use is within scope
	Metric 4:	Temporal Representativeness	High	× 2	2	2012 CDR data
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	N/A		N/A	N/A - qualitative information
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	N/A		N/A	N/A - qualitative information
Overall Quality Determination†			High		1.0	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Ashford, R. D.. 2001. Ashford's Dictionary of Industrial ChemicalsN-propyl bromide.
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3860433

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Manufacture
Life Cycle Description (Subcategory of Use):	Manufacture
Process Description:	Ashford Chemical Dictionary indicates 1-BP production is from n-propanol with ydrochromic acid (alcohol bromination)
Possible Physical Form:	Liquid

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	Ashford Chemical Dictionary
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Mfg is within scope
	Metric 4:	Temporal Representativeness	Medium	× 2	4	2001 edition
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	N/A		N/A	N/A - qualitative information
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	N/A		N/A	N/A - qualitative information
Overall Quality Determination†			High		1.3	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	IRTA. 2016. Alternative Compliance Strategies for Enclosed and Conveyorized Vapor Degreasers under a Prohibition of Trichloroethylene. Draft..
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	5018567

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Degreasing
Number of Sites:	100 vacuum degreasers and 800 conveyorized degreasers using 1-BP

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Low	× 1	3	Data sources and estimation techniques not specified
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Use is within scope
	Metric 4:	Temporal Representativeness	High	× 2	2	2016 document
	Metric 5:	Sample Size	Low	× 1	3	Estimate not characterized by statistics
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Low	× 1	3	Underlying data and methods not fully transparent
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Variability and uncertainty not addressed
Overall Quality Determination†			Medium		1.9	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Enviro Tech International. 2017. RE: 1-Bromopropane, Docket ID number EPA-HQ-OPPT 2016-0741. The Use of 1-bromopropane (nPB) in the Dry Cleaning Industry.
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	5018569

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Dry cleaning
Total Annual U.S. Volume (and percent of PV):	<50,000 lb 1-BP used in dry cleaning sector in 2015, <40,000 lb in 2016, and likely <30,000 lb in 2017
Number of Sites:	9 converted PERC machines and 19 DrySolv machines were in service in 2016

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Medium	× 1	2	Data from company expected to be knowledgeable with the sector, but industry data may present potential biase
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Use is within scope
	Metric 4:	Temporal Representativeness	High	× 2	2	2017 public comment
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Data comes from a company likely knowledgeable with the information, but underlying data are not fully transparent
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Variability and uncertainty not addressed
Overall Quality Determination†			High		1.5	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	U.S. EPA. 2013. Use and market profile for 1-bromopropane in vapor degreasers, spray adhesives, and aerosol solvents.
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3045699

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Aerosol Degreasing
Number of Sites:	1,000 - 5,000 businesses used 1-BP-based aerosol solvents in 2002

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	US govt publication
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Use is within scope
	Metric 4:	Temporal Representativeness	Medium	× 2	4	2013 publication, which cites data from a 2007 document
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Low	× 1	3	Underlying data and methods not fully transparent
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Does not address variability/uncertainty
Overall Quality Determination†			Medium		1.8	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Enviro Tech International. 2019. Personal communication between R. Morford (Enviro Tech International, Inc.) and D. Parsons (U.S. EPA).
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	5261917

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Dry cleaning
Number of Sites:	8 dry cleaning establishments use 1-BP in 2019

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Medium	× 1	2	Data from company expected to be knowledgeable with the sector, but industry data may present potential biase
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Use is within scope
	Metric 4:	Temporal Representativeness	High	× 2	2	2019 communication
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Data comes from a company likely knowledgeable with the information, but underlying data are not fully transparent as the location of the specific establishments is not known
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Variability and uncertainty not addressed
Overall Quality Determination†			High		1.5	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.