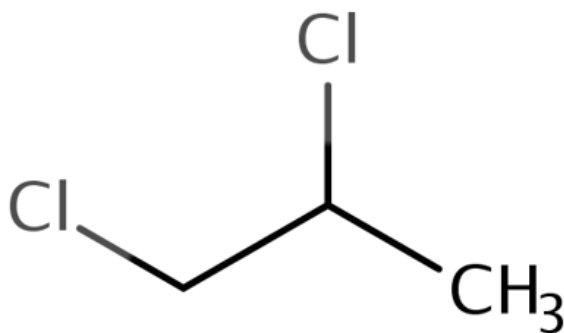

**Draft Data Quality Evaluation and Data Extraction Information for
Environmental Release and Occupational Exposure for
1,2-Dichloropropane**

Systematic Review Support Document for the Draft Risk Evaluation

CASRN: 78-87-5



July 2026

This supplemental file contains information regarding the data extraction and quality evaluation results for data sources that were considered for the *Draft Risk Evaluation for 1,2-Dichloropropane* and that underwent systematic review. EPA conducted data extraction, and quality evaluation based on author-reported descriptions and results; additional analyses (*e.g.*, statistical analyses) potentially conducted by EPA are not contained in this supplemental file. EPA used the TSCA systematic review process described in the *Draft Systematic Review Protocol Supporting TSCA Risk Evaluations for Chemical Substances* (referred to hereafter as the '2021 Draft Systematic Review Protocol').

Data that met the RESO screening criteria during the full-text screening was extracted by three data types, general facility, occupational exposure, and environmental release, as explained in Section 6.2 of the 2021 Draft Systematic Review Protocol. Five different data quality evaluation forms were used depending on the data type and condition of use (COU), as explained in Appendix M of the 2021 Draft Systematic Review Protocol. All references with data points containing monitoring data (*e.g.*, measured occupational exposures) underwent data quality evaluation as described in Section M.6.1, using the monitoring data quality metrics. All references with data points containing environmental release data (*e.g.*, measured or calculated quantities of chemical release across facility fence line) underwent data quality evaluation as described in Section M.6.2, using the environmental release data quality metrics. All references with data points containing published models for environmental release or occupational exposure (*e.g.*, published models used to calculate occupational exposure or environmental releases) underwent data quality evaluation as described in Section M.6.3, using the published models for environmental release or occupational exposure quality metrics. All references with data points containing completed exposure or risk assessments (*e.g.*, completed exposure or risk assessments containing a broad range of data types) underwent data quality evaluation as described in Section M.6.4, using the completed exposure or risk assessments quality metrics. All references with data points containing reports for data or information other than exposure or release data (*e.g.*, process description) underwent data quality evaluation as described in Section M.6.5, using the reports for data or information other than exposure or release data quality metrics. The extracted data and their data quality evaluation are available in the tables below.

Additionally, each data type and condition of use is evaluated independently within a given study; therefore, each reference may have more than one overall quality determination (OQD) to reflect the quality of each outcome and the exposures and releases more appropriately as described by the study authors. No OQD is determined for each reference, as a whole, if it contains data from more than one evidence stream.

HERO ID	Reference	Page
Occupational Exposure		
Monitoring Data		
13283276	ACC, (2021). ACC PDC TSCA Consortium Monitoring Data - Letters and data files.	9
13283270	Consulting,, Integral (2026). Final Study Report for Inhalation Monitoring of 1,2-Dichloropropane [Redacted].	10
10610564	Dow Chemical, (2018). [Redacted] 2017 Industrial hygiene monitoring for XXX 1,2-dichloropropane, B-7500, propylene oxide purification, Freeport, Texas.	11
1441904	Dow Chemical, (1982). Environmental health survey report first half-1978 personnel exposure to chlorinated hydrocarbons at the chlorinated solvents plant.	12
2803592	Dow Chemical, (1982). Industrial hygiene monitoring glycerine I.	13
2803605	Dow Chemical, (1979). Personnel monitoring at Dowicil plant for chlorinated hydrocarbons.	14
3064997	Dow Chemical, (1979). Environmental health survey report first half-1979 personnel exposure to chlorinated hydrocarbons at the chlorinated solvents plant.	15
4214362	Dow Chemical, (1992). Letter from Dow Chem Co submitting several studies with trichloroethylene and other chemicals in humans with attachments (sanitized).	16
6569934	Dow Chemical, (1984). Comments on 1,2-dichloropropane proposed test rule. Document control number OPTS-42043.	17
5344296	Hanazato, M., Suzuki, N., Koga, C., Nakaoka, H., Mori, C. (2018). A study of design for reduction and monitoring of volatile organic compounds in indoor air: The case of a commercial bank in Japan. Journal of Asian Architecture and Building Engineering 17(3):573-579.	18
5160036	IARC, (2017). Some chemicals used as solvents and in polymer manufacture.	19
4725079	Kwak, K. M., Jeong, K. S., Shin, D. H., Choi, W. J., Kim, H. S., Kang, S. K. (2018). Acute toxic encephalopathy induced by occupational exposure to 1,2-dichloropropane. Industrial Health 56(6):561-565.	21
7700090	Mo, H., Lu, S., Shao, M. (2021). Volatile organic compound (VOC) emissions and health risk assessment in paint and coatings industry in the Yangtze River Delta, China. Environmental Pollution 269:115740.	22
7700088	Park, C. S., Kim, H. S., Ahn, Y. S., Ahn, J. H., Jeong, K. S. (2020). Validation of urinary 1,2-dichloropropane concentration as a biological exposure index for workers exposed to 1,2-dichloropropane. Annals of Occupational and Environmental Medicine 32(1):e24.	23
6613834	Ravina, M., Facelli, A., Zanetti, M. (2020). Halocarbon emissions from hazardous waste landfills: Analysis of sources and risks. Atmosphere 11(4):375.	24
2803575	Sybron, (1976). W/R 0670 charcoal absorption.	25
2803576	Sybron, (1982). Personal air sampling results for propylene dichloride.	26
5074722	Tong, R., Zhang, L.,ei, Yang, X., Liu, J., Zhou, P., Li, J. (2019). Emission characteristics and probabilistic health risk of volatile organic compounds from solvents in wooden furniture manufacturing. Journal of Cleaner Production 208:1096-1108.	27
1455493	Vitali, M., Ensabella, F., Stella, D., Guidotti, M. (2006). Exposure to organic solvents among handicraft car painters: A pilot study in Italy. Industrial Health 44(2):310-317.	28

Table of Contents

4697151	Xing, L., Wang, L., Zhang, R. (2018). Characteristics and health risk assessment of volatile organic compounds emitted from interior materials in vehicles: a case study from Nanjing, China. Environmental Science and Pollution Research 25(15):14789-14798.	29
Published Models for Exposures or Releases		
3230538	Frasch, H. F., Bunge, A. L. (2015). The transient dermal exposure II: post-exposure absorption and evaporation of volatile compounds. Journal of Pharmaceutical Sciences 104(4):1499-1507.	30
5160036	IARC, (2017). Some chemicals used as solvents and in polymer manufacture.	31
3222353	Ng, M. G., Tongeren, van, M., Semple, S. (2014). Simulated transfer of liquids and powders from hands and clothing to the mouth. Journal of Occupational and Environmental Hygiene 11(10):633-644.	32
3064883	Yamada, K., Kumagai, S., Endo, G. (2015). Chemical exposure levels in printing workers with cholangiocarcinoma (second report). Journal of Occupational Health 57(3):245-252.	34
3064878	Yamada, K., Kumagai, S., Kubo, S., Endo, G. (2015). Chemical exposure levels in printing and coating workers with cholangiocarcinoma (third report). Journal of Occupational Health 57(6):565-571.	35
2797854	Yamada, K., Kumagai, S., Nagoya, T., Endo, G. (2014). Chemical exposure levels in printing workers with cholangiocarcinoma. Journal of Occupational Health 56(5):332-338.	36
Completed Exposure or Risk Assessments		
7474963	ACC, (2021). Letter to DGAD, OPPT, USEPA, from Colleen Stevens, ACC, re: Propylene dichloride: In vitro dermal absorption rate testing (CAS No 78-87-5).	37
2803587	Dow Chemical, (1983). Letter summarizing the EPA/Dow Chemical Co meeting regarding the manufacture of 1,2-dichloropropane.	38
7461856	DuPont, (2005). Propylene dichloride: In vitro dermal absorption rate testing.	41
6499659	OSHA, (2019). Chemical exposure health data (CEHD) sampling results: CASRNs 75-34-3, 85-68-7, 84-74-2, 78-87-5, 117-81-7, 106-93-4, 50-00-0, 95-50-1, 85-44-9, 106-46-7, 79-00-5, and 115-86-6.	42
10480466	U.S. EPA, (2023). Use of laboratory chemicals - Generic scenario for estimating occupational exposures and environmental releases (Revised draft generic scenario).	43
11182966	U.S. EPA, (2022). Chemical repackaging - Generic scenario for estimating occupational exposures and environmental releases (revised draft).	44
1481714	U.S. EPA, (1988). Preliminary results summary: Indoor air monitoring phase II & data for warehouse and navy yard & evaluation of selected heating, ventilation & air conditioning system with attachments.	45
6385708	U.S. EPA, (2003). Transportation equipment cleaning - Generic scenario for estimating occupational exposures and environmental releases (draft).	46
5550004	Wang, D., Yu, H., Shao, X., Yu, H., Nie, L. (2018). Direct and potential risk assessment of exposure to volatile organic compounds for primary receptor associated with solvent consumption. Environmental Pollution 233:501-509.	47
Reports for Data or Information Other than Exposure or Release Data		
5160134	ATSDR, (1989). Toxicological profile for 1,2-dichloropropane.	48
1997907	Bauer, A. (2013). Contact dermatitis in the cleaning industry. Current Opinion in Allergy and Clinical Immunology 13(5):521-524.	49
664488	CDC, (2009). Fourth national report on human exposure to environmental chemicals.	50
61012	Cohr, K. H. (1986). Uptake and distribution of common industrial solvents. Progress in Clinical and Biological Research 220:45-60.	51
1441931	Dow Chemical, (1988). Mortality among Dow Chemical employees of a Texas operations per-tet manufacturing plant with cover letter dated 050389.	52

1,2-Dichloropropane

Table of Contents

664480	Dow Chemical, (1991). Letter to USEPA regarding enclosed document concerning the complete review of a medical surveillance and related data concerning Dow Chemical Company employees.	53
7310678	ECHA, (2020). Substance infocard: 1,2-dichloropropane.	54
7347515	ECHA, (2021). Registration dossier: 1,2-Dichloropropane: Toxicological summary.	55
1618719	Fasano, W. J., McDougal, J. N. (2008). In vitro dermal absorption rate testing of certain chemicals of interest to the Occupational Safety and Health Administration: Summary and evaluation of USEPA's mandated testing. Regulatory Toxicology and Pharmacology 51(2):181-194.	56
684250	Grzywa, Z., Rudzki, E. (1981). Dermatitis from dichloropropane. Contact Dermatitis 7(3):151-152.	57
7681904	NCBI, (2020). PubChem Compound Summary for CID 6564, 1,2-Dichloropropane.	58
192177	NIOSH, (2007). NIOSH pocket guide to chemical hazards.	59
2919616	NIOSH, (2019). NIOSH pocket guide to chemical hazards. Propylene dichloride.	60
7347516	NIOSH, (1978). Occupational health guideline for propylene dichloride.	61
13283273	Restek Corp, (2026). Safety Data Sheet (SDS): 1,2-Dichloropropane standard.	62
13283271	Sigma-Aldrich, (2026). Safety Data Sheet (SDS): 1,2-Dichloropropane.	63
11138808	U.S. BLS, (2023). U.S. Census Bureau of Labor Statistics Data from 2021.	64
10366189	U.S. EPA, (2020). 2020 CDR: Commercial and consumer use.	65
11224653	U.S. EPA, (2013). Updating CEB's method for screening-level estimates of dermal exposure.	66
13246149	U.S. EPA, (2026). Chemical Data Reporting (CDR): Reporting year 2024.	67

Environmental Releases**Environmental Release Data**

1481094	Arthur D. Little Inc, (1987). Evaluation of chemical air emissions from the Bristol plant production facilities, Rohm and Haas, Delaware Valley, Inc (final report) with attachments and cover letter dated 08/10/1989.	68
5160134	ATSDR, (1989). Toxicological profile for 1,2-dichloropropane.	69
6569934	Dow Chemical, (1984). Comments on 1,2-dichloropropane proposed test rule. Document control number OPTS-42043.	70
10385015	Earthjustice, (2020). Exhibit 1 to comments of rubbertown emergency action et al., re: TSCA risk evaluations for high-priority substances and substances undergoing manufacturer-requested risk evaluations.	71
1441930	Eastman Kodak, (1988). Draft environmental impact statement for Eastman Kodak Company's proposed cellulose triacetate film base machine on methylene chloride (volume I - volume V) w-letter dated 111588. 890000038:#86-890000038.	72
2803584	Haas,, R.a. (1981). DCE, DCP and DCEE discharge data for Sept. 1981 from the Rohm and Haas Philadelphia plant's discharges into the city sewer and 1,2-dichloropropane analysis with cover letter.	73
658817	Hart, J. R. (1994). Comparison of emissions from burning hazardous waste in a dry-process cement kiln with emission from burning conventional fossil fuels. Hazardous Waste and Hazardous Materials 11(1):193-199.	74
10164739	Li, R., Xu, A., Zhao, Y., Chang, H., Li, X., Lin, G. (2022). Genetic algorithm (GA) - Artificial neural network (ANN) modeling for the emission rates of toxic volatile organic compounds (VOCs) emitted from landfill working surface. Journal of Environmental Management 305:114433.	75
87136	Middleton, P., Sockwell, R., Carter, L., W.P. (1990). Aggregation and analysis of volatile organic compound emissions for regional modeling. Atmospheric Environment, Part A: General Topics 24(5):1107-1133.	76

Table of Contents

5160041	OECD, (2006). SIDS Initial Assessment Report: 1,2-Dichloropropane. :219.	77
7348917	OECD, (2011). Resource compendium of PRTR release estimation techniques, part 4: Summary of techniques for releases from products, version 1.0.	78
1441911	Oil,, Shell (1982). Tertiary water treatment I. A preliminary assessment of active carbon sorption.	79
1629033	Oil,, Shell (1986). Fate of some specific compounds in the Norco chemical biotreater and their effect on the outcome of effluent bioassays.	80
2373425	Qiu, K., Yang, L., Lin, J., Wang, P., Yang, Y.i, Ye, D., Wang, L. (2014). Historical industrial emissions of non-methane volatile organic compounds in China for the period of 1980-2010. Atmospheric Environment 86:102-112.	81
5159900	RIVM, (2007). Ecotoxicologically based environmental risk limits for several volatile aliphatic hydrocarbons. :217.	82
1333014	Roy F. Weston Inc, (1980). Characterization and fate of the discharge of priority pollutants from the Rohm and Haas Philadelphia plant into the Delaware low level collector of the Philadelphia sewer.	83
4663142	Salthammer, T., Fuhrmann, F., Uhde, E. (2003). Flame retardants in the indoor environment – Part II: release of VOCs (triethylphosphate and halogenated degradation products) from polyurethane. Indoor Air 13(1):49-52.	84
6151563	Trenholm, A., Lapp, T., Scheil, G., Cootes, J., Klammer, S., Cassady, C. (1988). Total mass emissions from a hazardous waste incinerator. Journal of Hazardous Materials 18(1):99-106.	85
13283262	U.S. EPA, (2024). Discharge Monitoring Report (DMR): 1,2-Dichloropropane, reporting years 2019-2023.	86
13283263	U.S. EPA, (2024). Toxics Release Inventory (TRI): 1,2-Dichloropropane, reporting years 2019-2023.	87
13283264	U.S. EPA, (2020). National Emissions Inventory (NEI): 1,2-Dichloropropane, reporting years 2017 and 2020.	88
46492	U.S. EPA, (1995). AP-42: Compilation of air pollutant emission factors. Volume I: Stationary point and area sources, fifth edition.	89
6535959	U.S. EPA, (2019). National Emissions Inventory (NEI) [database]: CASRNs 79-00-5, 75-34-3, 107-06-2, 78-87-5, 84-61-7, 106-99-0, 106-93-4, 50-00-0, 85-44-9, 106-46-7, 85-68-7, 84-74-2, and 115-86-6.	90
8347325	U.S. EPA, (2021). National analysis TRI dataset (TRI): Data used for TSCA risk evaluations, reporting year 2019.	91
8784984	U.S. EPA, (2019). TRI on-site and off-site reported disposed of or otherwise released (in pounds), for all industries.	92
78369	Walker, B. L., Cooper, C. D. (1992). Air pollution emission factors for medical waste incinerators. Journal of the Air and Waste Management Association 42(6):784-791.	93
Published Models for Exposures or Releases		
6957413	Kawamoto, K., Park, K. A. (2006). Calculation of environmental concentration and comparison of output for existing chemicals using regional multimedia modeling. Chemosphere 63(7):1154-1164.	94
Completed Exposure or Risk Assessments		
5475844	Boegel, J. V. (1989). Air stripping and steam stripping. :6.107-6.118.	95
6306753	OECD, (2011). Emission scenario document on the chemical industry.	96
6393282	OECD, (2009). Emission scenario document on transport and storage of chemicals.	97
6414932	OECD, (2015). Emission scenario document (ESD) on industrial use of industrial cleaners.	98
10480466	U.S. EPA, (2023). Use of laboratory chemicals - Generic scenario for estimating occupational exposures and environmental releases (Revised draft generic scenario).	99
11182966	U.S. EPA, (2022). Chemical repackaging - Generic scenario for estimating occupational exposures and environmental releases (revised draft).	100

Table of Contents

6385708	U.S. EPA, (2003). Transportation equipment cleaning - Generic scenario for estimating occupational exposures and environmental releases (draft).	101
Reports for Data or Information Other than Exposure or Release Data		
664488	CDC, (2009). Fourth national report on human exposure to environmental chemicals.	102
10385015	Earthjustice, (2020). Exhibit 1 to comments of rubbertown emergency action et al., re: TSCA risk evaluations for high-priority substances and substances undergoing manufacturer-requested risk evaluations.	103
6311590	Ecology and Environment, (1992). Site investigation and evaluation of remedial measures report Howard Hughes properties plant site, Los Angeles, California.	104
7681904	NCBI, (2020). PubChem Compound Summary for CID 6564, 1,2-Dichloropropane.	105
5467872	Pekin, T., Moore, A. (1982). Air stripping of trace volatile organics from wastewater. :765-771.	106
5467967	Thoma, G. J., Thibodeaux, L. J., Springer, C. (1989). The effectiveness of polyvinyl-chloride as an organic vapour barrier. Hazardous Waste and Hazardous Materials 6(1):1-16.	107
5740947	Whittaker, K. F., Moore, A. T. (1984). Pilot scale investigations in the removal of volatile organics and phthalates from electronics manufacturing wastewater. :579-589.	108
General Engineering Assessment		
Published Models for Exposures or Releases		
3064878	Yamada, K., Kumagai, S., Kubo, S., Endo, G. (2015). Chemical exposure levels in printing and coating workers with cholangiocarcinoma (third report). Journal of Occupational Health 57(6):565-571.	109
Completed Exposure or Risk Assessments		
7474963	ACC, (2021). Letter to DGAD, OPPT, USEPA, from Colleen Stevens, ACC, re: Propylene dichloride: In vitro dermal absorption rate testing (CAS No 78-87-5).	110
7461856	DuPont, (2005). Propylene dichloride: In vitro dermal absorption rate testing.	111
6306753	OECD, (2011). Emission scenario document on the chemical industry.	112
6393282	OECD, (2009). Emission scenario document on transport and storage of chemicals.	113
6414932	OECD, (2015). Emission scenario document (ESD) on industrial use of industrial cleaners.	114
10480466	U.S. EPA, (2023). Use of laboratory chemicals - Generic scenario for estimating occupational exposures and environmental releases (Revised draft generic scenario).	115
11182966	U.S. EPA, (2022). Chemical repackaging - Generic scenario for estimating occupational exposures and environmental releases (revised draft).	116
6385708	U.S. EPA, (2003). Transportation equipment cleaning - Generic scenario for estimating occupational exposures and environmental releases (draft).	118
Reports for Data or Information Other than Exposure or Release Data		
13283276	ACC, (2021). ACC PDC TSCA Consortium Monitoring Data - Letters and data files.	119
5160134	ATSDR, (1989). Toxicological profile for 1,2-dichloropropane.	120
5251828	Brown, S. L., Chan, F. Y., Jones, J. L., Liu, D. H., Mccaleb, K. E. (1975). Research program on hazard priority ranking of manufactured chemicals (Chemicals 21-40).	121
5155640	CalEPA, (1999). Public health goal for 1,2-dichloropropane in drinking water.	122

1,2-Dichloropropane

Table of Contents

13283270	Consulting,, Integral (2026). Final Study Report for Inhalation Monitoring of 1,2-Dichloropropane [Redacted].	123
1441931	Dow Chemical, (1988). Mortality among Dow Chemical employees of a Texas operations per-tet manufacturing plant with cover letter dated 050389.	124
2803587	Dow Chemical, (1983). Letter summarizing the EPA/Dow Chemical Co meeting regarding the manufacture of 1,2-dichloropropane.	125
6569934	Dow Chemical, (1984). Comments on 1,2-dichloropropane proposed test rule. Document control number OPTS-42043.	128
10385015	Earthjustice, (2020). Exhibit 1 to comments of rubbertown emergency action et al., re: TSCA risk evaluations for high-priority substances and substances undergoing manufacturer-requested risk evaluations.	129
7310678	ECHA, (2020). Substance infocard: 1,2-dichloropropane.	130
18092	Fishbein, L. (1979). Potential halogenated industrial carcinogenic and mutagenic chemicals. III. Alkane halides, alkanols and ethers. Science of the Total Environment 11(3):223-257.	131
684250	Grzywa, Z., Rudzki, E. (1981). Dermatitis from dichloropropane. Contact Dermatitis 7(3):151-152.	132
2797906	IARC, (1986). 1,2-Dichloropropane. IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Humans, vol. 41 41(1986):131-147.	133
5160036	IARC, (2017). Some chemicals used as solvents and in polymer manufacture.	134
1718788	Kleijn, R., Voet, V.D., E., Haes, U.d., H. A. (1994). Controlling substance flows: The case of chlorine. Environmental Management 18(4):523-542.	135
10164739	Li, R., Xu, A., Zhao, Y., Chang, H., Li, X., Lin, G. (2022). Genetic algorithm (GA) - Artificial neural network (ANN) modeling for the emission rates of toxic volatile organic compounds (VOCs) emitted from landfill working surface. Journal of Environmental Management 305:114433.	136
5160041	OECD, (2006). SIDS Initial Assessment Report: 1,2-Dichloropropane. :219.	137
13283273	Restek Corp, (2026). Safety Data Sheet (SDS): 1,2-Dichloropropane standard.	138
5159900	RIVM, (2007). Ecotoxicologically based environmental risk limits for several volatile aliphatic hydrocarbons. :217.	139
13283274	Scientific,, Fisher (2026). EPA Method 524.2 Volatile Calibration Standard (No Gasses), SPEX CertiPrep.	140
13283271	Sigma-Aldrich, (2026). Safety Data Sheet (SDS): 1,2-Dichloropropane.	141
659430	Stangroom, S. J., Collins, C. D., Lester, J. N. (1998). Sources of organic micropollutants to lowland rivers. Environmental Technology 19(7):643-666.	142
13283272	Supelco, (2026). Safety Data Sheet (SDS): EPA 8260 volatiles calibration mix.	143
11138808	U.S. BLS, (2023). U.S. Census Bureau of Labor Statistics Data from 2021.	144
10366189	U.S. EPA, (2020). 2020 CDR: Commercial and consumer use.	145
13246149	U.S. EPA, (2026). Chemical Data Reporting (CDR): Reporting year 2024.	146
13283263	U.S. EPA, (2024). Toxics Release Inventory (TRI): 1,2-Dichloropropane, reporting years 2019-2023.	147
13283264	U.S. EPA, (2020). National Emissions Inventory (NEI): 1,2-Dichloropropane, reporting years 2017 and 2020.	148
13283275	U.S. EPA, (2025). EPA Building Assessment Survey and Evaluation (BASE) Study.	149
46492	U.S. EPA, (1995). AP-42: Compilation of air pollutant emission factors. Volume I: Stationary point and area sources, fifth edition.	150
8347325	U.S. EPA, (2021). National analysis TRI dataset (TRI): Data used for TSCA risk evaluations, reporting year 2019.	151

Study Citation:	ACC, (2021). ACC PDC TSCA Consortium Monitoring Data - Letters and data files.			
HERO ID:	13283276			
Conditions of Use:	Manufacturing as a Byproduct; Processing as a Reactant			
EXTRACTION				
Parameter	Data			
Worker activity description:	Worker activities for each sample are provided in both Company’s provided Excel sheets.			
Exposure route:	inhalation			
Physical form:	liquid			
Personal sampling data:	PBZ sampling is presented in two Excel sheets from two companies. Discrete samples are provided.			
Exposure duration:	Exposure duration is provided for each sample taken in both Excel sheets. Durations range from 8-12 hours/day.			
Number of workers:	Number of workers for 6 facilities are provided. Facility worker counts are 35, 36, 35, 9, 29, and 3.			
Personal protective equipment:	Discrete data for PPE worn by employees is present for every sample in the Excel files. Common PPE includes goggles, gloves, and FRC.			
Engineering control:	Discrete data for engineering controls is present for every sample in the Excel files. Common controls include fume hoods, closed systems, and activated carbon recovery systems.			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Reliability	Metric 1:	Sampling and Analytical Methodology	High	Sampling is performed via NIOSH 1013.
Domain 2: Representativeness	Metric 2:	Geographic Scope	High	Data are from the U.S.
	Metric 3:	Applicability	High	Data are for two in-scope OES.
	Metric 4:	Temporal Representativeness	Medium	Dates of sampling range from 2004-2020. Some data is greater than 10 years old.
	Metric 5:	Sample Size	High	Samples fully characterized, discrete data provided.
Domain 3: Accessibility/ Clarity	Metric 6:	Metadata Completeness	Medium	Monitoring data include most metadata, but is missing exposure frequency.
Domain 4: Variability and Uncertainty	Metric 7:	Metadata Completeness	High	Uncertainty addressed via analytical methodology. Variability addressed in sampling different sites and worker activities.
Overall Quality Determination		High		

Study Citation:	Consulting,, Integral (2026). Final Study Report for Inhalation Monitoring of 1,2-Dichloropropane [Redacted].
HERO ID:	13283270
Conditions of Use:	Manufacturing as a Byproduct; Processing as a Reactant

EXTRACTION	
Parameter	Data
Worker activity description:	Discrete data for worker activities is provided in the raw dataset in column AV. Process operators do maintenance prep, repairs, filter changes, sample collection, and sample analysis. Maintenance techs do maintenance, equipment openings. Lab techs do sample analysis. Logistics techs load railcars, take samples, and clean up spills.
Exposure route:	inhalation, dermal
Physical form:	liquid
Personal sampling data:	PBZ results are provided in the raw dataset. Summary statistics for PBZ sampling per SEG are provided in Section 3.1.
Exposure duration:	Discrete data for exposure duration are provided in the raw dataset in column BC. Shifts range from 8-16 hours.
Exposure frequency:	Exposure frequency for each SEG is described in Section 3.2. Typical durations include a 5 days/week normal schedule, or a rotating schedule. This is a 4-week cycle with alternating 12-hour shifts, (e.g., 4 night shifts, then 3 days off, then 3 day shifts, then 1 day off, then 3 night shifts, then 3 days off, then 4 day shifts, then 7 days off, then repeat). The schedule averages 42 hours per week over the 4week period.
Number of workers:	Per the raw dataset, 122 individual workers were sampled.
Personal protective equipment:	Table 3-6 provides baseline, task-specific, and emergency PPE for each SEG. Discrete data for each sampled worker are provided in the raw dataset columns BO-CL.
Engineering control:	Engineering controls are described in Section 4.4.1. Discrete data for each sampled worker are provided in the raw dataset columns BG-BN.

EVALUATION				
Domain	Metric		Rating	Comments
Domain 1: Reliability	Metric 1:	Sampling and Analytical Methodology	High	Data is obtained via NIOSH 1013 and was approved by EPA.
Domain 2: Representativeness	Metric 2:	Geographic Scope	High	Data are from the U.S.
	Metric 3:	Applicability	High	Data are for two OES in-scope.
	Metric 4:	Temporal Representativeness	High	Data are from 2026.
	Metric 5:	Sample Size	High	All data is fully characterized. Discrete data are provided in a raw dataset as Appendix H.
Domain 3: Accessibility/ Clarity	Metric 6:	Metadata Completeness	High	Monitoring data includes all metadata.
Domain 4: Variability and Uncertainty	Metric 7:	Metadata Completeness	High	Uncertainty is addressed in the sampling methodology. Variability is addressed by sampling across 4 sites and different shifts.

Overall Quality Determination

High

Study Citation:	Dow Chemical, (2018). [Redacted] 2017 Industrial hygiene monitoring for XXX 1,2-dichloropropane, B-7500, propylene oxide purification, Freeport, Texas.
HERO ID:	10610564
Conditions of Use:	Manufacture

Parameter	Data
Worker activity description:	Sample #8906: Hook up double block and bleed to temp line 3" rail road PDC Bottoms to V-107 cleared with water and nitrogen. Sample #8907: Assisting with setup of DBB on temp line - PDC line from rail road to V-107. Sample #8932: Cleaning PV-109 mag drive pump PDC service with water and nitrogen.
Personal sampling data:	Samples by sample number [PDF Pg. 9] Sample #8906: ND (<0.4 ppm) Sample #8907: ND (<0.4 ppm) Sample #8932: ND (<0.3 ppm)
Exposure duration:	12hour shifts [PDF Pg. 2]
Personal protective equipment:	Hard hat, nitrile gloves, leather gloves, side shield safety glasses, ear plugs, FRC work clothing, chemical protective clothing, full-facemask with OVAG cartridges, rubber boots and safety shoes. [PDF Pg. 2]

Domain	Metric	EVALUATION Rating	Comments
Domain 1: Reliability	Metric 1: Sampling and Analytical Methodology	High	Sampling/analytical methodology is an approved EPA method. [OSHA 7]
Domain 2: Representativeness	Metric 2: Geographic Scope	High	Data are from the U.S.
	Metric 3: Applicability	High	Data are for manufacturing, an in-scope occupational scenario.
	Metric 4: Temporal Representativeness	High	Sampling data is based on current industry conditions and data no more than 10 years old.
	Metric 5: Sample Size	High	Statistical distribution of samples is fully characterized (discrete sampling data provided).
Domain 3: Accessibility/ Clarity	Metric 6: Metadata Completeness	Medium	Sample type and exposure type provided but missing exposure frequency, physical form, engineering controls.
Domain 4: Variability and Uncertainty	Metric 7: Metadata Completeness	High	Uncertainty is addressed in sampling/analytical methodology. Variability addressed by sampling multiple worker activities.

Overall Quality Determination

High

Study Citation:	Dow Chemical, (1982). Environmental health survey report first half-1978 personnel exposure to chlorinated hydrocarbons at the chlorinated solvents plant.
HERO ID:	1441904
Conditions of Use:	Domestic Manufacturing; Intermediate in all other basic organic chemical manufacturing

EXTRACTION	
Parameter	Data
Number of sites:	1
Worker activity description:	Chlorinated solvents plant Various job classifications listed on p. 8-13, 14
Exposure route:	inhalation
Personal sampling data:	First Half 1978 Survey on chlorinated hydrocarbons - average 0.29 ppm for 2nd half 1977 (73 employees) and 1st half 1978 (80 employees) (p. 7) Results for various job classifications (p. 8-13) Average exposures by work type (p. 14)
Exposure duration:	samples taken over 8-hr period (p. 3)
Number of workers:	73-80 surveyed
Comments:	number of samples provided, varies (p. 7). Samples taken over 8-hr period (p. 3). Analytic method: "gas chromatograph equipped with a flameionization detector (p. 4)"

EVALUATION				
Domain	Metric		Rating	Comments
Domain 1: Reliability	Metric 1:	Sampling and Analytical Methodology	Medium	Sampling/analytical methodology is not an approved OSHA/NIOSH method (data from Dow) but is an acceptable methodology.
Domain 2: Representativeness	Metric 2:	Geographic Scope	High	Data are from the U.S.
	Metric 3:	Applicability	High	Data are for manufacturing or processing, both in-scope occupational scenarios.
	Metric 4:	Temporal Representativeness	Low	Monitoring data are greater than 20 years old.
	Metric 5:	Sample Size	High	Statistical distribution of samples is fully characterized (discrete sampling data provided for contemporaneous survey, average provided for earlier survey).
Domain 3: Accessibility/ Clarity	Metric 6:	Metadata Completeness	High	All metadata provided.
Domain 4: Variability and Uncertainty	Metric 7:	Metadata Completeness	Medium	Variability addressed by taking samples for multiple workers at various plant areas, but uncertainty is not addressed.

Overall Quality Determination	High
--------------------------------------	-------------

Study Citation:	Dow Chemical, (1982). Industrial hygiene monitoring glycerine I.			
HERO ID:	2803592			
Conditions of Use:	Domestic Manufacturing; Intermediate in all other basic organic chemical manufacturing			
EXTRACTION				
Parameter	Data			
Worker activity description:	Contractor hydroblaster during reboiler maintenance, B Control Operator.			
Exposure route:	Inhalation			
Personal sampling data:	2 personal samples: 0.1 ppm (contractor hydroblaster during reboiler maintenance, 3.5 hrs, p. 10); 0.95 ppm for B Control Operator (sampling/exposure duration not specified - assume 8-hr since it was compared to IHG, p. 12)			
Exposure duration:	3.5-8 hr			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Reliability	Metric 1:	Sampling and Analytical Methodology	Medium	Sampling/analytical methodology is not an approved OSHA/NIOSH method but is an acceptable methodology.
Domain 2: Representativeness	Metric 2:	Geographic Scope	High	Data are from the U.S.
	Metric 3:	Applicability	Medium	The article does not explicitly state whether 1,2 dicholoropropane is manufactured or processed. But it can be inferred, that the data is for either the in-scope occupational scenario of manufacturing or processing.
	Metric 4:	Temporal Representativeness	Low	Monitoring data are greater than 20 years old.
	Metric 5:	Sample Size	High	Statistical distribution of samples is fully characterized (discrete sampling data provided).
Domain 3: Accessibility/ Clarity	Metric 6:	Metadata Completeness	Medium	Sample type and exposure type provided but missing metadata such as exposure frequency.
Domain 4: Variability and Uncertainty	Metric 7:	Metadata Completeness	Low	Variability and uncertainty are not addressed.
Overall Quality Determination		Medium		

Study Citation:	Dow Chemical, (1979). Personnel monitoring at Dowicil plant for chlorinated hydrocarbons.		
HERO ID:	2803605		
Conditions of Use:	Processing (Incorporation into formulation, mixture, or reaction product)		
EXTRACTION			
Parameter	Data		
Worker activity description:	Production and packaging of DOWICIL 200 antimicrobial agent		
Exposure route:	Inhalation		
Personal sampling data:	<0.1 - 0.8 (ppm)		
EVALUATION			
Domain	Metric	Rating	Comments
Domain 1: Reliability	Metric 1: Sampling and Analytical Methodology	Medium	Sampling or analytical methodology is not equivalent to an approved OSHA or NIOSH method and EPA review of information indicates the methodology is acceptable. Differences in methods are not expected to lead to lower quality data.
Domain 2: Representativeness	Metric 2: Geographic Scope	High	The data are from the United States and are representative of the industry being evaluated.
	Metric 3: Applicability	High	The data are for an occupational scenario within the scope of the risk evaluation.
	Metric 4: Temporal Representativeness	Low	Data is more than 20 years old (data collected in 1979).
	Metric 5: Sample Size	High	Statistical distribution of samples is fully characterized.
Domain 3: Accessibility/ Clarity	Metric 6: Metadata Completeness	Medium	Monitoring data include most critical metadata, such as sample type and exposure type, but lacks additional metadata, such as sample durations, exposure durations, exposure frequency, and/or worker activities.
Domain 4: Variability and Uncertainty	Metric 7: Metadata Completeness	Medium	Variability addressed by sampling on multiple dates, but uncertainty is not addressed
Overall Quality Determination		High	

Study Citation:	Dow Chemical, (1979). Environmental health survey report first half-1979 personnel exposure to chlorinated hydrocarbons at the chlorinated solvents plant.
HERO ID:	3064997
Conditions of Use:	Domestic Manufacturing; Intermediate in all other basic organic chemical manufacturing

EXTRACTION	
Parameter	Data
Worker activity description:	Workers in a chlorinated solvents plant. Job classifications are engineers, shift supervisors, lab personnel, loading, EDO, man, P/T boardman, sample man, P/T SOT, relief man, material cont, instrument men, pipefitters, insulators, construction, laborers, carpenters [p. 9-16]
Exposure route:	Inhalation
Personal sampling data:	First Half 1979 Survey on chlorinated hydrocarbons - average 0.29 ppm for 2nd half 1977 (73 employees) and 1st half 1978 (80 employees); 1.2 ppm for 1st half 1979 (81 employees) (p. 8) Results for various job classifications (p. 9-15) Average exposures by work type (p. 16)
Exposure duration:	samples taken over 8-hr period (p. 4)
Comments:	The article does not explicitly state which exposures to 1,2 dichloropropane is because of manufacturing or processing. But it can be inferred, that the data is for either the in-scope occupational scenario of manufacturing or processing in the chlorinated solvents plant. Various samples (p. 8). samples taken over 8-hr period (p. 4). Analytic Method: gas chromatograph equipped with a flame ionization detector (p. 4).

EVALUATION				
Domain	Metric		Rating	Comments
Domain 1: Reliability	Metric 1:	Sampling and Analytical Methodology	Medium	Sampling/analytical methodology is not an approved OSHA/NIOSH method but is an acceptable methodology.
Domain 2: Representativeness	Metric 2:	Geographic Scope	High	Data are from the U.S.
	Metric 3:	Applicability	Medium	The article does not explicitly state which exposures to 1,2 dichloropropane is because of manufacturing or processing. But it can be inferred, that the data is for either the in-scope occupational scenario of manufacturing or processing.
	Metric 4:	Temporal Representativeness	Low	Monitoring data are greater than 20 years old.
	Metric 5:	Sample Size	High	Statistical distribution of samples is fully characterized (discrete sampling data provided for contemporaneous survey, average provided for earlier survey).
Domain 3: Accessibility/ Clarity	Metric 6:	Metadata Completeness	Medium	Monitoring data include most critical metadata, such as sample type and exposure type, but lacks additional metadata, such as exposure frequency, and/or worker activities.
Domain 4: Variability and Uncertainty	Metric 7:	Metadata Completeness	Medium	Variability addressed by taking samples for multiple workers at various plant areas, but uncertainty is not addressed.

Overall Quality Determination

Medium

Study Citation:	Dow Chemical, (1992). Letter from Dow Chem Co submitting several studies with trichloroethylene and other chemicals in humans with attachments (sanitized).			
HERO ID:	4214362			
Conditions of Use:	Domestic Manufacturing; Intermediate in all other basic organic chemical manufacturing			
EXTRACTION				
Parameter	Data			
Area sampling data:	No data provided for propylene dichloride except that it is present in the plant.			
Personal protective equipment:	respirator usage			
EVALUATION				
Domain	Metric	Rating		Comments
Domain 1: Reliability	Metric 1:	Sampling and Analytical Methodology	Low	Sampling/analytical methodology is not specified.
Domain 2: Representativeness	Metric 2:	Geographic Scope	High	Data are from the U.S.
	Metric 3:	Applicability	Uninformative	No data provided
	Metric 4:	Temporal Representativeness	Low	Monitoring data are greater than 20 years old (early 1990s)
	Metric 5:	Sample Size	N/A	No data provided
Domain 3: Accessibility/ Clarity	Metric 6:	Metadata Completeness	N/A	No data provided
Domain 4: Variability and Uncertainty	Metric 7:	Metadata Completeness	N/A	No data provided
Overall Quality Determination		Uninformative		

Study Citation:	Dow Chemical, (1984). Comments on 1,2-dichloropropane proposed test rule. Document control number OPTS-42043.			
HERO ID:	6569934			
Conditions of Use:	Manufacture			
EXTRACTION				
Parameter	Data			
Exposure route:	Inhalation			
Area sampling data:	5 PPM for an 8-hour TWA and less than 20ppm for short-term exposures			
Number of workers:	200			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Reliability	Metric 1:	Sampling and Analytical Methodology	Medium	Report uses high quality data/techniques/methods that are not from frequently-used sources and there are no known quality issues.
Domain 2: Representativeness	Metric 2:	Geographic Scope	High	Data are from the U.S.
	Metric 3:	Applicability	High	Data are for manufacturing, an in-scope occupational scenario.
	Metric 4:	Temporal Representativeness	Low	Report is based on data greater than 20 years old and industry conditions that are expected to be outdated.
	Metric 5:	Sample Size	Low	Sample distribution is characterized by no statistics.
Domain 3: Accessibility/ Clarity	Metric 6:	Metadata Completeness	Medium	Methods, results, and assumptions are clearly documented, but underlying data sources are not fully transparent.
Domain 4: Variability and Uncertainty	Metric 7:	Metadata Completeness	Low	Variability and uncertainty are not addressed.
Overall Quality Determination			Medium	

Study Citation:	Hanazato, M., Suzuki, N., Koga, C., Nakaoka, H., Mori, C. (2018). A study of design for reduction and monitoring of volatile organic compounds in indoor air: The case of a commercial bank in Japan. Journal of Asian Architecture and Building Engineering 17(3):573-579.			
HERO ID:	5344296			
Conditions of Use:	General occupational indoor environments			
EXTRACTION				
Parameter	Data			
Number of sites:	1			
Exposure route:	Inhalation			
Area sampling data:	ND (LOD = 1ug/m^3)			
Exposure duration:	1 hr sampling (p. 4)			
Comments:	Measurements were performed using the standard methods of air sampling and measurement issued by the MHLW (MHLW, 2016b). see page 577			
EVALUATION				
Domain	Metric	Rating		Comments
Domain 1: Reliability	Metric 1:	Sampling and Analytical Methodology	Medium	Sampling/analytical methodology is not an approved OSHA/NIOSH method but is an acceptable methodology. [Journal article]
Domain 2: Representativeness	Metric 2:	Geographic Scope	Medium	Data are from Japan, an OECD country.
	Metric 3:	Applicability	Low	Data are for indoor air concentrations at a bank, which is similar to other indoor in-scope occupational scenarios. [General indoor air concentrations at a bank - not a listed COU]
	Metric 4:	Temporal Representativeness	High	Monitoring data are no more than 10 years old. [2018]
	Metric 5:	Sample Size	Medium	Sample distribution characterized by a range with uncertain statistics. [2 samples taken - ND values for both]
Domain 3: Accessibility/ Clarity	Metric 6:	Metadata Completeness	Medium	Sample type and exposure type provided but missing metadata other than duration. [Area samples - no specific metadata provided except for sample duration]
Domain 4: Variability and Uncertainty	Metric 7:	Metadata Completeness	Medium	Variability addressed by taking samples during different years, but uncertainty is not addressed. [Samples taken in Dec 2013 and Feb 2014 but only at one site]
Overall Quality Determination		Medium		

Study Citation:	IARC, (2017). Some chemicals used as solvents and in polymer manufacture.			
HERO ID:	5160036			
Conditions of Use:	Car Repair Painting			
EXTRACTION				
Parameter	Data			
Exposure route:	inhalation			
Personal sampling data:	5.3 mg/m3 over 5.5 hrs of monitoring pg144			
Area sampling data:	5.3 mg/m3 over 5.5 hrs of monitoring			
Comments:	Small car painting workshops in Italy: 5.3 mg/m3 over 5.5 hrs of monitoring (Vitali et al, 2006 - HERO ID 5096125) (p. 156)			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Reliability	Metric 1:	Sampling and Analytical Methodology	Medium	Sampling/analytical methodology is not specified, but references the original data source - see original reference HERO ID 5096125
Domain 2: Representativeness	Metric 2:	Geographic Scope	Medium	Data are from Italy, an OECD country.
	Metric 3:	Applicability	Medium	Data are for car repair painting, which is similar to the in-scope occupational scenarios related to cleaning.
	Metric 4:	Temporal Representativeness	Medium	Monitoring data are greater than 10 years old but no more than 20 years old.
	Metric 5:	Sample Size	Medium	Sample distribution characterized by a range with uncertain statistics - see original reference HERO ID 5096125.
Domain 3: Accessibility/ Clarity	Metric 6:	Metadata Completeness	Medium	Sample type and exposure type provided but missing metadata such as frequency (see original reference HERO ID 5096125).
Domain 4: Variability and Uncertainty	Metric 7:	Metadata Completeness	Medium	Variability addressed by indicating only 1 of 8 shops measured 1,2-DCP, but uncertainty is not addressed.
Overall Quality Determination		Medium		

Study Citation:	IARC, (2017). Some chemicals used as solvents and in polymer manufacture.			
HERO ID:	5160036			
Conditions of Use:	Plastic Product, paint-, and chemical-manufacturing industries			
EXTRACTION				
Parameter	Data			
Exposure route:	inhalation			
Personal sampling data:	Most of the air concentrations were between 10 and 150 mg/m3, although two were > 400 mg/m3. (Ghittori et al., 1987) (p. 156)			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Reliability	Metric 1:	Sampling and Analytical Methodology	Medium	Sampling/analytical methodology is not specified, but references the original data source - see original reference Ghittori et al., 1987
Domain 2: Representativeness	Metric 2:	Geographic Scope	Medium	Data are from Italy, an OECD country.
	Metric 3:	Applicability	Medium	Data are for plastic product, paint, and chemical manufacturing, which is similar to the in-scope occupational scenario intermediate in all other chemical product or preparation manufacturing.
	Metric 4:	Temporal Representativeness	Low	Monitoring data are greater than 20 years old.
	Metric 5:	Sample Size	Medium	Sample distribution characterized by a range with uncertain statistics - see original reference.
Domain 3: Accessibility/ Clarity	Metric 6:	Metadata Completeness	Medium	Sample type provided but no other metadata (see original source).
Domain 4: Variability and Uncertainty	Metric 7:	Metadata Completeness	Low	Variability and uncertainty are not addressed.
Overall Quality Determination		Medium		

Study Citation:	Kwak, K. M., Jeong, K. S., Shin, D. H., Choi, W. J., Kim, H. S., Kang, S. K. (2018). Acute toxic encephalopathy induced by occupational exposure to 1,2-dichloropropane. Industrial Health 56(6):561-565.			
HERO ID:	4725079			
Conditions of Use:	Commercial Use: Cleaning and furnishing care product (detergent)			
EXTRACTION				
Parameter	Data			
Worker activity description:	Manually skimming rust off the surface of detergent (containing 1,2-DCP).			
Exposure route:	Inhalation			
Area sampling data:	TWAs between 8.4 to 41.5 ppm and STELs between 49.8-76.6 ppm (p. 564).			
EVALUATION				
Domain	Metric	Rating		Comments
Domain 1: Reliability	Metric 1:	Sampling and Analytical Methodology	Medium	Sampling/analytical methodology is not an approved OSHA/NIOSH method but is an acceptable methodology (sampling conducted by Korean Occupational Safety and Health Agency).
Domain 2: Representativeness	Metric 2:	Geographic Scope	Medium	Data are from Korea, an OECD country.
	Metric 3:	Applicability	High	The data are for an occupational scenario within the scope of the risk evaluation.
	Metric 4:	Temporal Representativeness	Medium	Monitoring data are no more than 10 years old.
	Metric 5:	Sample Size	High	Statistical distribution of samples is fully characterized (discrete sampling data provided).
Domain 3: Accessibility/ Clarity	Metric 6:	Metadata Completeness	Medium	Monitoring data include most critical metadata, such as sample type and exposure type, but lacks additional metadata, such as exposure frequency.
Domain 4: Variability and Uncertainty	Metric 7:	Metadata Completeness	Low	Variability and uncertainty are not addressed.
Overall Quality Determination		Medium		

Study Citation:	Mo, H., Lu, S., Shao, M. (2021). Volatile organic compound (VOC) emissions and health risk assessment in paint and coatings industry in the Yangtze River Delta, China. Environmental Pollution 269:115740.
HERO ID:	7700090
Conditions of Use:	Use of Paints and Coatings

EXTRACTION	
Parameter	Data
Exposure route:	Inhalation
Personal sampling data:	See Table S4 for air concentrations.
Personal protective equipment:	The activated carbon-based masks were used by the workers.
Engineering control:	The central ventilation system was installed in the workplaces and the exhaust gas was discharged from the chimney and stack.

		EVALUATION		
Domain	Metric	Rating	Comments	
Domain 1: Reliability	Metric 1:	Sampling and Analytical Methodology	High	Sampling/analytical methodology is an approved NIOSH/OSHA method.
Domain 2: Representativeness	Metric 2:	Geographic Scope	Low	Data are from China, a non-OECD country.
	Metric 3:	Applicability	Medium	The data are for an occupational scenario that is similar to an occupational scenario within the scope of the risk evaluation, in terms of the type of industry, operations, and work activities.
	Metric 4:	Temporal Representativeness	High	Monitoring data were collected after the most recent PEL and no more than 10 years old.
	Metric 5:	Sample Size	Medium	Sample distribution is characterized with uncertain statistics. Unclear on the characterization of the results presented.
Domain 3: Accessibility/ Clarity	Metric 6:	Metadata Completeness	High	All metadata provided.
Domain 4: Variability and Uncertainty	Metric 7:	Metadata Completeness	High	Uncertainty is addressed in sampling/analytical methodology. Variability addressed by multiple samples collected per site.

Overall Quality Determination	High
--------------------------------------	-------------

Study Citation:	Park, C. S., Kim, H. S., Ahn, Y. S., Ahn, J. H., Jeong, K. S. (2020). Validation of urinary 1,2-dichloropropane concentration as a biological exposure index for workers exposed to 1,2-dichloropropane. Annals of Occupational and Environmental Medicine 32(1):e24.			
HERO ID:	7700088			
Conditions of Use:	Use of cleaning agents			
EXTRACTION				
Parameter	Data			
Personal sampling data:	See Table 1 (pdf page 4) for measurements			
Exposure duration:	8 hr/day			
Personal protective equipment:	All workers wore glovesas personal protective equipment during work but none used masks during operation.			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Reliability	Metric 1:	Sampling and Analytical Methodology	High	Sampling/analytical methodology is an approved NIOSH method.
Domain 2: Representativeness	Metric 2:	Geographic Scope	Medium	Data are from South Korea, an OECD country.
	Metric 3:	Applicability	High	Data are for use of waxes polishes, cleaners, which is an in-scope occupational scenario.
	Metric 4:	Temporal Representativeness	High	Monitoring data were collected after the most recent PEL and no more than 10 years old.
	Metric 5:	Sample Size	Medium	Sample distribution characterized by limited statistics (arithmetic mean, std deviation, geometric mean, gsd) but discrete samples not provided and distribution not fully characterized.
Domain 3: Accessibility/ Clarity	Metric 6:	Metadata Completeness	High	All metadata provided.
Domain 4: Variability and Uncertainty	Metric 7:	Metadata Completeness	High	Uncertainty is addressed in sampling/analytical methodology. Variability addressed by selecting appropriate sample size and controls.
Overall Quality Determination		High		

Study Citation:	Ravina, M., Facelli, A., Zanetti, M. (2020). Halocarbon emissions from hazardous waste landfills: Analysis of sources and risks. Atmosphere 11(4):375.			
HERO ID:	6613834			
Conditions of Use:	Waste Handling, Treatment, and Disposal (Landfills)			
EXTRACTION				
Parameter	Data			
Area sampling data:	June 2017: <0.06 mg/m3, <0.06 mg/m3, <0.06 mg/m3, <0.06 mg/m3, <0.06 mg/m3Dec. 2017: 9.75 mg/m3, 8.19 mg/m3, 10.11 mg/m3, 4.31 mg/m3 (Table 5)			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Reliability	Metric 1:	Sampling and Analytical Methodology	Low	Sampling/analytical methodology is not specified.
Domain 2: Representativeness	Metric 2:	Geographic Scope	Medium	Data are from Italy, an OECD country.
	Metric 3:	Applicability	High	Data are for disposal, an in scope occupational scenario.
	Metric 4:	Temporal Representativeness	High	Monitoring data were collected after the most recent PEL and no more than 10 years old.
	Metric 5:	Sample Size	Low	Sample distribution is characterized by no statistics.
Domain 3: Accessibility/ Clarity	Metric 6:	Metadata Completeness	Medium	Sample type and exposure type provided but missing number of samples, exposure durations, worker activities.
Domain 4: Variability and Uncertainty	Metric 7:	Metadata Completeness	Medium	Variability addressed by samples collected at multiple times throughout the year (volatilization may vary with temperature).
Overall Quality Determination			Medium	

Study Citation:	Sybron, (1976). W/R 0670 charcoal absorption.			
HERO ID:	2803575			
Conditions of Use:	Disposal			
EXTRACTION				
Parameter	Data			
Worker activity description:	CME operator; S plant operator; amination building operator.			
Personal sampling data:	Personal 'weighted average'S plant Operator: PD exposure was 0.24 (ppm);CME Operator: 0.16 (ppm) (based on only afternoon sample);S plant Operator: PD +ED exposure was 6.3 (ppm);Amination Building Operator(3.67 hours in the morning and 3.67 hours in the afternoon): 0.65 (ppm);S Plant Operator(3.75 hours in the morning and 3.88 hours in the afternoon): 0.39 (ppm);			
Exposure duration:	Unclear if this was sampling or clock in/clock out hours. Report states amination building operator was exposed 3.67 hours in the morning and 3.67 hours in the afternoon. S-Plant Operator was exposed 3.75 hours in the morning and 3.88 hours in the afternoon.			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Reliability	Metric 1:	Sampling and Analytical Methodology	Low	Sampling/analytical methodology is not clearly specified, appears to involves charcoal absorption.
Domain 2: Representativeness	Metric 2:	Geographic Scope	High	Data are from the U.S.
	Metric 3:	Applicability	Low	Data are for unknown but are for occupational workers. The report specifies its a part of the chemical division at the company.
	Metric 4:	Temporal Representativeness	Low	Monitoring data were collected prior to the most recent PEL.
	Metric 5:	Sample Size	Medium	Sample distribution characterized by limited statistics (mean) but discrete samples not provided and distribution not fully characterized.
Domain 3: Accessibility/ Clarity	Metric 6:	Metadata Completeness	Medium	Sample type and exposure type provided but missing exposure frequency, physical form, PPE, engineering controls.
Domain 4: Variability and Uncertainty	Metric 7:	Metadata Completeness	Medium	Variability addressed by sampling multiple work activities, but uncertainty is not addressed.
Overall Quality Determination		Medium		

Study Citation:	Sybron, (1982). Personal air sampling results for propylene dichloride.			
HERO ID:	2803576			
Conditions of Use:	Domestic Manufacturing; Intermediate in all other basic organic chemical manufacturing			
EXTRACTION				
Parameter	Data			
Worker activity description:	neutralizer, sulfonator, operator (p 2).			
Exposure route:	inhalation			
Personal sampling data:	12 personal air samples - ND to 284.65 ppm (p. 2)			
Exposure duration:	2 hr sampling per tube (p. 2)			
Comments:	NIOSH Method #595; 2 hr sampling per tube (p. 2). Analytic method: gas chromatographThe monitoring data is from 3 areas of a chemical manufacturing facility, but does not explicitly state which areas 1,2 dichloropropane is manufactured or processed.			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Reliability	Metric 1:	Sampling and Analytical Methodology	Medium	Sampling/analytical methodology is an approved NIOSH (#595) method, but source states that that the high value of 284.65 ppm is due to tampering with the sample.
Domain 2: Representativeness	Metric 2:	Geographic Scope	High	Data are from the U.S.
	Metric 3:	Applicability	Medium	The article does not explicitly state whether 1,2 dichloropropane is manufactured or processed. But it can be inferred, that the data is for either the in-scope occupational scenario of manufacturing or processing.
	Metric 4:	Temporal Representativeness	Low	Monitoring data are greater than 20 years old.
	Metric 5:	Sample Size	High	Statistical distribution of samples is fully characterized (discrete sampling data provided).
Domain 3: Accessibility/ Clarity	Metric 6:	Metadata Completeness	Medium	Sample type and exposure type provided but missing worker activities and exposure frequency.
Domain 4: Variability and Uncertainty	Metric 7:	Metadata Completeness	Medium	Variability addressed by providing at least 3 samples per job class, but uncertainty is not addressed.
Overall Quality Determination		Medium		

Study Citation:	Tong, R., Zhang, L.,ei, Yang, X., Liu, J., Zhou, P., Li, J. (2019). Emission characteristics and probabilistic health risk of volatile organic compounds from solvents in wooden furniture manufacturing. Journal of Cleaner Production 208:1096-1108.
HERO ID:	5074722
Conditions of Use:	Adhesives and sealants

EXTRACTION	
Parameter	Data
Number of sites:	1
Exposure route:	Inhalation
Area sampling data:	Concentrations (mg/m3) in various areas in furniture manufacturing workshops (p. 1101) and non-production areas (p. 1102).
Exposure duration:	Probabilistic evaluation: 8, 10, 12 hours/day
Exposure frequency:	Probabilistic evaluation: 264, 292, 324 days/year
Comments:	A portable handy air sampler (EM-500, AMAE, China), which can absorb most VOCs at a constant flow rate, was employed for gas sampling, except in the case of chloroalkanes. The relative sampling height was set at 1.5m, which represents the breathing zone of workers. We conducted sampling three times every working day from 9:00-10:00, 15:00-16:00 and 20:00-21:00, and each sampling lasted for 1 h. Chloroalkane sampling method unclear (p. 1099). Chloroalkanes were analyzed by gas chromatography in direct injection mode in the laboratory to obtain VOC concentration data (p. 1099).

EVALUATION				
Domain		Metric	Rating	Comments
Domain 1: Reliability	Metric 1:	Sampling and Analytical Methodology	Medium	Sampling/analytical methodology is not an approved OSHA/NIOSH method but is an acceptable methodology. [Journal article]
Domain 2: Representativeness	Metric 2:	Geographic Scope	Low	Data are from China, a non-OECD country.
	Metric 3:	Applicability	Medium	Data are for furniture manufacturing, which is similar to the in-scope occupational scenario adhesives and sealants. [Specific use of chemical in furniture manufacturing is unclear - assumed potential use in adhesives/sealants]
	Metric 4:	Temporal Representativeness	High	Monitoring data are no more than 10 years old. [2015-2017 annually]
	Metric 5:	Sample Size	Medium	Sample distribution characterized by a range with uncertain statistics. [range provided; number of samples unclear]
Domain 3: Accessibility/ Clarity	Metric 6:	Metadata Completeness	Medium	Sample type and exposure type provided but missing number of workers and number of sites. [estimates exposure durations and frequencies]
Domain 4: Variability and Uncertainty	Metric 7:	Metadata Completeness	Medium	Variability addressed by taking samples at different plants areas over different years, but uncertainty is not addressed. [Various samples taken in different plant areas, in different years; but only one 1 plant sampled]

Overall Quality Determination

Medium

Study Citation:	Vitali, M., Ensabella, F., Stella, D., Guidotti, M. (2006). Exposure to organic solvents among handicraft car painters: A pilot study in Italy. <i>Industrial Health</i> 44(2):310-317.
HERO ID:	1455493
Conditions of Use:	Car repair painting

EXTRACTION	
Parameter	Data
Worker activity description:	In summary, a large number of italian car painting shops employ few workers without specific duties and precise working times. Painting booths with ventilation systems are always present in the workshops, but PPD are often not used due to the lack of specific and effective training, explaining their relevance to prevent harms to workers' health: they are just considered cumbersome and slow down the work. (p. 311)
Exposure route:	inhalation
Number of workers:	2-5 workers at small car painting shops (p. 310); >80,000 workers total (p. 311)
Engineering control:	spray booths with ventilation (p. 312)
Comments:	Various personal/area sampling data at 8 car painting workshops (p. 313), 16 samples. passive diffusive samples (p. 311). Analytic Method: Solid-Phase MicroExtraction (SPME) technique and gaschromatography—mass spectrometry (GC-MS) in Selected Ions Monitoring (SIM) mode (p. 312)

EVALUATION				
Domain		Metric	Rating	Comments
Domain 1: Reliability	Metric 1:	Sampling and Analytical Methodology	Medium	Sampling/analytical methodology is not an approved OSHA/NIOSH method but is an acceptable methodology.
Domain 2: Representativeness	Metric 2:	Geographic Scope	Medium	Data are from Italy, an OECD country.
	Metric 3:	Applicability	Medium	Data are for car repair painting, which is similar to the in-scope occupational scenarios related to cleaning.
	Metric 4:	Temporal Representativeness	Medium	Monitoring data are greater than 10 years old but no more than 20 years old.
	Metric 5:	Sample Size	High	Statistical distribution of samples is fully characterized (discrete sampling data provided).
Domain 3: Accessibility/ Clarity	Metric 6:	Metadata Completeness	Medium	Sample type and exposure type provided but missing metadata such as frequency.
Domain 4: Variability and Uncertainty	Metric 7:	Metadata Completeness	Medium	Variability addressed by taking samples at 8 shops, but uncertainty is not addressed.

Overall Quality Determination	Medium
--------------------------------------	---------------

Study Citation:	Xing, L., Wang, L., Zhang, R. (2018). Characteristics and health risk assessment of volatile organic compounds emitted from interior materials in vehicles: a case study from Nanjing, China. Environmental Science and Pollution Research 25(15):14789-14798.			
HERO ID:	4697151			
Conditions of Use:	Distribution in commerce			
EXTRACTION				
Parameter	Data			
Worker activity description:	Source: interior of vehicles			
Exposure route:	Inhalation			
Area sampling data:	ND to 36.10 ug/m3 (MDL = 0.025 ug/m3), 9.49 ug/m3 (median), 9.81 ug/m3 mean (p. 14792)			
Exposure duration:	2 hr/day; assumed 10 year exposure duration because level of VOCs decrease with time (p. 14791)			
Exposure frequency:	300 dpy (p. 14791)			
Comments:	Analytic method: stainless steel canisters - analyzed with high-resolution gas chromatograph-mass spectrometer (GC-MS; Agilent 7890A Series, Agilent Technologies, USA) coupled with a mass spectrometer (MSD 5975C, Agilent Technologies, USA); Method TO-15 (p. 14790).			
EVALUATION				
Domain		Metric	Rating	Comments
Domain 1: Reliability	Metric 1:	Sampling and Analytical Methodology	High	Sampling/analytical methodology is an approved EPA method. [USEPA Method TO-15]
Domain 2: Representativeness	Metric 2:	Geographic Scope	Low	Data are from China, a non-OECD country.
	Metric 3:	Applicability	Medium	Data are for vehicle interiors, which is similar to the in-scope occupational scenario distribution in commerce [Vehicle interiors - mainly private cars - potentially applicable for Distribution in Commerce]
	Metric 4:	Temporal Representativeness	High	Monitoring data are no more than 10 years old. [2018]
	Metric 5:	Sample Size	Medium	Sample distribution characterized by a range with uncertain statistics. [range provided; number of samples unclear]
Domain 3: Accessibility/ Clarity	Metric 6:	Metadata Completeness	Medium	Sample type and exposure type provided but missing number of sites and number of workers. [estimates exposure durations and frequencies]
Domain 4: Variability and Uncertainty	Metric 7:	Metadata Completeness	High	Uncertainty is addressed in sampling/analytical methodology. Variability addressed by sampling randomly selected cars of varying ages. [23 randomly selected vehicles; varying ages; discussed calibration tests]
Overall Quality Determination			High	

Study Citation:	Frasch, H. F., Bunge, A. L. (2015). The transient dermal exposure II: post-exposure absorption and evaporation of volatile compounds. Journal of Pharmaceutical Sciences 104(4):1499-1507.			
HERO ID:	3230538			
Conditions of Use:	All - Dermal Exposure			
EXTRACTION				
Parameter	Data			
Dermal exposure data:	mathematical representation of post-exposure absorption and evaporation of chemicals in the skin after exposure.			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Reliability	Metric 1: Methodology	High	Report uses high quality data from frequently-used sources.	
Domain 2: Representativeness	Metric 2: Geographic Scope	High	Data are from the U.S.	
	Metric 3: Applicability	High	Model can be applied to all occupational scenarios.	
	Metric 4: Temporal Representativeness	High	Model is based on current industry conditions and based on data no more than 10 years old.	
Domain 3: Accessibility/ Clarity	Metric 5: Metadata Completeness	High	Model approach, equations, and choice of parameter values are transparent. Rationales for choice of approach, equations, and parameter values provided.	
Domain 4: Variability and Uncertainty	Metric 6: Metadata Completeness	Low	Variability and uncertainty are not addressed.	
Overall Quality Determination		High		

Study Citation:	IARC, (2017). Some chemicals used as solvents and in polymer manufacture.		
HERO ID:	5160036		
Conditions of Use:	Printing Plants		
EXTRACTION			
Parameter	Data		
Worker activity description:	Printing roller cleaning (p. 150)		
Exposure route:	inhalation		
Comments:	Estimated exposure levels during print roller cleaning - references several articles (p. 150-151, 155-158) :- Kumagai et al., 2013- JNIOOSH, 2012- Yamada et al., 2014 (HERO ID 2797854)- Kumagai, 2014- MHLW, 2013a		
EVALUATION			
Domain	Metric	Rating	Comments
Domain 1: Reliability	Metric 1: Methodology	Medium	Model is free of mathematical errors and based on sound approaches/methods; however, choice of equations and parameters are not fully described (compiles data from various journal article, uses well-mixed and near field far field models)
Domain 2: Representativeness	Metric 2: Geographic Scope	Medium	Data are from Japan, an OECD country.
	Metric 3: Applicability	High	Model is for printing, not an in-scope occupational scenario, but may be adapted/used as surrogate for an in-scope occupational scenario.
	Metric 4: Temporal Representativeness	High	Model is based on current industry conditions and based on data no more than 10 years old.
Domain 3: Accessibility/ Clarity	Metric 5: Metadata Completeness	Medium	Model approach and parameters described but the underlying equations and parameter values are not provided. Rationales for choice of approach and parameters are not provided. Specifies original sources of data which may be referenced for metadata.
Domain 4: Variability and Uncertainty	Metric 6: Metadata Completeness	Medium	Variability addressed by compiling various scenarios/studies, but uncertainty is not addressed
Overall Quality Determination		High	

Study Citation:	Ng, M. G., Tongeren, van, M., Semple, S. (2014). Simulated transfer of liquids and powders from hands and clothing to the mouth. Journal of Occupational and Environmental Hygiene 11(10):633-644.
HERO ID:	3222353
Conditions of Use:	May apply to more than 1 COU

EXTRACTION	
Parameter	Data
Exposure route:	hand/object to mouth (inadvertent ingestion)
Physical form:	Liquid and powder
Dermal exposure data:	pg. 2/13: "Overall, direct transfer from the hands to the oral cavity was significantly higher (mean Transfer Efficiencies, TE = 51.6) than indirect transfer from the hands to the oral cavity via the perioral area by licking the lips (mean TE = 11.5)."Pg. 8/13: "Three transfer coefficient (TEs) are reported for indirect transfer: hand-to-perioral, perioral-to-oral, and hand-to-oral. The hand-to-oral TE describes the overall indirect transfer from the hand to the oral cavity. Liquids transferred from the perioral to the oral areamore readily than solids (mean TE liquids = 100.0%, solids = 71.2%; p = 0.029). But from the hands to the oral area there were no significant differences between transfer for solids and liquids for both direct and indirect transfer."For Solid:Hand-to-oral direct transfer mean TE%: 56.6Hand-to-perioral mean TE%: 17.4Perioral-to-oral mean TE%: 71.2Hand-to-oral (via perioral) mean TE%: 13.2Bare hands direct transfer hand to oral mean TE%: 69.7Bare hands indirect transfer hand-to-perioral mean TE%: 17.6Nitrile direct transfer hand to oral mean TE%: 70.0Nitrile indirect transfer hand-to-perioral mean TE%: 12.0 Cotton direct transfer hand to oral mean TE%: 47.7Cotton indirect transfer hand-to-perioral mean TE%: 4.8 For Liquid:Hand-to-oral direct transfer mean TE%: 36.8Hand-to-perioral mean TE%: 6.5Perioral-to-oral mean TE%: 100Hand-to-oral (via perioral) mean TE%: 6.5Bare hands direct transfer hand to oral mean TE%: 36.8Bare hands indirect transfer hand-to-perioral mean TE%: 6.5Nitrile direct transfer hand to oral mean TE%: 41.4Nitrile indirect transfer hand-to-perioral mean TE%: 8.9Cotton direct transfer hand to oral mean TE%: 31.0Cotton indirect transfer hand-to-perioral mean TE%: 5.9 For soluble powder:Hand-to-oral direct transfer mean TE%: 69.7Hand-to-perioral mean TE%: 17.6Perioral-to-oral mean TE%: 96.4Hand-to-oral (via perioral) mean TE%: 17.0For insoluble powder:Hand-to-oral direct transfer mean TE%: 50.0Hand-to-perioral mean TE%: 17.3Perioral-to-oral mean TE%: 58.6Hand-to-oral (via perioral) mean TE%: 11.3For fine MC:Hand-to-oral direct transfer mean TE%: 39.0Hand-to-perioral mean TE%: 17.8Perioral-to-oral mean TE%: 57.8Hand-to-oral (via perioral) mean TE%: 10.6For rough MC:Hand-to-oral direct transfer mean TE%: 61.0Hand-to-perioral mean TE%: 16.8Perioral-to-oral mean TE%: 59.4Hand-to-oral (via perioral) mean TE%: 12.0All of the TEs from contaminated hands to the perioral area while putting a respirator on and taking it off were below 0.5%. Two of the four transfer TEs from contaminated respirators to the perioral area were below <0.5% and the range of TEs was <0.5%–3.1%. Because the results from experiments with olive oil were considered unreliable only one scenario was assessed: transfer of calcium acetate from the pen to the oral cavity. There was therefore no scope for statistical comparison of groups. The TEs measured ranged from <0.8 to 117.7%, showing potential for a very wide range of TEs.Transfer When Wiping the Perioral Area with the Arm or a Cotton SleeveFor Vinegar: Bare Arms Arm-to-Perioral mean TE%: 13.1Cotton Sleeve Arm-to-Perioral mean TE%: 1.0For Calcium Acetate: Bare Arms Arm-to-Perioral mean TE%: 26.8Cotton Sleeve Arm-to-Perioral mean TE%: 5.0 pg. 2/13: Observational studies of adults have shown average hand-to-mouth contact frequencies of 2–5 contacts per hour
Exposure frequency:	
Comments:	This data source contains laboratory measurements of the transfer efficiency associated with exposure resulting from inadvertent ingestion because of hand/object -to-mouth transfer. The reported transfer efficiencies pertain to surrogate chemicals. An equation is given for calculating exposure resulting from inadvertent ingestion from these transfer efficiencies. pg. 12/13: "This study has provided evidence that transfer of chemicals from the hands or objects to the mouth is influenced by parameters including physical state, chemical/physical properties, and use of protective clothing. These findings may have implications for exposure modeling and exposure control. This work was preliminary in nature and additional study is required to obtain a greater understanding of the parameters that can affect transfer and the possible interactions between them."

EVALUATION			
Domain	Metric		Comments
Domain 1: Reliability	Metric 1:	Methodology	High The equation for amount inadvertently ingested is reasonable. The method of measuring transfer efficiency is sound.
Domain 2: Representativeness			

Continued on next page ...

...continued from previous page

Study Citation:	Ng, M. G., Tongeren, van, M., Semple, S. (2014). Simulated transfer of liquids and powders from hands and clothing to the mouth. Journal of Occupational and Environmental Hygiene 11(10):633-644.			
HERO ID:	3222353			
Conditions of Use:	May apply to more than 1 COU			
Domain		Metric	EVALUATION	
			Rating	Comments
	Metric 2:	Geographic Scope	N/A	The geographic attribute is not relevant in the case of a mathematical model and data obtain via laboratory experiments.
	Metric 3:	Applicability	High	Inadvertent digestion is tentatively in scope (EPA will consider this scenario according to the Scope Documents.)
	Metric 4:	Temporal Representativeness	High	The data were generated less than 10 years ago.
Domain 3: Accessibility/ Clarity				
	Metric 5:	Metadata Completeness	High	Meta data is complete.
Domain 4: Variability and Uncertainty				
	Metric 6:	Metadata Completeness	High	Variability and uncertainty are well characterized.
Overall Quality Determination			High	

Study Citation:	Yamada, K., Kumagai, S., Endo, G. (2015). Chemical exposure levels in printing workers with cholangiocarcinoma (second report). Journal of Occupational Health 57(3):245-252.
HERO ID:	3064883
Conditions of Use:	Printing Plants

EXTRACTION	
Parameter	Data
Worker activity description:	Workers in printing rooms and during ink removal operations
Exposure route:	Inhalation
Personal sampling data:	The exposure concentrations of the workers were estimated using different models. The estimated maximum exposure concentrations for each of the four workers were 230 to 420 ppm for 1,2-DCP, and the estimated shift average exposure concentrations were 0 to 210 ppm for 1,2-DCP.
Exposure duration:	7.5-11.5 hrs (p. 10-16)
Number of workers:	4 workers exposed
Comments:	Exposure concentrations in the printing rooms were estimated using a well-mixed model, and exposure concentrations during the ink removal operation were estimated using a near-field and far-field model.

EVALUATION				
Domain		Metric	Rating	Comments
Domain 1: Reliability				
	Metric 1:	Methodology	Medium	Model is free of mathematical errors and based on sound approaches/methods; however, choice of equations and parameters are not fully described (journal article, uses well-mixed and near field far field models)
Domain 2: Representativeness				
	Metric 2:	Geographic Scope	Medium	Data are from Japan, an OECD country.
	Metric 3:	Applicability	Medium	Model is used for printing, not an in-scope occupational scenario, but may be adapted/used as surrogate for an in-scope occupational scenario like non-incorporative activities (industrial use).
	Metric 4:	Temporal Representativeness	High	Model is based on current industry conditions and based on data no more than 10 years old.
Domain 3: Accessibility/ Clarity				
	Metric 5:	Metadata Completeness	High	Model approach, equations, and choice of parameter values are transparent. Rationales for choice of approach, equations, and parameter values provided.
Domain 4: Variability and Uncertainty				
	Metric 6:	Metadata Completeness	Medium	Variability addressed by modeling multiple scenarios, but uncertainty is not addressed

Overall Quality Determination

High

Study Citation:	Yamada, K., Kumagai, S., Kubo, S., Endo, G. (2015). Chemical exposure levels in printing and coating workers with cholangiocarcinoma (third report). Journal of Occupational Health 57(6):565-571.
HERO ID:	3064878
Conditions of Use:	Printing plants

EXTRACTION	
Parameter	Data
Worker activity description:	Workers in printing and coating rooms and ink and dirt removal processes.
Exposure route:	Inhalation
Personal sampling data:	The exposure concentrations of the workers were estimated using different models. Printing workers: Maximum exposure: 190 - 560 (ppm); Average shift exposure: 0 - 230 (ppm). Coating worker: maximum exposure: 150 (ppm); average shift exposure: 5 - 19 (ppm)
Exposure duration:	0.5-3.75 hr
Number of workers:	5 printing workers and one coating worker
Comments:	Exposure concentrations in the printing and coating rooms were estimated using a well-mixed model, and exposure concentrations during the removal operation were estimated using a near-field and far-field model.

EVALUATION				
Domain	Metric		Rating	Comments
Domain 1: Reliability	Metric 1:	Methodology	Medium	Model is free of mathematical errors and based on sound approaches/methods; however, choice of equations and parameters are not fully described (journal article, uses well-mixed and near field far field models)
	Metric 2:	Geographic Scope	Medium	Data are from Japan, an OECD country.
Domain 2: Representativeness	Metric 3:	Applicability	Medium	Model is used for printing, not an in-scope occupational scenario, but may be adapted/used as surrogate for an in-scope occupational scenario like non-incorporative activities (industrial use).
	Metric 4:	Temporal Representativeness	High	Model is based on current industry conditions and based on data no more than 10 years old.
Domain 3: Accessibility/ Clarity	Metric 5:	Metadata Completeness	High	Model approach, equations, and choice of parameter values are transparent. Rationales for choice of approach, equations, and parameter values provided.
	Metric 6:	Metadata Completeness	Medium	Variability addressed by modeling multiple scenarios, but uncertainty is not addressed
Domain 4: Variability and Uncertainty				

Overall Quality Determination

High

Study Citation:	Yamada, K., Kumagai, S., Nagoya, T., Endo, G. (2014). Chemical exposure levels in printing workers with cholangiocarcinoma. Journal of Occupational Health 56(5):332-338.		
HERO ID:	2797854		
Conditions of Use:	Printing Plants		
EXTRACTION			
Parameter	Data		
Worker activity description:	estimated 1,2-DCP concentratons in off-set printing rooms and during ink removal operations (p. 336)		
Exposure route:	inhalation		
Exposure duration:	9-11.5 hrs (p. 336)		
Comments:	various estimated shift TWAs (p. 336); 9-11.5 hrs (p. 336)		
EVALUATION			
Domain	Metric	Rating	Comments
Domain 1: Reliability	Metric 1: Methodology	Medium	Model is free of mathematical errors and based on sound approaches/methods; however, choice of equations and parameters are not fully described (journal article, uses near field far field model)
Domain 2: Representativeness	Metric 2: Geographic Scope	Medium	Data are from Japan, an OECD country.
	Metric 3: Applicability	High	Model is for printing, not an in-scope occupational scenario, but may be adapted/used as surrogate for an in-scope occupational scenario.
	Metric 4: Temporal Representativeness	High	Model is based on current industry conditions and based on data no more than 10 years old.
Domain 3: Accessibility/ Clarity	Metric 5: Metadata Completeness	High	Model approach, equations, and choice of parameter values (Provided by Ministry of Health, Labour, and Welfare) are transparent. Rationales for choice of approach, equations, and parameter values provided.
Domain 4: Variability and Uncertainty	Metric 6: Metadata Completeness	Medium	Variability addressed by modeling multiple scenarios, but uncertainty is not addressed
Overall Quality Determination		High	

Study Citation:	ACC, (2021). Letter to DGAD, OPPT, USEPA, from Colleen Stevens, ACC, re: Propylene dichloride: In vitro dermal absorption rate testing (CAS No 78-87-5).			
HERO ID:	7474963			
Conditions of Use:	In Vitro Dermal Absorption Rate Testing (can apply to multiple in-scope COUs)			
EXTRACTION				
Parameter	Data			
Exposure route:	Dermal			
Physical form:	Liquid			
Dermal exposure data:	Permeability coefficient: 4.32*10^-4 cm/h; steady-state penetration: 500.8 ug equiv/cm^2/h; short-term (10-minute) penetration rate: 677.8 ug equiv/cm^2/h; short-term (60-minute) penetration rate: 665.8 ug equiv/cm^2/h			
Exposure duration:	10 minute and 60 minute			
EVALUATION				
Domain	Metric		Rating	Comments
Domain 1: Reliability	Metric 1:	Methodology	High	Report uses high quality data and is from an In Vitro Dermal Absorption Rate Testing report submitted to EPA.
Domain 2: Representativeness	Metric 2:	Geographic Scope	High	Data are from the U.S.
	Metric 3:	Applicability	High	Data are for dermal exposures, which can occur for multiple in-scope occupational scenarios.
	Metric 4:	Temporal Representativeness	Medium	The assessment captures operations, equipment, and worker activities that are expected to be reasonably representative of current conditions. The completed exposure or risk assessment is more than 10 years but no more than 20 years old.
	Metric 5:	Sample Size	Medium	Sample distribution characterized by limited statistics (mean) but discrete samples not provided and distribution not fully characterized.
Domain 3: Accessibility/ Clarity	Metric 6:	Metadata Completeness	High	All data sources, methods, results, and assumptions are clearly documented.
Domain 4: Variability and Uncertainty	Metric 7:	Metadata Completeness	Medium	Variability is not addressed, uncertainty is addressed by sample preparation method and sampling method.
Overall Quality Determination			High	

Study Citation:	Dow Chemical, (1983). Letter summarizing the EPA/Dow Chemical Co meeting regarding the manufacture of 1,2-dichloropropane.			
HERO ID:	2803587			
Conditions of Use:	Ion exchange manufacturing			
EXTRACTION				
Parameter	Data			
Area sampling data:	<1 (ppm)			
Number of workers:	70			
EVALUATION				
Domain	Metric		Rating	Comments
Domain 1: Reliability	Metric 1:	Methodology	High	Report uses high quality data from frequently-used sources.
Domain 2: Representativeness	Metric 2:	Geographic Scope	High	Data are from the U.S.
	Metric 3:	Applicability	Medium	Data are for ion exchange manufacture, which is similar to the in-scope occupational scenario intermediate in all other basic organic chemical manufacturing.
	Metric 4:	Temporal Representativeness	Low	Report is based on data greater than 20 years old and industry conditions that are expected to be outdated.
	Metric 5:	Sample Size	Medium	Sample distribution characterized by limited statistics (mean) but discrete samples not provided and distribution not fully characterized.
Domain 3: Accessibility/ Clarity	Metric 6:	Metadata Completeness	Medium	Methods, results, and assumptions are clearly documented, but underlying data sources are not fully transparent.
Domain 4: Variability and Uncertainty	Metric 7:	Metadata Completeness	Low	Variability and uncertainty are not addressed.
Overall Quality Determination			Medium	

Study Citation:	Dow Chemical, (1983). Letter summarizing the EPA/Dow Chemical Co meeting regarding the manufacture of 1,2-dichloropropane.			
HERO ID:	2803587			
Conditions of Use:	Intermediate in all other basic organic chemical manufacturing			
EXTRACTION				
Parameter		Data		
Area sampling data:		<2 (ppm)		
Number of workers:		70		
EVALUATION				
Domain		Metric	Rating	Comments
Domain 1: Reliability		Metric 1: Methodology	High	Report uses high quality data from frequently-used sources.
Domain 2: Representativeness		Metric 2: Geographic Scope	High	Data are from the U.S.
		Metric 3: Applicability	Medium	Data are for intermediate in all other basic organic chemical manufacture, which is an in-scope, occupational scenario.
		Metric 4: Temporal Representativeness	Low	Report is based on data greater than 20 years old and industry conditions that are expected to be outdated.
		Metric 5: Sample Size	Medium	Sample distribution characterized by limited statistics (mean) but discrete samples not provided and distribution not fully characterized.
Domain 3: Accessibility/ Clarity		Metric 6: Metadata Completeness	Medium	Methods, results, and assumptions are clearly documented, but underlying data sources are not fully transparent.
Domain 4: Variability and Uncertainty		Metric 7: Metadata Completeness	Low	Variability and uncertainty are not addressed.
Overall Quality Determination			Medium	

Study Citation:	Dow Chemical, (1983). Letter summarizing the EPA/Dow Chemical Co meeting regarding the manufacture of 1,2-dichloropropane.			
HERO ID:	2803587			
Conditions of Use:	Paper coating			
EXTRACTION				
Parameter	Data			
Area sampling data:	<25 (ppm)			
Number of workers:	70			
EVALUATION				
Domain	Metric		Rating	Comments
Domain 1: Reliability	Metric 1:	Methodology	High	Report uses high quality data from frequently-used sources.
Domain 2: Representativeness	Metric 2:	Geographic Scope	High	Data are from the U.S.
	Metric 3:	Applicability	Medium	Data are for paper coating, which is similar to the in-scope occupational scenarios related to cleaning.
	Metric 4:	Temporal Representativeness	Low	Report is based on data greater than 20 years old and industry conditions that are expected to be outdated.
	Metric 5:	Sample Size	Medium	Sample distribution characterized by limited statistics (mean) but discrete samples not provided and distribution not fully characterized.
Domain 3: Accessibility/ Clarity	Metric 6:	Metadata Completeness	Medium	Methods, results, and assumptions are clearly documented, but underlying data sources are not fully transparent.
Domain 4: Variability and Uncertainty	Metric 7:	Metadata Completeness	Low	Variability and uncertainty are not addressed.
Overall Quality Determination			Medium	

Study Citation:	DuPont, (2005). Propylene dichloride: In vitro dermal absorption rate testing.			
HERO ID:	7461856			
Conditions of Use:	In Vitro Dermal Absorption Rate Testing (can apply to multiple in-scope COUs)			
EXTRACTION				
Parameter	Data			
Exposure route:	Dermal			
Physical form:	Liquid			
Dermal exposure data:	Permeability coefficient: 4.32*10^-4 cm/h; steady-state penetration: 500.8 ug equiv/cm^2/h; short-term (10-minute) penetration rate: 677.8 ug equiv/cm^2/h; short-term (60-minute) penetration rate: 665.8 ug equiv/cm^2/h			
Exposure duration:	10 minute and 60 minute			
EVALUATION				
Domain	Metric		Rating	Comments
Domain 1: Reliability	Metric 1:	Methodology	High	Report uses high quality data and is from an In Vitro Dermal Absorption Rate Testing report submitted to EPA.
Domain 2: Representativeness	Metric 2:	Geographic Scope	High	Data are from the U.S.
	Metric 3:	Applicability	High	Data are for dermal exposures, which can occur for multiple in-scope occupational scenarios.
	Metric 4:	Temporal Representativeness	Medium	The assessment captures operations, equipment, and worker activities that are expected to be reasonably representative of current conditions. The completed exposure or risk assessment is more than 10 years but no more than 20 years old.
	Metric 5:	Sample Size	Medium	Sample distribution characterized by limited statistics (mean) but discrete samples not provided and distribution not fully characterized.
Domain 3: Accessibility/ Clarity	Metric 6:	Metadata Completeness	High	All data sources, methods, results, and assumptions are clearly documented.
Domain 4: Variability and Uncertainty	Metric 7:	Metadata Completeness	Medium	Variability is not addressed, uncertainty is addressed by sample preparation method and sampling method.
Overall Quality Determination			High	

Study Citation:	OSHA, (2019). Chemical exposure health data (CEHD) sampling results: CASRNs 75-34-3, 85-68-7, 84-74-2, 78-87-5, 117-81-7, 106-93-4, 50-00-0, 95-50-1, 85-44-9, 106-46-7, 79-00-5, and 115-86-6.			
HERO ID:	6499659			
Conditions of Use:	Unknown			
EXTRACTION				
Parameter	Data			
Number of sites:	1			
Personal sampling data:	0-0.045224 (ppm)			
Comments:	Analyzed via GC/FID.			
EVALUATION				
Domain	Metric		Rating	Comments
Domain 1: Reliability	Metric 1:	Methodology	High	Assessment uses high quality data/techniques from frequently-used sources.
Domain 2: Representativeness	Metric 2:	Geographic Scope	High	Data are from the U.S.
	Metric 3:	Applicability	Uninformative	Condition of use is unknown.
	Metric 4:	Temporal Representativeness	High	Assessment is based on current industry conditions and data no more than 10 years old.
	Metric 5:	Sample Size	High	Statistical distribution of samples is fully characterized (discrete sampling data provided).
Domain 3: Accessibility/ Clarity	Metric 6:	Metadata Completeness	Medium	Methods, results, and assumptions are clearly documented, but underlying data sources are not fully transparent.
Domain 4: Variability and Uncertainty	Metric 7:	Metadata Completeness	Medium	Variability addressed by testing multiple facilities but uncertainty is not addressed.
Overall Quality Determination			Uninformative	

Study Citation:	U.S. EPA, (2023). Use of laboratory chemicals - Generic scenario for estimating occupational exposures and environmental releases (Revised draft generic scenario).
HERO ID:	10480466
Conditions of Use:	Laboratory Chemicals

EXTRACTION	
Parameter	Data
Worker activity description:	Container unloading (liquids and solids), container cleaning, equipment cleaning, laboratory analyses, disposal of laboratory chemicals.
Exposure route:	Dermal, Inhalation.
Physical form:	Liquid or solid.
Personal sampling data:	Inhalation: Provides methods for modeling exposures to non-volatile and volatile liquids and solids.
Dermal exposure data:	Dermal: Provides methods for modeling exposures to non-volatile and volatile liquids and solids.
Exposure duration:	8-12 hr/day.
Exposure frequency:	250 days/yr.
Number of workers:	3 workers/facility and 3 ONUs/facility.
Personal protective equipment:	Basic PPE includes wearing long sleeves (lab coats), long pants, closed-toe shoes, safety glasses or goggles, and gloves during the use of laboratory chemicals. Additional PPE may be worn depending on the level of hazard or specifics of the process.
Engineering control:	Fume hood.

EVALUATION				
Domain	Metric		Rating	Comments
Domain 1: Reliability	Metric 1:	Methodology	High	Assessment uses high quality information/data from frequently-used sources.
Domain 2: Representativeness	Metric 2:	Geographic Scope	High	This GS is based on U.S. data.
	Metric 3:	Applicability	Medium	Data is for an in-scope occupational scenario; however, data is general and not specific to a chemical.
	Metric 4:	Temporal Representativeness	High	Assessment is based on current industry conditions and data no more than 10 years old.
	Metric 5:	Sample Size	Medium	Sample distribution characterized by a range with uncertain statistics.
Domain 3: Accessibility/ Clarity	Metric 6:	Metadata Completeness	High	All data sources, methods, results, and assumptions are clearly documented.
Domain 4: Variability and Uncertainty	Metric 7:	Metadata Completeness	Low	Variability and uncertainty are not addressed.

Overall Quality Determination	High
--------------------------------------	-------------

Study Citation:	U.S. EPA, (2022). Chemical repackaging - Generic scenario for estimating occupational exposures and environmental releases (revised draft).			
HERO ID:	11182966			
Conditions of Use:	Repackaging			
EXTRACTION				
Parameter	Data			
Worker activity description:	Unloading transport containers, container cleaning, equipment cleaning, loading of transport containers.			
Exposure route:	Dermal, Inhalation.			
Physical form:	Liquid or solid.			
Area sampling data:	Inhalation: Provides methods for modeling exposures to non-volatile and volatile liquids and solids.			
Dermal exposure data:	Dermal: Provides methods for modeling exposures to non-volatile and volatile liquids and solids.			
Exposure duration:	8-12 hr/day.			
Exposure frequency:	The number of operating days is given in a range of 174-260 days/yr with an EPA default of 260 days/yr.			
Number of workers:	3 workers/facility and 1 ONUs/facility (total number of employees and facilities given in Table 5-3).			
Personal protective equipment:	Commonly used PPE includes safety glasses, face shields, aprons, and gloves.			
Engineering control:	Local exhaust ventilation.			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Reliability	Metric 1: Methodology	High	Assessment uses high quality information/data from frequently-used sources.	
Domain 2: Representativeness	Metric 2: Geographic Scope	High	This GS is based on U.S. data.	
	Metric 3: Applicability	Medium	Data are for an in-scope occupational scenario; however, data is general and not specific to a chemical.	
	Metric 4: Temporal Representativeness	Medium	Assessment is based on data greater than 10 years old but no more than 20 years old and industry conditions that are expected to be representative of current industry conditions.	
	Metric 5: Sample Size	High	Statistical distribution of samples is fully characterized (discrete use amounts provided).	
Domain 3: Accessibility/ Clarity	Metric 6: Metadata Completeness	High	All data sources, methods, results, and assumptions are clearly documented.	
Domain 4: Variability and Uncertainty	Metric 7: Metadata Completeness	Medium	Uncertainty not addressed. Variability addressed by considering multiple worker activities.	
Overall Quality Determination		High		

Study Citation:	U.S. EPA, (1988). Preliminary results summary: Indoor air monitoring phase II & data for warehouse and navy yard & evaluation of selected heating, ventilation & air conditioning system with attachments.			
HERO ID:	1481714			
Conditions of Use:	Cleaning products and furniture care products (carpet off-gassing)			
EXTRACTION				
Parameter	Data			
Exposure route:	Inhalation			
Physical form:	Vapor			
Comments:	On PDF Pg.19-28 there are tables which looks to have area sampling results for the relevant chlorinated solvents, but the pages containing the table are too blurry to extract data from.			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Reliability	Metric 1:	Methodology	High	Report uses high quality data from frequently-used sources.
Domain 2: Representativeness	Metric 2:	Geographic Scope	High	Data are from the U.S.
	Metric 3:	Applicability	High	Data are for cleaning and furniture care products, which can occur for multiple in-scope occupational scenarios.
	Metric 4:	Temporal Representativeness	Low	Report is based on data greater than 20 years old and industry conditions that are expected to be outdated.
	Metric 5:	Sample Size	N/A	Sample results too unclear to read.
Domain 3: Accessibility/ Clarity	Metric 6:	Metadata Completeness	Uninformative	Sampling results provided are too unclear to read; cannot be extracted.
Domain 4: Variability and Uncertainty	Metric 7:	Metadata Completeness	N/A	Sample results too unclear to read.
Overall Quality Determination		Uninformative		

Study Citation:	U.S. EPA, (2003). Transportation equipment cleaning - Generic scenario for estimating occupational exposures and environmental releases (draft).			
HERO ID:	6385708			
Conditions of Use:	Disposal			
EXTRACTION				
Parameter	Data			
Worker activity description:	The greatest potential for worker exposure to materials last transported occurs during heel removal.			
Personal protective equipment:	Facility personnel typically wear coveralls, safety shoes, protective glasses, and gloves during tank cleaning.			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Reliability	Metric 1: Methodology	High	Assessment uses high quality information/data from frequently-used sources.	
Domain 2: Representativeness	Metric 2: Geographic Scope	High	This GS is based on U.S. data.	
	Metric 3: Applicability	Medium	Data is for disposal; however, data is general and not specific to a chemical.	
	Metric 4: Temporal Representativeness	Medium	Assessment is based on data greater than 10 years old but no more than 20 years old and industry conditions that are expected to be representative of current industry conditions.	
	Metric 5: Sample Size	N/A	N/A - only qualitative information provided	
Domain 3: Accessibility/ Clarity	Metric 6: Metadata Completeness	Medium	Methods, results, and assumptions are clearly documented, but underlying data sources are not fully transparent.	
Domain 4: Variability and Uncertainty	Metric 7: Metadata Completeness	N/A	No scope to address variability and uncertainty.	
Overall Quality Determination		High		

Study Citation:	Wang, D., Yu, H., Shao, X., Yu, H., Nie, L. (2018). Direct and potential risk assessment of exposure to volatile organic compounds for primary receptor associated with solvent consumption. Environmental Pollution 233:501-509.			
HERO ID:	5550004			
Conditions of Use:	Adhesives and sealants			
EXTRACTION				
Parameter	Data			
Exposure route:	Inhalation			
Physical form:	Vapor			
Area sampling data:	Acrylic primer: 28.3 (ug/m^3); Epoxy primer: 7.3 (ug/m^3); Acrylic topcoat: 20.4 (ug/m^3).			
Comments:	See table 2- exposure concentration of WBPs for primary receptors			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Reliability	Metric 1:	Methodology	Medium	Assessment uses high quality data that are not from frequently-used sources and there are no known quality issues.
Domain 2: Representativeness	Metric 2:	Geographic Scope	Low	Data are from China, a non-OECD country.
	Metric 3:	Applicability	High	Data are for adhesives and sealants, an in-scope occupational scenario.
	Metric 4:	Temporal Representativeness	High	Assessment is based on current industry conditions and data no more than 10 years old.
	Metric 5:	Sample Size	Medium	Sample distribution characterized by limited statistics (mean, standard deviation, median, maximum) but discrete samples not provided and distribution not fully characterized.
Domain 3: Accessibility/ Clarity	Metric 6:	Metadata Completeness	Medium	Methods, results, and assumptions are clearly documented, but underlying data sources are not fully transparent.
Domain 4: Variability and Uncertainty	Metric 7:	Metadata Completeness	Medium	Variability addressed by multiple product types being tested but uncertainty is not addressed.
Overall Quality Determination		Medium		

Study Citation:	ATSDR, (1989). Toxicological profile for 1,2-dichloropropane.			
HERO ID:	5160134			
Conditions of Use:	All			
EXTRACTION				
Parameter	Data			
Exposure route:	inhalation			
Number of workers:	A National Occupational Exposure Survey (NOES) conducted by NIOSH from 1981 to 1983 estimated that 2119 workers including 949 women were potentially exposed to 1,2-dichloropropane in the United States (NIOSH 1988). The distribution of these estimated exposed workers by standard industrial category (SIC) was: 408 in business services, 831 in machinery, except electrical, 161 in abricated metal products, 672 in the chemical and allied products, and 47 in textile mill products. (p. 101)			
Engineering control:	Potential exposure to PDC in the occupational setting is limited since it is handled and used predominately in closed systems. (p. 5)			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Reliability	Metric 1: Methodology	High	Report uses high quality data from frequently-used sources (compiled by ATSDR).	
Domain 2: Representativeness	Metric 2: Geographic Scope	High	Data are from the U.S.	
	Metric 3: Applicability	High	Data are for import, an in-scope occupational scenario.	
	Metric 4: Temporal Representativeness	Low	Report is based on data greater than 20 years old and industry conditions that are expected to be outdated.	
	Metric 5: Sample Size	N/A	no sample data	
Domain 3: Accessibility/ Clarity	Metric 6: Metadata Completeness	High	Only results provided - however data sources/methodology from trusted government sources.	
Domain 4: Variability and Uncertainty	Metric 7: Metadata Completeness	Low	Variability and uncertainty are not addressed.	
Overall Quality Determination		High		

Study Citation:	Bauer, A. (2013). Contact dermatitis in the cleaning industry. Current Opinion in Allergy and Clinical Immunology 13(5):521-524.			
HERO ID:	1997907			
Conditions of Use:	All purpose liquid cleaner/polish			
EXTRACTION				
Parameter	Data			
Exposure route:	dermal			
Personal protective equipment:	Summarizing the recent literature, skin care and protection regimes for cleaners might include the following items: replacement and avoidance of hazardous substances in cleaning, avoidance of multiple work sites types, reduction of the number of cleansing products used, regular use of re-usable, thiuram-free, chemical resistant gloves with cotton lining for wet work and handling disinfectants and other hazardous cleaning agents, no use of gloves for dry work tasks, reduction of hand washing procedures, and regular use of skin care and protection ointments (p. 3-4)			
EVALUATION				
Domain	Metric	Rating		Comments
Domain 1: Reliability	Metric 1:	Methodology	Medium	Report uses high quality data that are not from frequently-used sources and there are no known quality issues.
Domain 2: Representativeness	Metric 2:	Geographic Scope	Medium	The report is from an OECD country other than the U.S.
	Metric 3:	Applicability	High	Data are for all-purpose cleaners, an in-scope occupational scenario.
	Metric 4:	Temporal Representativeness	High	Report is based on current industry conditions and data no more than 10 years old.
	Metric 5:	Sample Size	N/A	No sampling data.
Domain 3: Accessibility/ Clarity	Metric 6:	Metadata Completeness	Medium	Assessment or report clearly documents results, methods, and assumptions. Data sources are generally described but not fully transparent.
Domain 4: Variability and Uncertainty	Metric 7:	Metadata Completeness	N/A	No scope to address variability and uncertainty.
Overall Quality Determination			High	

Study Citation:	CDC, (2009). Fourth national report on human exposure to environmental chemicals.			
HERO ID:	664488			
Conditions of Use:	Various			
EXTRACTION				
Parameter	Data			
Worker activity description:	Workers involved in the production or use of these solvents may be exposed by inhalation or by dermal contact with the liquid solvents... Inhalation is the most common exposure route for the general population, including indoor sources from such as paints, adhesives, cleaning solutions, and aerosolized insecticide sprays; from industries producing these solvents; and from contaminated waste disposal sites (pg 488)			
Exposure route:	inhalation/dermal			
Physical form:	vapor/aerosol/liquid			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Reliability	Metric 1:	Methodology	High	Report uses high quality data/techniques/methods from frequently-used sources (CDC).
Domain 2: Representativeness	Metric 2:	Geographic Scope	High	Data are from the U.S.
	Metric 3:	Applicability	High	Data are for various in-scope occupational scenarios.
	Metric 4:	Temporal Representativeness	Medium	Report is based on data greater than 10 years old but no more than 20 years old and industry conditions that are expected to be representative of current industry conditions.
	Metric 5:	Sample Size	N/A	exposure info
Domain 3: Accessibility/ Clarity	Metric 6:	Metadata Completeness	High	All data sources, methods, results, and assumptions are clearly documented.
Domain 4: Variability and Uncertainty	Metric 7:	Metadata Completeness	N/A	exposure info
Overall Quality Determination			High	

Study Citation:	Cohr, K. H. (1986). Uptake and distribution of common industrial solvents. Progress in Clinical and Biological Research 220:45-60.			
HERO ID:	61012			
Conditions of Use:	All			
EXTRACTION				
Parameter	Data			
Worker activity description:	N/A; correlation between experimental exposure and dermal uptake			
Exposure route:	inhalation; dermal			
Physical form:	Vapor; liquid			
Dermal exposure data:	correlations on pg 6 and 10 (graphs); not real exposure data but correlation between experimental exposures and uptake			
Exposure duration:	30 minute			
Comments:	correlations on pg 6 and 10 (graphs); not real exposure data but correlation between experimental exposures and uptake			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Reliability	Metric 1:	Methodology	Medium	Report uses high quality methods that are not from frequently-used sources and there are no known quality issues.
Domain 2: Representativeness	Metric 2:	Geographic Scope	Medium	Data are from Denmark, an OECD country.
	Metric 3:	Applicability	High	Not specific to an in-scope OES, but generic dermal exposure data potentially applicable to multiple OESs
	Metric 4:	Temporal Representativeness	Low	Report is based on data greater than 20 years old (1986) and industry conditions that are expected to be outdated.
	Metric 5:	Sample Size	Low	Sample distribution is described qualitatively (graphical)
Domain 3: Accessibility/ Clarity	Metric 6:	Metadata Completeness	Medium	Methods, results, and assumptions are clearly documented, but underlying data sources are not fully transparent.
Domain 4: Variability and Uncertainty	Metric 7:	Metadata Completeness	Low	Variability and uncertainty are not addressed.
Overall Quality Determination		Medium		

Study Citation:	Dow Chemical, (1988). Mortality among Dow Chemical employees of a Texas operations per-tet manufacturing plant with cover letter dated 050389.			
HERO ID:	1441931			
Conditions of Use:	Processing as an intermediate			
EXTRACTION				
Parameter	Data			
Worker activity description:	Potential exposure to the feedstock, process chemicals, finished products and wastes have not been unique to any particular job classification. Anecdotal information indicated that before waste products were disposed of via a dosed tank, they were stored in open dumpsters, which resulted in potential for airborne exposure. This practice of waste disposal of the heavy chlorinated organics was discontinued in the late 1960's. At that time a dosed holding tank was built to store by-products that were then pumped through a closed system to a tank to be shipped to a thermal oxidizer.			
Exposure route:	Inhalation			
Physical form:	Vapor			
Exposure duration:	Mean years of experience in the plant was 4.3 years			
Number of workers:	270 white males (1944-1982)			
Comments:	The article is a study of mortality among Dow Chemical employees of a Texas operations per-tet manufacturing plant.			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Reliability	Metric 1:	Methodology	High	Report appears to use high quality techniques/sound methods and was submitted to EPA by a company.
Domain 2: Representativeness	Metric 2:	Geographic Scope	High	Data are from the U.S.
	Metric 3:	Applicability	High	Data are for processing as an intermediate, an in-scope occupational scenario.
	Metric 4:	Temporal Representativeness	Low	Report is based on data greater than 20 years old and industry conditions that are expected to be outdated.
	Metric 5:	Sample Size	N/A	N/A - no sample data
Domain 3: Accessibility/ Clarity	Metric 6:	Metadata Completeness	Medium	Assessment or report clearly documents results, methods, and assumptions. Data sources are generally described but not fully transparent.
Domain 4: Variability and Uncertainty	Metric 7:	Metadata Completeness	N/A	No scope to address variability and uncertainty.
Overall Quality Determination		High		

Study Citation:	Dow Chemical, (1991). Letter to USEPA regarding enclosed document concerning the complete review of a medical surveillance and related data concern- ing Dow Chemical Company employees.			
HERO ID:	664480			
Conditions of Use:	Manufacturing, Processing			
EXTRACTION				
Parameter	Data			
Exposure route:	Inhalation			
Number of workers:	13 employees at plant (pg 3)			
Personal protective equipment:	Respirators			
Comments:	The source only mentions that 13 workers handle 1,2 dichloropropane but does not state whether the chemical is manufactured or processed. The role of the workers are also not mentioned.			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Reliability	Metric 1:	Methodology	High	The report appears to use high quality data/information and was submitted by a com- pany to EPA.
Domain 2: Representativeness	Metric 2:	Geographic Scope	High	Data are from the U.S.
	Metric 3:	Applicability	Medium	The source only mentions that 13 workers handle 1,2 dichloropropane but does not state the role of the chemical or role of the workers. It can be inferred that the chemical is either manufactured or processed in the plant since the report was submitted by a chemical company -Dow.
	Metric 4:	Temporal Representativeness	Low	Report is based on data greater than 20 years old and industry conditions that are ex- pected to be outdated.
	Metric 5:	Sample Size	N/A	No sample data.
Domain 3: Accessibility/ Clarity	Metric 6:	Metadata Completeness	Low	Assessment or report provides results, but the underlying methods, data sources, and assumptions are not fully transparent.
Domain 4: Variability and Uncertainty	Metric 7:	Metadata Completeness	N/A	No scope to address variability and scope. Number of workers/PPE info only.
Overall Quality Determination		Medium		

Study Citation:	ECHA, (2020). Substance infocard: 1,2-dichloropropane.			
HERO ID:	7310678			
Conditions of Use:	May apply to more than 1 COU			
EXTRACTION				
Parameter	Data			
Exposure route:	Inhalation.			
Physical form:	Liquid and vapor.			
EVALUATION				
Domain	Metric		Rating	Comments
Domain 1: Reliability	Metric 1:	Methodology	High	Report uses high quality information/data from frequently-used sources.
Domain 2: Representativeness	Metric 2:	Geographic Scope	Medium	Data is from Europe.
	Metric 3:	Applicability	High	Data is not specific to one occupational scenario, but applies to more than 1 COU.
	Metric 4:	Temporal Representativeness	High	Report is based on current industry conditions and data no more than 10 years old.
	Metric 5:	Sample Size	N/A	N/A - Physical form and routes of exposure.
Domain 3: Accessibility/ Clarity	Metric 6:	Metadata Completeness	Medium	Methods, results, and assumptions are clearly documented, but underlying data sources are not fully transparent.
Domain 4: Variability and Uncertainty	Metric 7:	Metadata Completeness	N/A	N/A - Physical form and routes of exposure.
Overall Quality Determination			High	

Study Citation:	ECHA, (2021). Registration dossier: 1,2-Dichloropropane: Toxicological summary.			
HERO ID:	7347515			
Conditions of Use:	May apply to more than 1 COU			
EXTRACTION				
Parameter	Data			
Exposure route:	Dermal, oral and inhalation			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Reliability	Metric 1: Methodology	High	Report uses high quality information/data from frequently-used sources.	
Domain 2: Representativeness	Metric 2: Geographic Scope	Medium	Data is from Europe.	
	Metric 3: Applicability	High	Data is not specific to one occupational scenario, but may apply to more than 1 COU.	
	Metric 4: Temporal Representativeness	High	Report is based on current industry conditions and data no more than 10 years old.	
	Metric 5: Sample Size	N/A	N/A - Routes of exposure.	
Domain 3: Accessibility/ Clarity	Metric 6: Metadata Completeness	Medium	Methods, results, and assumptions are clearly documented, but underlying data sources are not fully transparent.	
Domain 4: Variability and Uncertainty	Metric 7: Metadata Completeness	N/A	N/A - Routes of exposure.	
Overall Quality Determination		High		

Study Citation:	Fasano, W. J., McDougal, J. N. (2008). In vitro dermal absorption rate testing of certain chemicals of interest to the Occupational Safety and Health Administration: Summary and evaluation of USEPA’s mandated testing. Regulatory Toxicology and Pharmacology 51(2):181-194.			
HERO ID:	1618719			
Conditions of Use:	Dermal Exposure			
EXTRACTION				
Parameter		Data		
Exposure route:		Dermal		
Dermal exposure data:		Steady-state flux: 501 yg/cm^2/h; 10-min flux: 678 ug/cm^2/h; 60-min flux: 665.8 ug/cm^2/h		
EVALUATION				
Domain		Metric	Rating	Comments
Domain 1: Reliability		Metric 1: Methodology	High	Report uses high quality data from frequently-used sources.
Domain 2: Representativeness		Metric 2: Geographic Scope	High	The data are from the United States
		Metric 3: Applicability	High	Data are for dermal exposures, which can occur for multiple in-scope occupational scenarios.
		Metric 4: Temporal Representativeness	Medium	Report is based on data greater than 10 years old but no more than 20 years old and industry conditions that are expected to be representative of current industry conditions.
		Metric 5: Sample Size	Medium	Sample distribution characterized by limited statistics (mean) but discrete samples not provided and distribution not fully characterized.
Domain 3: Accessibility/ Clarity		Metric 6: Metadata Completeness	High	All data sources, methods, results, and assumptions are clearly documented.
Domain 4: Variability and Uncertainty		Metric 7: Metadata Completeness	Medium	Variability addressed by sampling the steady-state flux along with 10-min and 60-min fluxes, but uncertainty is not addressed.
Overall Quality Determination			High	

Study Citation:	Grzywa, Z., Rudzki, E. (1981). Dermatitis from dichloropropane. Contact Dermatitis 7(3):151-152.
HERO ID:	684250
Conditions of Use:	Processing aids, not otherwise listed

EXTRACTION	
Parameter	Data
Worker activity description:	Worker on the production of various plastic products made of polypropylene, polystyrene, metaplex and bakelite. She had daily contact with three aerosols: Silform AR-1 (7.4% DCP), AR-2 (11% DCP) and AR-3 (12.7% DCP). She sprayed them repeatedly in the course of her work on to the mold into which the plastic was poured. Another worker worked on the production of baklite parts for cars. (p. 1-2)
Exposure route:	dermal
Exposure frequency:	daily (p. 1)

		EVALUATION	
Domain	Metric	Rating	Comments
Domain 1: Reliability	Metric 1:	Methodology	Medium
			Report uses high quality data that are not from frequently-used sources and there are no known quality issues.
Domain 2: Representativeness	Metric 2:	Geographic Scope	Medium
	Metric 3:	Applicability	Medium
			Data are from Poland, an OECD country.
	Metric 4:	Temporal Representativeness	Low
			Data are for manual spraying of mold release, which is potentially relevant to the in-scope occupational scenario industrial processing aid.
Domain 3: Accessibility/ Clarity	Metric 5:	Sample Size	N/A
			Report is based on data greater than 20 years old and industry conditions that are expected to be outdated.
Domain 4: Variability and Uncertainty	Metric 6:	Metadata Completeness	Medium
			N/A - no sample data provided
Domain 4: Variability and Uncertainty	Metric 7:	Metadata Completeness	Medium
			Assessment or report clearly documents results, methods, and assumptions. Data sources are generally described but not fully transparent.
Domain 4: Variability and Uncertainty			N/A
			No scope to address variability and uncertainty.

Overall Quality Determination

Medium

Study Citation:	NCBI, (2020). PubChem Compound Summary for CID 6564, 1,2-Dichloropropane.			
HERO ID:	7681904			
Conditions of Use:	May apply to more than 1 COU			
EXTRACTION				
Parameter	Data			
Worker activity description:	Workers may be exposed during use in cleaning, degreasing, & spot removal operations including paint & varnish removal, use during rubber compounding & vulcanizing operations, use during extraction processing of fats, oils, lactic acid, & petroleum waxes, use in manufacture of tetrachloroethylene & propylene oxide, & use as an additive & lead scavenger in antiknock fluids.			
Exposure route:	Dermal, ingestion, and inhalation			
Physical form:	Liquid			
Number of workers:	2,944			
Personal protective equipment:	Employees should be provided with & required to use impervious clothing, gloves, face shields (8 inch min), & other appropriate protective clothing necessary to prevent repeated or prolonged skin contact.			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Reliability	Metric 1: Methodology	High	Report uses high quality information/data from frequently-used sources.	
Domain 2: Representativeness	Metric 2: Geographic Scope	High	Data are from the U.S.	
	Metric 3: Applicability	High	Data is not specific to one occupational scenario, but may apply to more than 1 COU.	
	Metric 4: Temporal Representativeness	High	Report is based on current industry conditions and data no more than 10 years old.	
	Metric 5: Sample Size	Low	Sample distribution is characterized by no statistics.	
Domain 3: Accessibility/ Clarity	Metric 6: Metadata Completeness	High	All data sources, methods, results, and assumptions are clearly documented.	
Domain 4: Variability and Uncertainty	Metric 7: Metadata Completeness	Low	Variability and uncertainty are not addressed.	
Overall Quality Determination		High		

Study Citation:	NIOSH, (2007). NIOSH pocket guide to chemical hazards.			
HERO ID:	192177			
Conditions of Use:	General use			
EXTRACTION				
Parameter	Data			
Exposure route:	Toxicologically important entry routs (i.e., not potential routes associated with an exposure scenario): inhalation, dermal absorption, ingestion, dermal and eye contact. (pg. 298/454)			
Physical form:	Colorless liquid (pdf P.298/454). This is not the physical form in the case of an occupational exposure scenario of the risk evaluation.			
Personal protective equipment:	Table 3 shows various respirators selection. (pg. 298/454)			
Comments:	Synonyms/Trade Names: Propylene dichloride, Dichloro-1,2-propane			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Reliability	Metric 1:	Methodology	High	The assessment or report uses high quality data and/or techniques or sound methods.
Domain 2: Representativeness	Metric 2:	Geographic Scope	High	The data are from the United States
	Metric 3:	Applicability	N/A	The data source does not contain data that pertain to an occupational exposure scenario of the risk evaluation.
	Metric 4:	Temporal Representativeness	Medium	more than 10 years but no more than 20 years old.
	Metric 5:	Sample Size	N/A	This metric is not applicable to the data being extracted
Domain 3: Accessibility/ Clarity	Metric 6:	Metadata Completeness	High	Assessment or report clearly documents results, methods, and assumptions.
Domain 4: Variability and Uncertainty	Metric 7:	Metadata Completeness	N/A	This metric is not applicable to the data being extracted
Overall Quality Determination		High		

Study Citation:	NIOSH, (2019). NIOSH pocket guide to chemical hazards. Propylene dichloride.			
HERO ID:	2919616			
Conditions of Use:	All conditions of use			
EXTRACTION				
Parameter	Data			
Exposure route:	Inhalation and skin absorption, ingestion, skin and/or eye contact			
Physical form:	Liquid.			
Personal protective equipment:	At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration:APF = 10,000: Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode.APF = 10,000: Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus.Escape:APF = 50: Any purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister. Any appropriate escape-type, self-contained breathing apparatus.			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Reliability	Metric 1: Methodology	High	Report uses high quality [data/techniques/methods] from frequently-used sources.	
Domain 2: Representativeness	Metric 2: Geographic Scope	High	Data are from the U.S.	
	Metric 3: Applicability	High	Data are not specific to one occupational scenario, but general to all work in the presence of 1,2-DCP.	
	Metric 4: Temporal Representativeness	High	Report is based on current industry conditions and data no more than 10 years old.	
	Metric 5: Sample Size	N/A	N/A - physical form, exposure route, and PPE.	
Domain 3: Accessibility/ Clarity	Metric 6: Metadata Completeness	High	All data sources, methods, results, and assumptions are clearly documented.	
Domain 4: Variability and Uncertainty	Metric 7: Metadata Completeness	N/A	N/A - physical form, exposure route, and PPE.	
Overall Quality Determination		High		

Study Citation:	NIOSH, (1978). Occupational health guideline for propylene dichloride.			
HERO ID:	7347516			
Conditions of Use:	May apply to more than 1 COU			
EXTRACTION				
Parameter	Data			
Exposure route:	Dermal, ingestion, and inhalation			
Physical form:	Colorless liquid			
Personal protective equipment:	During work with 1,2-DCP, employees should use impervious clothing, gloves, face shields, and other appropriate protective clothing to prevent repeated or prolonged skin contact. Employees should be provided with and required to use splash-proof safety goggles where liquid propylene dichloride may contact the eyes. Respirators may be used.			
Engineering control:	Local Exhaust Ventilation			
EVALUATION				
Domain	Metric		Rating	Comments
Domain 1: Reliability	Metric 1:	Methodology	High	The assessment or report uses high quality data and/or techniques or sound methods that are from frequently used sources.
Domain 2: Representativeness	Metric 2:	Geographic Scope	High	The data are from the United States and are representative of the industry being evaluated.
	Metric 3:	Applicability	High	The report is for an occupational scenario within the scope of the risk evaluation.
	Metric 4:	Temporal Representativeness	Low	The report is more than 20 years old (1978).
	Metric 5:	Sample Size	N/A	No sample data.
Domain 3: Accessibility/ Clarity	Metric 6:	Metadata Completeness	Medium	Assessment or report clearly documents results, methods, and assumptions. Data sources are generally described but not fully transparent.
Domain 4: Variability and Uncertainty	Metric 7:	Metadata Completeness	N/A	No scope to address variability and uncertainty.
Overall Quality Determination			High	

Study Citation:	Restek Corp, (2026). Safety Data Sheet (SDS): 1,2-Dichloropropane standard.			
HERO ID:	13283273			
Conditions of Use:	Laboratory Chemicals			
EXTRACTION				
Parameter	Data			
Physical form:	liquid			
Personal protective equipment:	Protective gloves, safety glasses, protective clothing. In case of inadequate ventilation, wear respiratory protection.			
Engineering control:	Ensure good ventilation of the work station.			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Reliability	Metric 1:	Methodology	High	SDS information is primary data from the supplier. SDS does not appear to have quality issues.
Domain 2: Representativeness	Metric 2:	Geographic Scope	High	Product is from a US supplier.
	Metric 3:	Applicability	High	SDS is applicable to an occupational scenario within the scope of the risk evaluation (Laboratory chemicals).
	Metric 4:	Temporal Representativeness	High	Source is from 2026, which is less than 10 years old.
	Metric 5:	Sample Size	N/A	Only PPE/physical form provided, no statistics needed.
Domain 3: Accessibility/ Clarity	Metric 6:	Metadata Completeness	Low	Source just provides PPE/controls information and does not document how the requirements were obtained.
Domain 4: Variability and Uncertainty	Metric 7:	Metadata Completeness	Low	Does not address variability or uncertainty.
Overall Quality Determination			High	

Study Citation:	Sigma-Aldrich, (2026). Safety Data Sheet (SDS): 1,2-Dichloropropane.			
HERO ID:	13283271			
Conditions of Use:	Use of Laboratory Chemicals			
EXTRACTION				
Parameter	Data			
Exposure route:	Document references inhalation exposure metrics			
Physical form:	Liquid			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Reliability	Metric 1:	Methodology	High	SDS information is primary data from the supplier. SDS does not appear to have quality issues.
Domain 2: Representativeness	Metric 2:	Geographic Scope	High	Product is from a US supplier.
	Metric 3:	Applicability	High	SDS is applicable to an occupational scenario within the scope of the risk evaluation.
	Metric 4:	Temporal Representativeness	High	Source is from 2025, which is less than 10 years old.
	Metric 5:	Sample Size	N/A	N/A - Physical form and exposure route.
Domain 3: Accessibility/ Clarity	Metric 6:	Metadata Completeness	Low	Source just provides physical form and exposure route and does not document how these were obtained.
Domain 4: Variability and Uncertainty	Metric 7:	Metadata Completeness	N/A	N/A - Physical form and exposure route.
Overall Quality Determination		High		

Study Citation:	U.S. BLS, (2023). U.S. Census Bureau of Labor Statistics Data from 2021.			
HERO ID:	11138808			
Conditions of Use:	All			
EXTRACTION				
Parameter	Data			
Number of workers:	Used to develop a method to estimate number of sites and workers.			
EVALUATION				
Domain	Metric		Rating	Comments
Domain 1: Reliability	Metric 1:	Methodology	High	BLS is expected to use reliable survey methods.
Domain 2: Representativeness	Metric 2:	Geographic Scope	High	U.S. based economic data.
	Metric 3:	Applicability	High	Data applies to relevant COUs.
	Metric 4:	Temporal Representativeness	High	The BLS OES data are from 2021.
	Metric 5:	Sample Size	High	The BLS OES program provides detailed statistics and estimated relative standard error for each state, industry, and occupation survey conducted (https://www.bls.gov/oes/current/oes_research_estimates.htm).
Domain 3: Accessibility/ Clarity	Metric 6:	Metadata Completeness	Medium	BLS documents results and methods, but underlying survey results not accessible.
Domain 4: Variability and Uncertainty	Metric 7:	Metadata Completeness	Medium	Limited discussion of variability and uncertainty in results.
Overall Quality Determination			High	

Study Citation:	U.S. EPA, (2020). 2020 CDR: Commercial and consumer use.			
HERO ID:	10366189			
Conditions of Use:	Manufacture and Import			
EXTRACTION				
Parameter	Data			
Physical form:	Provides physical form.			
Number of workers:	Provides estimate of number of workers.			
EVALUATION				
Domain	Metric		Rating	Comments
Domain 1: Reliability	Metric 1:	Methodology	High	EPA is a trusted source.
Domain 2: Representativeness	Metric 2:	Geographic Scope	High	CDR is U.S. based data.
	Metric 3:	Applicability	High	CDR covers chemical manufacturers and importers, which are in scope for all chemicals.
	Metric 4:	Temporal Representativeness	High	EPA used data from the 2020 CDR.
	Metric 5:	Sample Size	Medium	Due to reporting threshold, statistical representativeness is unclear.
Domain 3: Accessibility/ Clarity	Metric 6:	Metadata Completeness	Medium	Submissions do not include method of how production volumes were determined. CDR industry sector codes, industrial processing and use codes, industrial function codes, and commercial product codes provide good metadata; but lack of clarifying information and narratives and occasional misreportings limit clarity of data.
Domain 4: Variability and Uncertainty	Metric 7:	Metadata Completeness	Low	CDR data do not address variability or uncertainty in submitter provided data.
Overall Quality Determination			High	

Study Citation:	U.S. EPA, (2013). Updating CEB’s method for screening-level estimates of dermal exposure.			
HERO ID:	11224653			
Conditions of Use:	All			
EXTRACTION				
Parameter	Data			
Dermal exposure data:	This document provides updates to the parameters used for dermal exposure estimates. Updated parameters are listed below: Routine, direct handling of solids with 2 hands Resulting dermal contact: up to 3,100 mg Routine contact with surfaces, 2 hands, solids Resulting dermal contact: up to 1,100 mg Routine immersion, 2 hands, liquids Surface area: 1,070 cm^2 Amount retained on skin: 1.3-10.3 mg/cm^2 Resulting dermal contact: up to 11,000 mg Routine contact, 2 hands, liquids Surface area: 1,070 cm^2 Amount retained on skin: 0.7-2.1 mg/cm^2 Resulting dermal contact: up to 2,200 mg Incidental contact, 2 hands, liquids Surface area: 1,070 cm^2 Amount retained on skin: 0.7-2.1 mg/cm^2 Resulting dermal contact: up to 2,200 mg Incidental contact, 1 hand, liquids Surface area: 535 cm^2 Amount retained on skin: 0.7-2.1 mg/cm^2 Resulting dermal contact: up to 1,100 mg			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Reliability	Metric 1: Methodology	High	Document published by EPA CEB.	
Domain 2: Representativeness	Metric 2: Geographic Scope	High	Data are from the U.S.	
	Metric 3: Applicability	High	Data are applicable to all COUs involving dermal contact.	
	Metric 4: Temporal Representativeness	Medium	Report is based on data greater than 10 years old but no more than 20 years old and industry conditions that are expected to be representative of current industry conditions.	
	Metric 5: Sample Size	N/A	N/A - Document describes general dermal exposure parameters. Sample size is not applicable.	
Domain 3: Accessibility/ Clarity	Metric 6: Metadata Completeness	High	All data sources, methods, results, and assumptions are clearly documented.	
Domain 4: Variability and Uncertainty	Metric 7: Metadata Completeness	Medium	Variability addressed by describing dermal exposure parameters for different exposure scenarios but uncertainty is not addressed.	
Overall Quality Determination		High		

Study Citation:	U.S. EPA, (2026). Chemical Data Reporting (CDR): Reporting year 2024.			
HERO ID:	13246149			
Conditions of Use:	Manufacturing as a primary product, Manufacturing as a byproduct, Import-Repackaging, and Processing as a reactant			
EXTRACTION				
Parameter	Data			
Physical form:	Provides physical form for multiple OES.			
Number of workers:	Provides number of workers for multiple OES.			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Reliability	Metric 1: Methodology	High	EPA is a trusted source.	
Domain 2: Representativeness	Metric 2: Geographic Scope	High	CDR is U.S. based data.	
	Metric 3: Applicability	High	CDR covers multiple OES, which are in scope for the chemical.	
	Metric 4: Temporal Representativeness	High	EPA used data from the 2024 CDR.	
	Metric 5: Sample Size	Medium	Number of workers is presented as a range.	
Domain 3: Accessibility/ Clarity	Metric 6: Metadata Completeness	Medium	CDR industry sector codes, industrial processing and use codes, industrial function codes, and commercial product codes provide good metadata; but lack of clarifying information and narratives and occasional misreportings limit clarity of data.	
Domain 4: Variability and Uncertainty	Metric 7: Metadata Completeness	Low	CDR data do not address variability or uncertainty in submitter provided data.	
Overall Quality Determination		High		

Study Citation:	Arthur D. Little Inc, (1987). Evaluation of chemical air emissions from the Bristol plant production facilities, Rohm and Haas, Delaware Valley, Inc (final report) with attachments and cover letter dated 08/10/1989.			
HERO ID:	1481094			
Conditions of Use:	Domestic Manufacture			
EXTRACTION				
Parameter	Data			
Release or emission factors:	Media: water. Non-detect (Pg. 122)			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Reliability	Metric 1: Methodology	High	Methodology is known and expected to be accurate and cover all release sources at the site.	
Domain 2: Representativeness	Metric 2: Geographic Scope	High	Data are from the U.S.	
	Metric 3: Applicability	High	Data are for manufacture, an in-scope occupational scenario.	
	Metric 4: Temporal Representativeness	Low	Data are greater than 20 years old.	
	Metric 5: Sample Size	Low	Sample distribution is characterized by no statistics.	
Domain 3: Accessibility/ Clarity	Metric 6: Metadata Completeness	Low	Release media provided but no other metadata.	
Domain 4: Variability and Uncertainty	Metric 7: Metadata Completeness	Medium	Uncertainty is addressed by QC of samples and multiple samples being taken. Variability is not addressed.	
Overall Quality Determination		Medium		

Study Citation:	ATSDR, (1989). Toxicological profile for 1,2-dichloropropane.			
HERO ID:	5160134			
Conditions of Use:	All			
EXTRACTION				
Parameter		Data		
Description of release source:		Incineration under controlled conditions appears to be the most viable method of disposal for 1,2-dichloropropane (OHM-TADS 1988; HSDB 1988). It is reported that Dow Chemical incinerates 7 million pounds of 1,2-dichloropropane annually (EPA 1986c). Disposal through the use of a liquid injection incinerator requires a temperature range of 650 to 1600°C and residence time of 0.1 to 2 seconds. A rotary kiln incinerator requires a temperature range of 820 to 1600°C and a residence time of seconds. A fluidized bed incinerator requires a temperature range of 450 to 980°C and a residence time of seconds (HSDB 1988). Where land disposal of waste residue containing 1,2-dichloropropane is sought, environmental regulatory agencies should be consulted on acceptable disposal practices (HSDB 1988). 1,2- Dichloropropane may also be a constituent of wastewater streams where it would be susceptible to removal by air stripping (EPA 1986c). (p. 88)		
Release or emission factors:		The total estimated annual environmental release of 1,2-dichloropropane from production and industrial use, primarily in the manufacture of perchloroethylene, was 1,146,000 lbs (EPA 1986c). This figure represents releases regulated by the Toxic Substances Control Act (TSCA), and therefore excludes pesticidal uses of 1,2-dichloropropane. Of these releases, 772,000 lbs were to air, 198,000 lbs to water, and 176,000 lbs to land disposal sites. They include releases from process emissions to the air, secondary air emissions resulting from volatilization during wastewater treatment (aeration), releases to water in wastewater effluent, emissions to air from incomplete incineration, and land disposal of solid waste residues. The inclusion of fugitive emissions would increase the total. (p. 92)		
EVALUATION				
Domain		Metric	Rating	Comments
Domain 1: Reliability		Metric 1: Methodology	High	Methodology is known and expected to be accurate and cover all release sources at the site (references TRI).
Domain 2: Representativeness		Metric 2: Geographic Scope	High	Data are from the U.S.
		Metric 3: Applicability	Medium	Data is consolidated across all COUs.
		Metric 4: Temporal Representativeness	Low	Data are greater than 20 years old.
		Metric 5: Sample Size	Medium	Sample distribution characterized by limited statistics (aggregated data) but discrete samples not provided and distribution not fully characterized.
Domain 3: Accessibility/ Clarity		Metric 6: Metadata Completeness	High	Limited metadata, but is data from a trusted source (TRI)
Domain 4: Variability and Uncertainty		Metric 7: Metadata Completeness	High	Uncertainty is addressed by addressing limitations of TRI (i.e., excluded non-TSCA uses). Variability addressed by discussing multiple release media/sources.
Overall Quality Determination			High	

Study Citation:	Dow Chemical, (1984). Comments on 1,2-dichloropropane proposed test rule. Document control number OPTS-42043.			
HERO ID:	6569934			
Conditions of Use:	Disposal			
EXTRACTION				
Parameter	Data			
Description of release source:	Discharge from Dow’s chlorohydrin manufacturing sites			
Release quantity:	10,000 (lbs/year)			
Waste treatment methods and pollution control:	Stripper, biological treatment			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Reliability	Metric 1:	Methodology	High	Methodology is known and expected to be accurate and cover all release sources at the site.
Domain 2: Representativeness	Metric 2:	Geographic Scope	High	Data are from the U.S.
	Metric 3:	Applicability	High	Data are for manufacturing, an in-scope occupational scenario.
	Metric 4:	Temporal Representativeness	Low	Data are greater than 20 years old.
	Metric 5:	Sample Size	Low	Sample distribution is characterized by no statistics
Domain 3: Accessibility/ Clarity	Metric 6:	Metadata Completeness	Medium	Release media and release frequency provided but missing control efficiency.
Domain 4: Variability and Uncertainty	Metric 7:	Metadata Completeness	Low	Variability and uncertainty are not addressed.
Overall Quality Determination			Medium	

Study Citation:	Earthjustice, (2020). Exhibit 1 to comments of rubbertown emergency action et al., re: TSCA risk evaluations for high-priority substances and substances undergoing manufacturer-requested risk evaluations.
HERO ID:	10385015
Conditions of Use:	All

EXTRACTION

Parameter	Data
Description of release source:	industrial wastewater treatment or incineration facilities
Release quantity:	1,2-DCP Releases & Transfers, 2012-2018 (lbs)Veolia Es Technical Solutions Port Arthur, TX, Air- 26.6Incoming Waste Transfers - 15,235.0 (P 47/103)1,2-DCP Releases & Transfers, 2012-2018 (lbs) Location Air Water Land Underground Injection Wells Total Releases Incoming Waste Transfer Offsite TransferDow Chemical Freeport, TX 31,278.00 1,082.00 4,974.00 - 37,334.00 8,148,977.00 1,333,897.00Clean Harbors Deer Park LaPorte, TX 12.40 - - - 12.40 99,125.00 1.00Clean Harbors Environmental Services LaPorte, TX - - - - 5.00 -Olin Blue Cube Freeport, TX 2,343.00 2.00 - - 2,345.00 - 7,888,720.00Texas Barge & Boat Inc Freeport, TX 126.00 - - - 126.00 - 12,384.00Southwest Shipyard LP Channelview, TX 19.00 - - - 19.00 - -Total 33,778.40 1,084.00 4,974.00 - 39,836.40 8,248,107.00 9,235,002.00P(63/103)Chemical Waste Management Sulphur, LAland - 8 lbsIncoming Waste Transfers -11 lbs (P 78/103)1,2-DCP Releases & Transfers, 2012-2018 (lbs) Location Air Water Land Underground Injection Wells Total Releases Incoming Waste Transfers Offsite Transfer Dow Chemical Plaquemine, LA 9,675.00 1,969.00 4,461.00 - 16,105.00 - 14,636.00 Hexion Inc Norco, LA 5,555.00 - - - 5,555.00 - 720.00 Blue Cube (Olin) Plaquemine, LA 1,327.00 - - - 1,327.00 - 377.00 Occidental Chemical Geismar, LA 610.00 - - - 610.00 - - Waste Management Woodside Landfill Walker, LA - - 421.00 - 421.00 421.00 - Westlake Vinyls Geismar, LA 80.00 - - - 80.00 - - The Dow Chemical Grand Bayou Operations Paincourtville, LA 21.00 - - - 21.00 - -Totals 17,268.00 1,969.00 4,469.00 - 24,119.00 421.00 15,733.00(P// 91/103)

EVALUATION

Domain	Metric	Rating	Comments
Domain 1: Reliability	Metric 1: Methodology	High	The release data methodology is known or expected to be accurate and is known to cover all release sources at the site.
Domain 2: Representativeness	Metric 2: Geographic Scope	High	The data are from the United States
	Metric 3: Applicability	High	The release data are for an occupational scenario within the scope of the risk evaluation.
	Metric 4: Temporal Representativeness	High	no more than 10 years old
	Metric 5: Sample Size	High	Statistical distribution of samples is fully characterized. Sample size is sufficiently representative.
Domain 3: Accessibility/ Clarity	Metric 6: Metadata Completeness	High	Release data include all associated metadata, including release media;
Domain 4: Variability and Uncertainty	Metric 7: Metadata Completeness	Medium	The release data study provides only limited discussion of the variability in the determinants of release. The release data study provides only limited discussion of the uncertainty in the release results.

Overall Quality Determination**High**

Study Citation:	Eastman Kodak, (1988). Draft environmental impact statement for Eastman Kodak Company's proposed cellulose triacetate film base machine on methylene chloride (volume I - volume V) w-letter dated 111588. 890000038:#86-890000038.
HERO ID:	1441930
Conditions of Use:	Processing aids, not otherwise listed

EXTRACTION	
Parameter	Data
Number of sites:	1
Description of release source:	New acetate film base machine (cellulose triacetate manufacturing) at Kodak Eastman site
Release quantity:	0.92 lb/hr or 3.9 tons per year (p. 69)
Release or emission factors:	Media: air 0.92 lb/hr or 3.9 tons per year (p. 69)
Release frequency:	365 assumed days/yr for community air dispersion modeling (p. 446)

EVALUATION				
Domain	Metric		Rating	Comments
Domain 1: Reliability	Metric 1:	Methodology	Medium	Methodology is known and expected to be accurate but may not cover all release sources at the site (provided by Eastman Kodak).
Domain 2: Representativeness	Metric 2:	Geographic Scope	High	Data are from the U.S.
	Metric 3:	Applicability	Medium	Data are for CTA manufacturing (may not be used anymore), which is similar to the in-scope occupational scenario processing aids, not otherwise listed.
	Metric 4:	Temporal Representativeness	Low	Data are greater than 20 years old.
	Metric 5:	Sample Size	Low	Sample distribution is characterized by no statistics (only single value provided).
Domain 3: Accessibility/ Clarity	Metric 6:	Metadata Completeness	Medium	Release media and release frequency provided (community air dispersion modeling assumes 365 days/yr) but missing miscellaneous other metadata..
Domain 4: Variability and Uncertainty	Metric 7:	Metadata Completeness	Low	Variability and uncertainty are not addressed.

Overall Quality Determination	Medium
--------------------------------------	---------------

Study Citation:	Haas,, R.a. (1981). DCE, DCP and DCEE discharge data for Sept. 1981 from the Rohm and Haas Philadelphia plant’s discharges into the city sewer and 1,2-dichloropropane analysis with cover letter.			
HERO ID:	2803584			
Conditions of Use:	Disposal			
EXTRACTION				
Parameter		Data		
Description of release source:		Rohm and Haas Philadelphia Plant aqueous discharge		
Release quantity:		August: 30 - 4830 lbs/day; September: 12 - 2010 lbs/day		
EVALUATION				
Domain		Metric	Rating	Comments
Domain 1: Reliability	Metric 1:	Methodology	Medium	Methodology is known and expected to be accurate but may not cover all release sources at the site.
Domain 2: Representativeness	Metric 2:	Geographic Scope	High	Data are from the U.S.
	Metric 3:	Applicability	High	Data are for disposal, an in-scope occupational scenario.
	Metric 4:	Temporal Representativeness	Low	Data are greater than 20 years old.
	Metric 5:	Sample Size	High	Statistical distribution of samples is fully characterized (discrete sampling data provided).
Domain 3: Accessibility/ Clarity	Metric 6:	Metadata Completeness	Medium	Release media and release frequency provided but missing waste treatment methods.
Domain 4: Variability and Uncertainty	Metric 7:	Metadata Completeness	Medium	Variability addressed by giving emissions from multiple days and months, but uncertainty is not addressed.
Overall Quality Determination			High	

Study Citation:	Hart, J. R. (1994). Comparison of emissions from burning hazardous waste in a dry-process cement kiln with emission from burning conventional fossil fuels. Hazardous Waste and Hazardous Materials 11(1):193-199.			
HERO ID:	658817			
Conditions of Use:	Disposal			
EXTRACTION				
Parameter	Data			
Description of release source:	Hazardous waste as fuel from Cement Kiln			
Release or emission factors:	Media: air; Lists 1,2-DCP as a compound analyzed but not detected in the exhaust gas (p. 6). LOD or initial concentration of 1,2-DCP in waste stream unknown.			
Waste treatment methods and pollution control:	Presents some efficiencies for other VOCs (p. 4)			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Reliability	Metric 1:	Methodology	Medium	Methodology is known and expected to be accurate but may not cover all release sources at the site.
Domain 2: Representativeness	Metric 2:	Geographic Scope	High	Data are from the U.S.
	Metric 3:	Applicability	High	Data are for disposal, an in-scope occupational scenario.
	Metric 4:	Temporal Representativeness	Low	Data are greater than 20 years old (1994)
	Metric 5:	Sample Size	Low	sample details not provided - report only indicated that 1,2-DCP not detected in waste stream
Domain 3: Accessibility/ Clarity	Metric 6:	Metadata Completeness	Low	Release media provided, but no other metadata provied: LOD, initial amount of 1,2-DCP in waste stream
Domain 4: Variability and Uncertainty	Metric 7:	Metadata Completeness	Low	Variability and uncertainty are not addressed.
Overall Quality Determination		Medium		

Study Citation:	Li, R., Xu, A., Zhao, Y., Chang, H., Li, X., Lin, G. (2022). Genetic algorithm (GA) - Artificial neural network (ANN) modeling for the emission rates of toxic volatile organic compounds (VOCs) emitted from landfill working surface. Journal of Environmental Management 305:114433.			
HERO ID:	10164739			
Conditions of Use:	Waste Handling, Treatment, and Disposal (Landfills)			
EXTRACTION				
Parameter	Data			
Description of release source:	A large MSW landfill			
Release quantity:	Annual emissions (tons/year) in figure 3			
Release or emission factors:	0.25123 ug/m2-s , standard deviation 0.57903 (Section S.6 in Supplemental)			
EVALUATION				
Domain	Metric		Rating	Comments
Domain 1: Reliability	Metric 1:	Methodology	High	Methodology is known and expected to be accurate and cover all release sources at the site.
Domain 2: Representativeness	Metric 2:	Geographic Scope	Low	Data are from China, a non-OECD country.
	Metric 3:	Applicability	High	Data are for waste handling (landfills), an in-scope occupational scenario.
	Metric 4:	Temporal Representativeness	High	Data are no more than 10 years old.
	Metric 5:	Sample Size	Medium	Sample distribution characterized by limited statistics (average, standard deviation) but discrete samples not provided and distribution not fully characterized.
Domain 3: Accessibility/ Clarity	Metric 6:	Metadata Completeness	High	All metadata provided.
Domain 4: Variability and Uncertainty	Metric 7:	Metadata Completeness	Medium	Variability addressed by continuous sampling over a nine-month period. but uncertainty is not addressed.
Overall Quality Determination			High	

Study Citation:	Middleton, P., Sockwell, R., Carter, L., W.P. (1990). Aggregation and analysis of volatile organic compound emissions for regional modeling. Atmospheric Environment, Part A: General Topics 24(5):1107-1133.			
HERO ID:	87136			
Conditions of Use:	Unknown			
EXTRACTION				
Parameter	Data			
Release quantity:	<1,000 metric tons (Pg. 26)			
Comments:	Media: Air			
EVALUATION				
Domain	Metric		Rating	Comments
Domain 1: Reliability	Metric 1:	Methodology	Medium	Methodology is known and expected to be accurate but may not cover all release sources at the site.
Domain 2: Representativeness	Metric 2:	Geographic Scope	High	Data are from the U.S.
	Metric 3:	Applicability	Low	Data are for and unknown COU, which may be similar to an in-scope occupational scenario.
	Metric 4:	Temporal Representativeness	Low	Data are greater than 20 years old.
	Metric 5:	Sample Size	Low	Sample distribution is described qualitatively.
Domain 3: Accessibility/ Clarity	Metric 6:	Metadata Completeness	Medium	Release media and release frequency provided but missing release source, release estimation method, number of sites, waste treatment method.
Domain 4: Variability and Uncertainty	Metric 7:	Metadata Completeness	Low	Variability and uncertainty are not addressed.
Overall Quality Determination			Low	

Study Citation:	OECD, (2006). SIDS Initial Assessment Report: 1,2-Dichloropropane. :219.			
HERO ID:	5160041			
Conditions of Use:	All conditions of use			
EXTRACTION				
Parameter	Data			
Release quantity:	1997Air: 378,454 (lbs)Water: 2,609 (lbs)Soil: 30 (lbs)Total: 393,463 (lbs)1998Air: 298,150 (lbs)Water: 1,122 (lbs)Soil: 32 (lbs)Total: 299,571 (lbs)1999Air: 249,655 (lbs)Water: 9,242 (lbs)Soil: 30 (lbs)Total: 265,783 (lbs)2000Air: 263,838 (lbs)Water: 431 (lbs)Soil: 382 (lbs)Total: 264,656 (lbs)2001Air: 140,490 (lbs)Water: 2,403 (lbs)Soil: 79 (lbs)Total: 142,972 (lbs)			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Reliability	Metric 1: Methodology	Medium	Methodology is known, data is from TRI, however the method to estimate releases via TRI can vary and are not fully specified in the report. TRI covers many industrial and commercial sites, but has exemptions so certain facilities may not be included in the estimates.	
Domain 2: Representativeness	Metric 2: Geographic Scope	High	Data are from the U.S.	
	Metric 3: Applicability	High	Data are not specific to one occupational scenario, but general to all work in the presence of 1,2-DCP.	
	Metric 4: Temporal Representativeness	Low	Report is based on data greater than 20 years old.	
	Metric 5: Sample Size	Low	Sample distribution is characterized by no statistics (only single value provided).	
Domain 3: Accessibility/ Clarity	Metric 6: Metadata Completeness	High	Release data include most critical metadata, but lacks the activity that is the source of the release	
Domain 4: Variability and Uncertainty	Metric 7: Metadata Completeness	Medium	Variability addressed by giving emissions from multiple years, but uncertainty is not addressed.	
Overall Quality Determination		Medium		

Study Citation:	OECD, (2011). Resource compendium of PRTR release estimation techniques, part 4: Summary of techniques for releases from products, version 1.0.			
HERO ID:	7348917			
Conditions of Use:	Commercial & Consumer Use			
EXTRACTION				
Parameter	Data			
Description of release source:	Building and construction products, Electrical and electronic products, Furniture, Nanoproducts, Packages and plastic bags, personal care and cleaning products, Textile and leather products, Toys and low-cost jewelry (page 17/109). Releases typically occur during the first use of a product, when carrying out maintenance of the product, and due to wearing, exposure to heat or light or other ageing of the product (page 63/109).			
Release or emission factors:	Table 23 contains emission factors and release estimation equations for various organic pollutants in end-use products (page 81/109).			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Reliability	Metric 1: Methodology	Medium	OECD paper provides general methods and equations used to calculate emissions, but details aren’t provided.	
Domain 2: Representativeness	Metric 2: Geographic Scope	Medium	Data are provided by the OECD.	
	Metric 3: Applicability	High	Data are for various consumer and commercial uses which are in scope of the risk evaluation.	
	Metric 4: Temporal Representativeness	Medium	Paper was published in 2011, but most emission factor data is from 2003-2004, which is greater than 10 years old.	
	Metric 5: Sample Size	Low	Emission factor data is characterized by no statistics.	
Domain 3: Accessibility/ Clarity	Metric 6: Metadata Completeness	Medium	Release data include release source and emission factors. Formulas for release quantity are provided. Data lacks release frequency and waste treatment methods.	
Domain 4: Variability and Uncertainty	Metric 7: Metadata Completeness	Low	The release data study does not address variability or uncertainty.	
Overall Quality Determination		Medium		

Study Citation:	Oil., Shell (1982). Tertiary water treatment I. A preliminary assessment of active carbon sorption.			
HERO ID:	1441911			
Conditions of Use:	Manufacturing			
EXTRACTION				
Parameter	Data			
Waste treatment methods and pollution control:	Filtration/Activated Carbon Technology - lab scale study of plant effluents to study effectiveness. 60-70% effective in lab-scale studies (page 33, 38,)			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Reliability	Metric 1:	Methodology	Medium	The release data methodology is known or expected to be accurate and is known to cover all release sources at the site.
Domain 2: Representativeness	Metric 2:	Geographic Scope	High	The data are from the United States
	Metric 3:	Applicability	High	The release data are for an occupational scenario within the scope of the risk evaluation.
	Metric 4:	Temporal Representativeness	Low	Data greater than 20 years old.
	Metric 5:	Sample Size	N/A	N/A (facility treatment description)
Domain 3: Accessibility/ Clarity	Metric 6:	Metadata Completeness	Medium	Release data include most critical metadata, including release media and release frequency, but lacks additional metadata, such as process, unit operation, and/or activity that is the source of the release.
Domain 4: Variability and Uncertainty	Metric 7:	Metadata Completeness	Low	The release data study does not address variability or uncertainty.
Overall Quality Determination			Medium	

Study Citation:	Oil., Shell (1986). Fate of some specific compounds in the Norco chemical biotreater and their effect on the outcome of effluent bioassays.
HERO ID:	1629033
Conditions of Use:	MFG/Intermediate

EXTRACTION

Parameter	Data
Description of release source:	Chemical plant wastewater
Release or emission factors:	Concentration of 12DCP in Biotreater feed, effluent, and off gas provided in Table 2 (pg 16); Tables 3-4 on pg 17 also have similar data; effluent concentration data in table 1, pg 34-39; Table 1 on pg 46 has concentration data in offgas; more concentration data in Table 1 on pg 50-51; Table 4, pg 62-67; Table 7, pg 68-69 on-site WWT; biotreatment/activated sludge pilot plant study; air stripping (primary), biodegradation (secondary) (pg 6); 95% overall for volatile priority pollutants (pg 8); 97% for 12DCP (pg 9); Table 5 (pg 18)
Waste treatment methods and pollution control:	
Comments:	media: water, air

EVALUATION

Domain	Metric	Rating	Comments
Domain 1: Reliability	Metric 1:	Methodology	High
			Methodology is known and expected to be accurate and cover all release sources at the site.
Domain 2: Representativeness	Metric 2:	Geographic Scope	High
	Metric 3:	Applicability	Medium
	Metric 4:	Temporal Representativeness	Low
	Metric 5:	Sample Size	High
			Data are from the U.S. Data are for a chemical production plant, but it is unclear what process(es) the wastewater originates from. Data are greater than 20 years old. Statistical distribution of samples is fully characterized (discrete sampling data provided throughout various Tables).
Domain 3: Accessibility/ Clarity	Metric 6:	Metadata Completeness	Low
			Release media provided but no other metadata.
Domain 4: Variability and Uncertainty	Metric 7:	Metadata Completeness	Medium
			Variability addressed by assessing EFs/% reduction for various chemicals and WWT operations, but uncertainty is not addressed.

Overall Quality Determination

Medium

Study Citation:	Qiu, K., Yang, L., Lin, J., Wang, P., Yang, Y.,i, Ye, D., Wang, L. (2014). Historical industrial emissions of non-methane volatile organic compounds in China for the period of 1980-2010. Atmospheric Environment 86:102-112.			
HERO ID:	2373425			
Conditions of Use:	General			
EXTRACTION				
Parameter	Data			
Description of release source:	Industrial processes; industrial solvent utilization; storage and transport; other			
Release quantity:	Estimated annual NMVOC emissions (1980-2010) for various general processes compared with values from other articles (see Release Source column) (p. 110)			
Release or emission factors:	Media: air. NMVOC emission factors summarized in tables on p. 104-106. NMVOC emission factors for various source categories - mainly USEPA or European Environment Agency (p. 103-104)			
EVALUATION				
Domain	Metric		Rating	Comments
Domain 1: Reliability	Metric 1:	Methodology	Medium	Methodology is known and expected to be accurate but may not cover all release sources at the site.
Domain 2: Representativeness	Metric 2:	Geographic Scope	Medium	Article calculated emissions in China (a non-OECD country), but emission factors primarily from USEPA and Europe (assigned mid score of 2)
	Metric 3:	Applicability	Medium	Data are for general industrial processes, which is similar to the in-scope occupational scenario for MFG and PROC (but only on NMVOC level)
	Metric 4:	Temporal Representativeness	Medium	EF dates vary from 1990s through 2000s (assigned mid score of 2)
	Metric 5:	Sample Size	Low	EFs provided for various processes, but derivation not discussed in this document
Domain 3: Accessibility/ Clarity	Metric 6:	Metadata Completeness	Low	EFs provided for various processes, but derivation not discussed in this document
Domain 4: Variability and Uncertainty	Metric 7:	Metadata Completeness	Low	Discusses variability with other estimates of overall NMVOC emissions in China, but does not discuss variability and uncertainty of EFs which are likely more relevant for risk assessment
Overall Quality Determination			Low	

Study Citation:	RIVM, (2007). Ecotoxicologically based environmental risk limits for several volatile aliphatic hydrocarbons. :217.			
HERO ID:	5159900			
Conditions of Use:	Industrial use			
EXTRACTION				
Parameter	Data			
Release quantity:	520*10^3 (kg) (Pg. 53)			
EVALUATION				
Domain	Metric		Rating	Comments
Domain 1: Reliability	Metric 1:	Methodology	Medium	Methodology is known and expected to be accurate but may not cover all release sources at the site.
Domain 2: Representativeness	Metric 2:	Geographic Scope	High	Data are from the U.S.
	Metric 3:	Applicability	High	Data are for solvent use, an in-scope occupational scenario.
	Metric 4:	Temporal Representativeness	Low	Data are greater than 20 years old.
	Metric 5:	Sample Size	Low	Sample distribution is characterized by no statistics.
Domain 3: Accessibility/ Clarity	Metric 6:	Metadata Completeness	Low	Release media provided but no other metadata.
Domain 4: Variability and Uncertainty	Metric 7:	Metadata Completeness	Low	Variability and uncertainty are not addressed.
Overall Quality Determination			Medium	

Study Citation:	Roy F. Weston Inc, (1980). Characterization and fate of the discharge of priority pollutants from the Rohm and Haas Philadelphia plant into the Delaware low level collector of the Philadelphia sewer.
HERO ID:	1333014
Conditions of Use:	Manufacturing; Intermediate in all other basic organic chemical manufacturing; Intermediate in all other chemical product and preparation manufacturing; Other in all other chemical product and preparation manufacturing

EXTRACTION

Parameter	Data
Description of release source:	Rohm and Haas Philadelphia Plant
Release quantity:	459 kg/day (1,012 lb/day) of 1,2-DCP in contaminated process sewer effluent to sewer - April 1979 (p. 33, 35) '2,313 kg/day (5,100 lb/day) of 1,2-DCP in contaminated process sewer effluent to sewer; June 1979 (p. 34) 276 kg/day (609 lb/day) Rohm and Haas effluent - December 1979 (p. 36) Influent and sludge flow rates (lb/day) for Northeast Philadelphia Treatment Plant summarized on p. 38-39
Release or emission factors:	Media: water; Spiking experiment on Rohm and Haas effluent. 1,2-DCA showed 30,696 ug/L unspiked (p. 63). It's unclear whether spiked concentration is representative of typical operation.
Waste treatment methods and pollution control:	WWTBiological oxidation* Adsorption* Volatilization/Stripping

EVALUATION

Domain	Metric	Rating	Comments
Domain 1: Reliability	Metric 1: Methodology	Medium	Methodology is known and expected to be accurate but may not cover all release sources at the site.
Domain 2: Representativeness	Metric 2: Geographic Scope	High	Data are from the U.S.
	Metric 3: Applicability	Medium	Data are for general chemical manufacturing/processing, but specific 1,2-DCP role unclear
	Metric 4: Temporal Representativeness	Low	Data are greater than 20 years old (1980)
	Metric 5: Sample Size	Medium	release estimates for 3 different days provided - unclear if representative
Domain 3: Accessibility/ Clarity	Metric 6: Metadata Completeness	Low	Release media provided but no other metadata.
Domain 4: Variability and Uncertainty	Metric 7: Metadata Completeness	Medium	Variability addressed by 3 data points over different days (only 1 site) but uncertainty is not addressed.

Overall Quality Determination

Medium

Study Citation:	Salthammer, T., Fuhrmann, F., Uhde, E. (2003). Flame retardants in the indoor environment – Part II: release of VOCs (triethylphosphate and halogenated degradation products) from polyurethane. Indoor Air 13(1):49-52.			
HERO ID:	4663142			
Conditions of Use:	Commercial Use: Cleaning and furnishing care product			
EXTRACTION				
Parameter	Data			
Description of release source:	Polyurethane soft foam and polyurethane recycling material.			
Release or emission factors:	Polyurethane foam: <10 (ug/m^2 h)Polyurethane recycling material: <20 - 26 (ug/m^2 h)			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Reliability	Metric 1:	Methodology	Medium	Methodology is known and expected to be accurate but may not cover all release sources at the site.
Domain 2: Representativeness	Metric 2:	Geographic Scope	High	Data are from the U.S.
	Metric 3:	Applicability	Low	Data are for polyurethane foam, which may be related to the in-scope occupational scenario of all-purpose liquid spray cleaners used on furniture.
	Metric 4:	Temporal Representativeness	Medium	Report is based on data greater than 10 years old but no more than 20 years old and industry conditions that are expected to be representative of current industry conditions. (2002).
	Metric 5:	Sample Size	Medium	Sample distribution characterized by limited statistics (mean) but discrete samples not provided and distribution not fully characterized.
Domain 3: Accessibility/ Clarity	Metric 6:	Metadata Completeness	Medium	Release media and release frequency provided but missing waste treatment methods and release quantity.
Domain 4: Variability and Uncertainty	Metric 7:	Metadata Completeness	Medium	Variability addressed by giving emission factors from polyurethane soft foam and polyurethane recycling products, but uncertainty is not addressed.
Overall Quality Determination		Medium		

Study Citation:	Trenholm, A., Lapp, T., Scheil, G., Cootes, J., Klamm, S., Cassady, C. (1988). Total mass emissions from a hazardous waste incinerator. Journal of Hazardous Materials 18(1):99-106.		
HERO ID:	6151563		
Conditions of Use:	Disposal		
EXTRACTION			
Parameter	Data		
Description of release source:	Release is part of the volatile organic constituents found in the incinerator stack gas during steady state conditions. Three types of solid waste feeds were used during all of the runs; a substituted cellulose, polyethylene wax, and chlorinated pyridine tars. Each of the solid wastes was individually contained in plastic drums and sealed with a metal rim ring. One drum of solid waste was fed every 4 minutes with the drums of each type of waste being alternately fed.		
Release quantity:	0 - 1.2 (ppb) (Pg. 6)		
Waste treatment methods and pollution control:	Incineration		
EVALUATION			
Domain	Metric	Rating	Comments
Domain 1: Reliability	Metric 1:	Methodology	Medium The release data methodology is known or expected to be accurate but may not cover all release sources at the site.
Domain 2: Representativeness	Metric 2:	Geographic Scope	High The data are from the United States.
	Metric 3:	Applicability	High The release data are for an occupational scenario within the scope of the risk evaluation.
	Metric 4:	Temporal Representativeness	Low Data is more than 20 years old.
	Metric 5:	Sample Size	High Statistical distribution of samples is fully characterized. Sample size is sufficiently representative.
Domain 3: Accessibility/ Clarity	Metric 6:	Metadata Completeness	Medium Release data include most critical metadata, including release media and unit operation, but lacks additional metadata, such as frequency of the release.
Domain 4: Variability and Uncertainty	Metric 7:	Metadata Completeness	Medium Uncertainty is addressed by performing multiple test runs using two methods. Variability is not addressed.
Overall Quality Determination		High	

Study Citation:	U.S. EPA, (2024). Discharge Monitoring Report (DMR): 1,2-Dichloropropane, reporting years 2019-2023.			
HERO ID:	13283262			
Conditions of Use:	All			
EXTRACTION				
Parameter	Data			
Release or emission factors:	Provides release data			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Reliability	Metric 1:	Methodology	Low	Methodology used by submitters to estimate release data is not known.
Domain 2: Representativeness	Metric 2:	Geographic Scope	High	DMR is U.S. based data
	Metric 3:	Applicability	High	DMR includes industries included in the scopes of multiple chemicals
	Metric 4:	Temporal Representativeness	High	DMR data are from 2019-2023
	Metric 5:	Sample Size	Medium	Universe is limited to NPDES permit holders; statistical representativeness is unclear.
Domain 3: Accessibility/ Clarity	Metric 6:	Metadata Completeness	Low	DMR only includes release media but no other metadata.
Domain 4: Variability and Uncertainty	Metric 7:	Metadata Completeness	Low	DMR does not address variability or uncertainty in submitter provided data.
Overall Quality Determination		Medium		

Study Citation:	U.S. EPA, (2024). Toxics Release Inventory (TRI): 1,2-Dichloropropane, reporting years 2019-2023.			
HERO ID:	13283263			
Conditions of Use:	All			
EXTRACTION				
Parameter	Data			
Release quantity:	Provides release data			
Waste treatment methods and pollution control:	Provides on and off-site waste treatment methods per site			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Reliability	Metric 1:	Methodology	Low	Methodology used by submitters to estimate release data is not known.
Domain 2: Representativeness	Metric 2:	Geographic Scope	High	TRI is U.S. based data
	Metric 3:	Applicability	High	TRI includes industries included in the scopes of multiple chemicals
	Metric 4:	Temporal Representativeness	High	TRI data are from 2019-2023
	Metric 5:	Sample Size	Medium	Due to reporting requirements, statistical representativeness is unclear.
Domain 3: Accessibility/ Clarity	Metric 6:	Metadata Completeness	Low	TRI only includes release media but no other metadata.
Domain 4: Variability and Uncertainty	Metric 7:	Metadata Completeness	Low	TRI does not address variability or uncertainty in submitter provided data.
Overall Quality Determination		Medium		

Study Citation:	U.S. EPA, (2020). National Emissions Inventory (NEI): 1,2-Dichloropropane, reporting years 2017 and 2020.
HERO ID:	13283264
Conditions of Use:	All

EXTRACTION

Parameter	Data
Description of release source:	Provides unit/process of release.
Release quantity:	Provides release quantity data.
Release or emission factors:	Provides release data.
Release frequency:	Provides annual operating time.
Waste treatment methods and pollution control:	Provides controls information.

EVALUATION

Domain	Metric	Rating	Comments
Domain 1: Reliability	Metric 1: Methodology	Medium	Submitters provide general method used to calculate emissions, but details not provided.
Domain 2: Representativeness	Metric 2: Geographic Scope	High	NEI is U.S. based data.
	Metric 3: Applicability	High	NEI includes industries included in the scopes of multiple chemicals.
	Metric 4: Temporal Representativeness	High	NEI data are from 2017 and 2020.
	Metric 5: Sample Size	Medium	Universe is limited to units subject to NESHAP with threshold potential to emit, although states may have different requirements; statistical representativeness is unclear.
Domain 3: Accessibility/ Clarity	Metric 6: Metadata Completeness	High	NEI includes release media and generally also includes daily and annual operating time, specific unit/process that is the source of release, and presence of engineering controls.
Domain 4: Variability and Uncertainty	Metric 7: Metadata Completeness	Low	NEI does not address variability or uncertainty in submitter provided data.

Overall Quality Determination**High**

Study Citation:	U.S. EPA, (1995). AP-42: Compilation of air pollutant emission factors. Volume I: Stationary point and area sources, fifth edition.			
HERO ID:	46492			
Conditions of Use:	Recycling			
EXTRACTION				
Parameter	Data			
Description of release source:	Storage tank vents, condenser vents, and fugitive emissions from initial treatment, distillation, purification, storage tanks, and handling operations.			
Release or emission factors:	Storage tank vents: 0.02 lb/ton (0.004-0.09)Condenser vent: 3.30 lb/ton (0.52-8.34)Incinerator stack: 0.02 lb/tonSpillage: 0.20 lb/tonLoading fugitive emissions: 0.72 lb/ton (0.00024-1.42)			
Waste treatment methods and pollution control:	Solvent recovery, scrubbers, condensers, afterburners, adsorption			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Reliability	Metric 1:	Methodology	High	Methodology is known and expected to be accurate and cover all release sources at the site.
Domain 2: Representativeness	Metric 2:	Geographic Scope	High	Data are from the U.S.
	Metric 3:	Applicability	Medium	Data are for disposal, an in-scope occupational scenario; however, data are not specific to this chemical.
	Metric 4:	Temporal Representativeness	Low	Report is based on data greater than 20 years old and industry conditions that are expected to be outdated.
	Metric 5:	Sample Size	Medium	Sample distribution characterized by limited statistics (mean and range) but discrete samples not provided and distribution not fully characterized.
Domain 3: Accessibility/ Clarity	Metric 6:	Metadata Completeness	Medium	Release media and emission factors for different processes provided but missing release amount and release days per year.
Domain 4: Variability and Uncertainty	Metric 7:	Metadata Completeness	Medium	Variability is addressed by emission factors from multiple operations, but uncertainty is not addressed.
Overall Quality Determination		Medium		

Study Citation:	U.S. EPA, (2019). National Emissions Inventory (NEI) [database]: CASRNs 79-00-5, 75-34-3, 107-06-2, 78-87-5, 84-61-7, 106-99-0, 106-93-4, 50-00-0, 85-44-9, 106-46-7, 85-68-7, 84-74-2, and 115-86-6.
HERO ID:	6535959
Conditions of Use:	All

EXTRACTION

Parameter	Data
Description of release source:	Provides unit/process of release.
Release quantity:	Provides release quantity per emission event.
Release frequency:	Provides annual operating time.
Waste treatment methods and pollution control:	Provides controls information.

EVALUATION

Domain	Metric	Rating	Comments
Domain 1: Reliability	Metric 1: Methodology	Medium	Submitters provide general method used to calculate emissions, but details not provided.
Domain 2: Representativeness	Metric 2: Geographic Scope	High	NEI is U.S. based data.
	Metric 3: Applicability	High	NEI includes industries included in the scopes of multiple chemicals.
	Metric 4: Temporal Representativeness	High	NEI data are from 2017.
	Metric 5: Sample Size	Medium	Universe is limited to units subject to NESHAP with threshold potential to emit, although states may have different requirements; statistical representativeness is unclear.
Domain 3: Accessibility/ Clarity	Metric 6: Metadata Completeness	High	NEI includes release media and generally also includes daily and annual operating time, specific unit/process that is the source of release, and presence of engineering controls.
Domain 4: Variability and Uncertainty	Metric 7: Metadata Completeness	Low	NEI does not address variability or uncertainty in submitter provided data.

Overall Quality Determination	High
--------------------------------------	-------------

Study Citation:	U.S. EPA, (2021). National analysis TRI dataset (TRI): Data used for TSCA risk evaluations, reporting year 2019.			
HERO ID:	8347325			
Conditions of Use:	Disposal			
EXTRACTION				
Parameter	Data			
Description of release source:	Manufacturing and on-site processing fugitive and stack air emissions.			
Release quantity:	Total on- and off-site releases are 351,208.92 lbs/year.			
Waste treatment methods and pollution control:	On-site energy recovery; recycling.			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Reliability	Metric 1:	Methodology	High	Methodology is known and expected to be accurate and cover all release sources at the site.
Domain 2: Representativeness	Metric 2:	Geographic Scope	High	Data are from the U.S.
	Metric 3:	Applicability	High	Data are for disposal, an in-scope occupational scenario.
	Metric 4:	Temporal Representativeness	High	Data are no more than 10 years old.
	Metric 5:	Sample Size	High	Statistical distribution of samples is fully characterized (discrete sampling data provided).
Domain 3: Accessibility/ Clarity	Metric 6:	Metadata Completeness	Medium	Release media and release frequency provided but missing activity that is the source of the release.
Domain 4: Variability and Uncertainty	Metric 7:	Metadata Completeness	Medium	Variability addressed by giving emissions from multiple facilities, but uncertainty is not addressed.
Overall Quality Determination			High	

Study Citation:	U.S. EPA, (2019). TRI on-site and off-site reported disposed of or otherwise released (in pounds), for all industries.			
HERO ID:	8784984			
Conditions of Use:	Disposal			
EXTRACTION				
Parameter	Data			
Release quantity:	Total On-site and Off-site Reported Disposal of or Other Releases (in pounds) is 20,341			
EVALUATION				
Domain	Metric		Rating	Comments
Domain 1: Reliability	Metric 1:	Methodology	Medium	The release data methodology is known or expected to be accurate but may not cover all release sources at the site.
Domain 2: Representativeness	Metric 2:	Geographic Scope	High	The data are from the United States and are representative of the industry being evaluated.
	Metric 3:	Applicability	High	The release data are for an occupational scenario within the scope of the risk evaluation.
	Metric 4:	Temporal Representativeness	High	Data from 2019.
	Metric 5:	Sample Size	Low	Distribution of samples is qualitative or characterized by no statistics.
Domain 3: Accessibility/ Clarity	Metric 6:	Metadata Completeness	Low	Release data includes on-site and off-site releases and no other metadata.
Domain 4: Variability and Uncertainty	Metric 7:	Metadata Completeness	Low	The release data study does not address variability or uncertainty.
Overall Quality Determination			Medium	

Study Citation:	Walker, B. L., Cooper, C. D. (1992). Air pollution emission factors for medical waste incinerators. Journal of the Air and Waste Management Association 42(6):784-791.			
HERO ID:	78369			
Conditions of Use:	Disposal			
EXTRACTION				
Parameter	Data			
Description of release source:	Medical Waste Incinerators			
Release or emission factors:	Media: Incineration; Efs (ug/kg waste) for various VOCs uncontrolled and controlled, including chlorinated solvents included (p. 6) Uncontrolled: 39-1,200 (575 average); Controlled: None for 1,2-DCP. Emissions obtained from survey.			
Waste treatment methods and pollution control:	Control efficiencies can be estimated using uncontrolled vs controlled emission factors (not for 1,2-DCP though, no controlled EF given) (p. 6)			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Reliability	Metric 1:	Methodology	Medium	Methodology is known and expected to be accurate but may not cover all release sources at the site.
Domain 2: Representativeness	Metric 2:	Geographic Scope	High	Data are from the U.S.
	Metric 3:	Applicability	Medium	Data are for disposal, but not specifically for 1,2-DCP.
	Metric 4:	Temporal Representativeness	Low	Data are greater than 20 years old.
	Metric 5:	Sample Size	Medium	Sample distribution characterized by a range with uncertain statistics.
Domain 3: Accessibility/ Clarity	Metric 6:	Metadata Completeness	Medium	Release media and release frequency provided but missing waste treatment method.
Domain 4: Variability and Uncertainty	Metric 7:	Metadata Completeness	Medium	Variability addressed by samples collected at multiple sites, but uncertainty is not addressed.
Overall Quality Determination		Medium		

Study Citation:	Kawamoto, K., Park, K. A. (2006). Calculation of environmental concentration and comparison of output for existing chemicals using regional multimedia modeling. Chemosphere 63(7):1154-1164.			
HERO ID:	6957413			
Conditions of Use:	Manufacture			
EXTRACTION				
Parameter	Data			
Description of release source:	Chemical industry			
Release quantity:	50,000 (kg/year)			
Comments:	Chemical industry in a highly industrial region in japan. see figure 2			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Reliability	Metric 1:	Methodology	High	Model is peer-reviewed and free of mathematical errors, based on sound approaches/methods, and uses appropriate equations and parameters.
Domain 2: Representativeness	Metric 2:	Geographic Scope	Medium	Data are from Japan, an OECD country.
	Metric 3:	Applicability	High	Model can be applied to manufacture, an in-scope occupational scenario.
	Metric 4:	Temporal Representativeness	Medium	Model is based on data greater than 10 years old but no more than 20 years old and industry conditions that are expected to be representative of current industry conditions.
Domain 3: Accessibility/ Clarity	Metric 5:	Metadata Completeness	High	Model approach, equations, and choice of parameter values are transparent. Rationales for choice of approach, equations, and parameter values provided.
Domain 4: Variability and Uncertainty	Metric 6:	Metadata Completeness	Low	Variability and uncertainty are not addressed
Overall Quality Determination			High	

Study Citation: Boegel, J. V. (1989). Air stripping and steam stripping. :6.107-6.118.
HERO ID: 5475844
Conditions of Use: Disposal

EXTRACTION

Parameter	Data
Description of release source:	Industrial aqueous wastes
Waste treatment methods and pollution control:	WWT; air stripping - limited to aqueous wastes with organics concentration <100 mg/L (pg 4); steam stripping; packed tower air stripper: >99% removal of volatile organics from water; steam stripping: 99% (pg 3)

EVALUATION

Domain	Metric	Rating	Comments
Domain 1: Reliability	Metric 1: Methodology	High	Report uses high quality data from frequently-used sources.
Domain 2: Representativeness	Metric 2: Geographic Scope	High	Data are from the U.S.
	Metric 3: Applicability	Medium	Data are for disposal, an in-scope occupational scenario; however data is not specific to chemical (overall efficiency).
	Metric 4: Temporal Representativeness	Low	Report is based on data greater than 20 years old and industry conditions that are expected to be outdated.
	Metric 5: Sample Size	N/A	pollution control efficiency
Domain 3: Accessibility/ Clarity	Metric 6: Metadata Completeness	Medium	Methods, results, and assumptions are clearly documented, but underlying data sources are not fully transparent.
Domain 4: Variability and Uncertainty	Metric 7: Metadata Completeness	Medium	Variability addressed by discussing different stripping techniques/configurations, but uncertainty is not addressed.

Overall Quality Determination

Medium

Study Citation:	OECD, (2011). Emission scenario document on the chemical industry.			
HERO ID:	6306753			
Conditions of Use:	Manufacture, Formulation of processing aids, processing as a reactant, use of processing aids			
EXTRACTION				
Parameter	Data			
Description of release source:	Stack Air: Reactor vents, distillation column vents, absorber units, strippers, sumps/decanter, dryers, cooling vents Fugitive Air: Valves, pump seals, compressor seals, pressure-relief valves, flanges/connections, open-ended lines, sampling connections Water: Drum cleaning, equipment cleaning, aqueous distillation streams, extraction, reaction water, absorption, solids-liquids separation, adsorption, condensation			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Reliability	Metric 1: Methodology	High	Assessment uses high quality data/techniques/methods from frequently-used sources.	
Domain 2: Representativeness	Metric 2: Geographic Scope	Low	This ESD was not developed by EPA, but another OECD-member country.	
	Metric 3: Applicability	Medium	Data are for multiple in-scope occupational scenarios; however, data is general and not specific to a chemical.	
	Metric 4: Temporal Representativeness	Low	Assessment from 2011 but is based on data greater than 20 years old.	
	Metric 5: Sample Size	Medium	Data characterized by a range with uncertain statistics.	
Domain 3: Accessibility/ Clarity	Metric 6: Metadata Completeness	High	All data sources, methods, results, and assumptions are clearly documented.	
Domain 4: Variability and Uncertainty	Metric 7: Metadata Completeness	Medium	Variability addressed by presenting emission factors for multiple scenarios but uncertainty is not addressed.	
Overall Quality Determination		Medium		

Study Citation: OECD, (2009). Emission scenario document on transport and storage of chemicals.
HERO ID: 6393282
Conditions of Use: Transportation and Storage

EXTRACTION

Parameter	Data
Description of release source:	Filling and emptying of containers, storage, pipelines, washing and cleaning, recycling and disposal of packaging
Release or emission factors:	Filling/emptying: 0.05-70 kg/tonne 0.21-0.61% (solids) Storage (breathing losses): 0.01-13.1 kg/m3 storage capacity-yr Fugitive emissions from leaking seals, connectors and flanges: 0.01-1.67 g/h Storage of solids in open systems: 0.12-20 kg/tonne Container residuals: <1% (road tankers); 0.19-0.63% (rail tankers); 1% (drums); 0.3% (IBCs) Fugitive emissions during container cleaning: 1.07-311 g/container (road tanker); 0.3-2,350 g/ container (rail and ship tanker) Disposal: 0.01% (drums); 0.3% (IBCs); 0.0025-0.25 kg/bag (solids)
Waste treatment methods and pollution control:	Vapor balancing (standard practice for the oil industry)

EVALUATION

Domain	Metric	Rating	Comments
Domain 1: Reliability	Metric 1: Methodology	High	Assessment uses high quality data/techniques/methods from frequently-used sources.
Domain 2: Representativeness	Metric 2: Geographic Scope	Medium	This ESD was not developed by EPA, but another OECD-member country.
	Metric 3: Applicability	Medium	Data is for an in-scope occupational scenario; however, data is general and not specific to a chemical.
	Metric 4: Temporal Representativeness	Low	Assessment is based on data greater than 20 years old.
	Metric 5: Sample Size	Medium	Sample distribution characterized by a range with uncertain statistics.
Domain 3: Accessibility/ Clarity	Metric 6: Metadata Completeness	High	All data sources, methods, results, and assumptions are clearly documented.
Domain 4: Variability and Uncertainty	Metric 7: Metadata Completeness	Medium	Uncertainty not addressed. Variability addressed by considering multiple chemical forms, containers and storage system types.

Overall Quality Determination**Medium**

Study Citation: OECD, (2015). Emission scenario document (ESD) on industrial use of industrial cleaners.
HERO ID: 6414932
Conditions of Use: Cleaning and furniture care products

EXTRACTION

Parameter	Data
Description of release source:	Drag-out, evaporation from openings of the washing tank, waste cleaning solution, drying
Release quantity:	Provides methodology to estimate releases based on various parameters including: opening area of cleaning equipment, physical-chemical properties of cleaner, air velocity, etc.
Waste treatment methods and pollution control:	Natural sedimentation device: 0-50% Coagulation-sedimentation equipment: 0-95% Microorganism decomposition device (aerobic): 0-95% Membrane filtration device: 0-100% Activated carbon adsorption device: 0-90% See table 2.18

EVALUATION

Domain	Metric	Rating	Comments
Domain 1: Reliability	Metric 1: Methodology	High	Assessment uses high quality data/techniques/methods from frequently-used sources.
Domain 2: Representativeness	Metric 2: Geographic Scope	Medium	This ESD was not developed by EPA, but another OECD-member country.
	Metric 3: Applicability	Medium	Data is for an in-scope occupational scenario; however, data is general and not specific to a chemical.
	Metric 4: Temporal Representativeness	Medium	Assessment is generally based on data greater than 10 years old but no more than 20 years old and industry conditions that are expected to be representative of current industry conditions.
	Metric 5: Sample Size	Low	Methodology results characterized by no statistics.
Domain 3: Accessibility/ Clarity	Metric 6: Metadata Completeness	High	All data sources, methods, results, and assumptions are clearly documented.
Domain 4: Variability and Uncertainty	Metric 7: Metadata Completeness	Medium	Uncertainty not addressed. Variability addressed by considering multiple cleaner types.

Overall Quality Determination

Medium

Study Citation:	U.S. EPA, (2023). Use of laboratory chemicals - Generic scenario for estimating occupational exposures and environmental releases (Revised draft generic scenario).
HERO ID:	10480466
Conditions of Use:	Laboratory Chemicals

EXTRACTION	
Parameter	Data
Description of release source:	Container unloading, container cleaning, labware equipment cleaning, during laboratory analyses, waste disposal.
Release or emission factors:	Transfer operation losses of solids: 0.5%Container Cleaning (liquids in small containers): 0.6%Container Cleaning (solids): 1%Labware equipment cleaning (liquids): 2%Labware equipment cleaning (solids): 1%laboratory waste disposal: 100%
Release frequency:	260 day/yr.
Waste treatment methods and pollution control:	Labware rinsed with water. Non-hazardous chemicals to landfill. laboratory chemicals or solvents used to clean labware may be considered hazardous. hazardous waste must be disposed of by incineration or to designated hazardous waste landfills.Local ventilation, accurate labeling of wastes, using secondary containment for hazardous wastes, and contacting specialty disposal companies.

EVALUATION				
Domain	Metric		Rating	Comments
Domain 1: Reliability	Metric 1:	Methodology	High	Assessment uses high quality information/data from frequently-used sources.
Domain 2: Representativeness	Metric 2:	Geographic Scope	High	This GS is based on U.S. data.
	Metric 3:	Applicability	Medium	Data is for an in-scope occupational scenario; however, data is general and not specific to a chemical.
	Metric 4:	Temporal Representativeness	High	Assessment is based on current industry conditions and data no more than 10 years old.
	Metric 5:	Sample Size	Medium	Sample distribution characterized by a range with uncertain statistics.
Domain 3: Accessibility/ Clarity	Metric 6:	Metadata Completeness	High	All data sources, methods, results, and assumptions are clearly documented.
Domain 4: Variability and Uncertainty	Metric 7:	Metadata Completeness	Low	Variability and uncertainty are not addressed.

Overall Quality Determination	High
--------------------------------------	-------------

Study Citation:	U.S. EPA, (2022). Chemical repackaging - Generic scenario for estimating occupational exposures and environmental releases (revised draft).
HERO ID:	11182966
Conditions of Use:	Repackaging

EXTRACTION

Parameter	Data
Description of release source:	Transfer losses, container cleaning, equipment cleaning, transfer losses during loading.
Release quantity:	Provides methodology to estimate releases based on various parameters including: opening area of cleaning equipment, physical-chemical properties, air velocity, etc.
Release or emission factors:	Transfer losses of solid chemicals: 0.5%Container cleaning (liquids): 0.2%Equipment Cleaning (liquids): 2% Equipment Cleaning (solids): 1%
Release frequency:	The number of operating days is given in a range of 174-260 days/yr with an EPA default of 260 days/yr.
Waste treatment methods and pollution control:	Filters used for fugitive dust emissions are disposed of in landfills or by incineration. Wastewater is treated on-site or sent off to a POTW.Automated pumps and containment systems are used to control emissions. Containment methods include bunds, kerbs, drip trays or any other systems that will prevent a spilled product escaping are recommended.

EVALUATION

Domain	Metric	Rating	Comments
Domain 1: Reliability			
Metric 1:	Methodology	High	Assessment uses high quality data/techniques/methods from frequently-used sources.
Domain 2: Representativeness			
Metric 2:	Geographic Scope	High	This GS is based on U.S. data.
Metric 3:	Applicability	Medium	Data is for an in-scope occupational scenario; however, data is general and not specific to a chemical.
Metric 4:	Temporal Representativeness	Medium	Assessment is generally based on data greater than 10 years old but no more than 20 years old and industry conditions that are expected to be representative of current industry conditions.
Metric 5:	Sample Size	Medium	Sample distribution characterized by a range with uncertain statistics.
Domain 3: Accessibility/ Clarity			
Metric 6:	Metadata Completeness	High	All data sources, methods, results, and assumptions are clearly documented.
Domain 4: Variability and Uncertainty			
Metric 7:	Metadata Completeness	Medium	Uncertainty not addressed. Variability addressed by considering emissions from multiple activities.

Overall Quality Determination**High**

Study Citation:	U.S. EPA, (2003). Transportation equipment cleaning - Generic scenario for estimating occupational exposures and environmental releases (draft).			
HERO ID:	6385708			
Conditions of Use:	Disposal			
EXTRACTION				
Parameter	Data			
Description of release source:	Any water soluble heels that are compatible with the facility’s treatment system and the conditions of the facility’s wastewater discharge permit are usually combined with other wastewaters for treatment and discharge at the facility. Incompatible heels are segregated into drums or tanks for disposal by alternative means, which may include sale to a reclamation facility, landfill, or incineration. The TEC facility may reuse heels comprised of soaps, detergents, solvents, acids, or alkalis as tank cleaning solutions, as neutralizers for future heels, and for wastewater treatment.			
Release or emission factors:	Between 35 and 1,124 gallons of wastewater per tank were reportedly generated during tank truck cleaning, between 76 and 2,399 gallons of wastewater per tank during rail tank car cleaning, and between 3,000 and 30,000 gallons of wastewater per tank during tank barge cleaning. Rail tank cars are more likely to be cleaned using steam than using caustic or detergent cleaning solutions and they typically generate between 3 and 121 gallons of heel. Tank trucks, intermediate bulk containers, and intermodal tank containers are generally considered empty when they arrive at the facility, but may contain between one quart and ten gallons of heel.			
Waste treatment methods and pollution control:	Disposal methods for heel are presented in the scenario. Most facilities discharge treated wastewater to POTWs, and facilities with wastewater treatment typically include equalization, pH adjustment, physical settling, and oil/water separation.			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Reliability	Metric 1:	Methodology	High	Assessment uses high quality information/data from frequently-used sources.
Domain 2: Representativeness	Metric 2:	Geographic Scope	High	This GS is based on U.S. data.
	Metric 3:	Applicability	Medium	Data are for disposal; however, data is general and not specific to a chemical.
	Metric 4:	Temporal Representativeness	Medium	Assessment is based on data greater than 10 years old but no more than 20 years old and industry conditions that are expected to be representative of current industry conditions.
	Metric 5:	Sample Size	Medium	Sample distributions characterized by ranges/estimations with uncertain statistics.
Domain 3: Accessibility/ Clarity	Metric 6:	Metadata Completeness	Medium	Methods, results, and assumptions are clearly documented, but underlying data sources are not fully transparent.
Domain 4: Variability and Uncertainty	Metric 7:	Metadata Completeness	Medium	Uncertainty not addressed. Variability addressed by considering multiple container types and cleaning methods.
Overall Quality Determination			High	

Study Citation:	CDC, (2009). Fourth national report on human exposure to environmental chemicals.			
HERO ID:	664488			
Conditions of Use:	Various			
EXTRACTION				
Parameter	Data			
Description of release source:	These volatile halogenated solvents may be released into the air from facilities that produce or use them, from contaminated waste water, or from hazardous waste sites. . . Because of their volatility, these halogenated solvents generally do not persist in soil or water. (pg 487-88)			
Comments:	media: air, land, water			
EVALUATION				
Domain	Metric		Rating	Comments
Domain 1: Reliability	Metric 1:	Methodology	High	Report uses high quality data/techniques/methods from frequently-used sources (CDC).
Domain 2: Representativeness	Metric 2:	Geographic Scope	High	Data are from the U.S.
	Metric 3:	Applicability	High	Data are for various in-scope occupational scenarios.
	Metric 4:	Temporal Representativeness	Medium	Report is based on data greater than 10 years old but no more than 20 years old and industry conditions that are expected to be representative of current industry conditions.
	Metric 5:	Sample Size	N/A	release source info
Domain 3: Accessibility/ Clarity	Metric 6:	Metadata Completeness	High	All data sources, methods, results, and assumptions are clearly documented.
Domain 4: Variability and Uncertainty	Metric 7:	Metadata Completeness	N/A	release source info
Overall Quality Determination			High	

Study Citation:	Earthjustice, (2020). Exhibit 1 to comments of rubbertown emergency action et al., re: TSCA risk evaluations for high-priority substances and substances undergoing manufacturer-requested risk evaluations.			
HERO ID:	10385015			
Conditions of Use:	All			
EXTRACTION				
Parameter	Data			
Description of release source:	industrial wastewater treatment or incineration facilities			
Release quantity:	1,2-DCP Releases & Transfers, 2012-2018 (lbs)Veolia Es Technical Solutions Port Arthur, TX, Air- 26.6Incoming Waste Transfers - 15,235.0 (P. 47/103)1,2-DCP Releases & Transfers, 2012-2018 (lbs) Location Air Water Land Underground Injection Wells Total Releases Incoming Waste Transfer Offsite TransferDow Chemical Freeport, TX 31,278.00 1,082.00 4,974.00 - 37,334.00 8,148,977.00 1,333,897.00Clean Harbors Deer Park LaPorte, TX 12.40 - - - 12.40 99,125.00 1.00Clean Harbors Environmental Services LaPorte, TX - - - - 5.00 -Olin Blue Cube Freeport, TX 2,343.00 2.00 - - 2,345.00 - 7,888,720.00Texas Barge & Boat Inc Freeport, TX 126.00 - - - 126.00 - 12,384.00Southwest Shipyard LP Channelview, TX 19.00 - - - 19.00 - -Total 33,778.40 1,084.00 4,974.00 - 39,836.40 8,248,107.00 9,235,002.00P(63/103)Chemical Waste Management Sulphur, LAland - 8 lbsIncoming Waste Transfers -11 lbs (P 78/103)1,2-DCP Releases & Transfers, 2012-2018 (lbs) Location Air Water Land Underground Injection Wells Total Releases Incoming Waste Transfers Offsite Transfer Dow Chemical Plaquemine, LA 9,675.00 1,969.00 4,461.00 - 16,105.00 - 14,636.00 Hexion Inc Norco, LA 5,555.00 - - - 5,555.00 - 720.00 Blue Cube (Olin) Plaquemine, LA 1,327.00 - - - 1,327.00 - 377.00 Occidental Chemical Geismar, LA 610.00 - - - 610.00 - - Waste Management Woodside Landfill Walker, LA - - 421.00 - 421.00 421.00 - Westlake Vinyls Geismar, LA 80.00 - - - 80.00 - - The Dow Chemical Grand Bayou Operations Paincourtville, LA 21.00 - - - 21.00 - -Totals 17,268.00 1,969.00 4,469.00 - 24,119.00 421.00 15,733.00(P// 91/103)			
EVALUATION				
Domain	Metric		Rating	Comments
Domain 1: Reliability	Metric 1:	Methodology	High	The assessment or report uses high quality data and/or techniques or sound methods
Domain 2: Representativeness	Metric 2:	Geographic Scope	High	The data are from the United States
	Metric 3:	Applicability	High	The report is for an occupational scenario within the scope of the risk evaluation.
	Metric 4:	Temporal Representativeness	High	more than 10 years old.
	Metric 5:	Sample Size	Medium	Distribution of samples is characterized by a range with uncertain statistics.
Domain 3: Accessibility/ Clarity	Metric 6:	Metadata Completeness	Medium	Assessment or report clearly documents results, methods, and assumptions. Datasources are generally described but not fully transparent.
Domain 4: Variability and Uncertainty	Metric 7:	Metadata Completeness	Low	The report provides only limited discussion of the variability and uncertainty in the results.
Overall Quality Determination			High	

Study Citation:	Ecology and Environment, (1992). Site investigation and evaluation of remedial measures report Howard Hughes properties plant site, Los Angeles, California.
HERO ID:	6311590
Conditions of Use:	Aircraft component production/R&D/testing (pg 22) [cleaning and degreasing solvents, pg 88];

EXTRACTION

Parameter	Data
Description of release source:	"Fire training burn pit [west end of property, pg 81], salvage yard underground sumps [west, east and northeast of building 23, pg 76-80], former drum storage area [west of building 947, pg 81], storm drain discharge area, building 12 clarifiers and test sump, building 15 utility trenches and sump [and clarifier, pg 75], building 14 clarifiers, Building 11 tanks [underground tanks west of building 11, pg 78], building 35 organics sump, underground tank south of building 5, underground tanks north of building 12, clarifier south of building 21 (pg 24-25); southwest corner of building 6 (liquid waste neutralization pit), west of building 11 (oil and grease pit area), area north of building 31 and south of runway (engine cleaning pits area), Building 32 Surface Runoff Area, Purged fuel storage area (west of building 45), Temporary drum storage area (building 29), Test site 2 and 3 (pg 73-81) "
Release or emission factors:	pg 98-267 has soil/groundwater sampling results, not emission factors but may be usable (also did not find any area sampling data which was tagged for this source, FT screener may have gotten the soil/water sampling results confused); more groundwater/soil sampling results presented throughout, e.g. App. B
Waste treatment methods and pollution control:	"6-well extraction system" to pump up and treat contaminated groundwater at site via air stripping (pg 22); more detail pg 26-7; pg 379-80 presents data on influent and effluent concentrations for groundwater air stripping, can likely be adapted for other COUs (since groundwater treatment is out of scope); pg 381 says 99.9% effective
Comments:	media: land (groundwater); fugitive air (volatilization)

EVALUATION

Domain	Metric	Rating	Comments
Domain 1: Reliability	Metric 1:	Methodology	High
			Report uses high quality data/techniques/methods from frequently-used sources (TSCA submission; references EPA analytical methods for solid/groundwater sampling analysis).
Domain 2: Representativeness	Metric 2:	Geographic Scope	High
	Metric 3:	Applicability	High
	Metric 4:	Temporal Representativeness	Low
	Metric 5:	Sample Size	High
			Statistical distribution of samples is fully characterized (discrete sampling data provided).
Domain 3: Accessibility/ Clarity	Metric 6:	Metadata Completeness	High
			All data sources, methods, results, and assumptions are clearly documented.
Domain 4: Variability and Uncertainty	Metric 7:	Metadata Completeness	Medium
			Variability addressed by considering multiple remediation/pollution prevention methods for each release source, but uncertainty is not addressed.

Overall Quality Determination

High

Study Citation:	NCBI, (2020). PubChem Compound Summary for CID 6564, 1,2-Dichloropropane.
HERO ID:	7681904
Conditions of Use:	Manufacture & Use

EXTRACTION

Parameter	Data
Description of release source:	Production of 1,2-dichloropropane and use as a solvent.
Waste treatment methods and pollution control:	1,2-Dichloropropane is a waste chemical stream constituent which may be subjected to ultimate disposal by controlled incineration. Incineration, preferably after mixing with another combustible fuel, care must be exercised to assure complete combustion to prevent the formation of phosgene. An acid scrubber is necessary to remove the halo acids produced.

EVALUATION

Domain	Metric	Rating	Comments
Domain 1: Reliability	Metric 1: Methodology	High	Report uses high quality information/data from frequently-used sources.
Domain 2: Representativeness	Metric 2: Geographic Scope	High	Data are from the U.S.
	Metric 3: Applicability	High	The report is for an occupational scenario within the scope of the risk evaluation.
	Metric 4: Temporal Representativeness	High	Report is based on current industry conditions and data no more than 10 years old.
	Metric 5: Sample Size	N/A	N/A - description of release source and waste treatment.
Domain 3: Accessibility/ Clarity	Metric 6: Metadata Completeness	High	All data sources, methods, results, and assumptions are clearly documented.
Domain 4: Variability and Uncertainty	Metric 7: Metadata Completeness	N/A	N/A - description of release source and waste treatment.

Overall Quality Determination	High
--------------------------------------	-------------

Study Citation:	Pekin, T., Moore, A. (1982). Air stripping of trace volatile organics from wastewater. :765-771.			
HERO ID:	5467872			
Conditions of Use:	Disposal			
EXTRACTION				
Parameter	Data			
Description of release source:	Wastewater			
Waste treatment methods and pollution control:	Air Stripping (Pilot studies); Removal efficiencies from 86-93+ percent from pilot studies (p. 9)			
Comments:	Media: air			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Reliability	Metric 1:	Methodology	Medium	Report uses high quality data/techniques/methods that are not from frequently-used sources and there are no known quality issues (pilot study).
Domain 2: Representativeness	Metric 2:	Geographic Scope	High	Data are from the U.S.
	Metric 3:	Applicability	Medium	Data are for wastewater treatment, which is similar to the in-scope occupational scenario disposal.
	Metric 4:	Temporal Representativeness	Low	Report is based on data greater than 20 years old and industry conditions that are expected to be outdated.
	Metric 5:	Sample Size	Medium	Sample distribution characterized by limited statistics (1 value per each configuration tested in pilot study) but discrete samples not provided and distribution not fully characterized.
Domain 3: Accessibility/ Clarity	Metric 6:	Metadata Completeness	Medium	Methods, results, and assumptions are clearly documented, but underlying data sources are not fully transparent (parameters provided for study).
Domain 4: Variability and Uncertainty	Metric 7:	Metadata Completeness	Medium	Variability addressed by testing different configurations but uncertainty is not addressed.
Overall Quality Determination			Medium	

Study Citation:	Thoma, G. J., Thibodeaux, L. J., Springer, C. (1989). The effectiveness of polyvinyl-chloride as an organic vapour barrier. Hazardous Waste and Hazardous Materials 6(1):1-16.
HERO ID:	5467967
Conditions of Use:	Disposal

EXTRACTION

Parameter	Data
Release or emission factors:	Flux of 1,2-DCP in soil: 14 - 16.1 (g/m ² /hr)
Waste treatment methods and pollution control:	Landfill
Comments:	Experiments were performed using landfill simulators. See table 6 & 7

EVALUATION

Domain	Metric	Rating	Comments
Domain 1: Reliability	Metric 1: Methodology	Medium	Methodology is known and expected to be accurate but may not cover all release sources at the site.
Domain 2: Representativeness	Metric 2: Geographic Scope	High	The data are from the United States
	Metric 3: Applicability	High	Data are for disposal, an in-scope occupational scenario.
	Metric 4: Temporal Representativeness	Low	The report is more than 20 years old.
	Metric 5: Sample Size	Medium	Sample distribution characterized by limited statistics (mean) but discrete samples not provided and distribution not fully characterized.
Domain 3: Accessibility/ Clarity	Metric 6: Metadata Completeness	Medium	Release media and release frequency provided but missing control efficiency.
Domain 4: Variability and Uncertainty	Metric 7: Metadata Completeness	Medium	Variability addressed by 2 test runs, but uncertainty is not addressed.

Overall Quality Determination	Medium
--------------------------------------	---------------

Study Citation:	Whittaker, K. F., Moore, A. T. (1984). Pilot scale investigations in the removal of volatile organics and phthalates from electronics manufacturing wastewater. :579-589.			
HERO ID:	5740947			
Conditions of Use:	Electronics MFG			
EXTRACTION				
Parameter	Data			
Description of release source:	wastewater			
Release or emission factors:	1300 max ppb in influent, 1400 max ppb effluent from existing treatment plant data (pdf pg. 4)			
Waste treatment methods and pollution control:	onsite WWT (and some WWT methods investigated in pilot study)			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Reliability	Metric 1:	Methodology	High	Report uses high quality data/techniques/methods from frequently-used sources.
Domain 2: Representativeness	Metric 2:	Geographic Scope	High	Data are from the U.S.
	Metric 3:	Applicability	Medium	Data are for electronics manufacturing, which is similar to the in-scope occupational scenario processing aids, not otherwise listed.
	Metric 4:	Temporal Representativeness	Low	Report is based on data greater than 20 years old and industry conditions that are expected to be outdated.
	Metric 5:	Sample Size	Medium	Sample distribution characterized by limited statistics (max) but discrete samples not provided and distribution not fully characterized.
Domain 3: Accessibility/ Clarity	Metric 6:	Metadata Completeness	Medium	Methods, results, and assumptions are clearly documented, but underlying data sources are not fully transparent.
Domain 4: Variability and Uncertainty	Metric 7:	Metadata Completeness	Low	Variability and uncertainty are not addressed.
Overall Quality Determination		Medium		

Study Citation:	Yamada, K., Kumagai, S., Kubo, S., Endo, G. (2015). Chemical exposure levels in printing and coating workers with cholangiocarcinoma (third report). Journal of Occupational Health 57(6):565-571.			
HERO ID:	3064878			
Conditions of Use:	Printing plants			
EXTRACTION				
Parameter		Data		
Throughput:		230 - 400 g/hour used in printing rooms		
EVALUATION				
Domain		Metric	Rating	Comments
Domain 1: Reliability	Metric 1:	Methodology	Medium	Model is free of mathematical errors and based on sound approaches/methods; however, choice of equations and parameters are not fully described (journal article, uses well-mixed and near field far field models)
Domain 2: Representativeness	Metric 2:	Geographic Scope	Medium	Data are from Japan, an OECD country.
	Metric 3:	Applicability	Medium	Model is used for printing, not an in-scope occupational scenario, but may be adapted/used as surrogate for an in-scope occupational scenario like non-incorporative activities (industrial use).
	Metric 4:	Temporal Representativeness	High	Model is based on current industry conditions and based on data no more than 10 years old.
Domain 3: Accessibility/ Clarity	Metric 5:	Metadata Completeness	High	Model approach, equations, and choice of parameter values are transparent. Rationales for choice of approach, equations, and parameter values provided.
Domain 4: Variability and Uncertainty	Metric 6:	Metadata Completeness	Medium	Variability addressed by modeling multiple scenarios, but uncertainty is not addressed
Overall Quality Determination			High	

Study Citation:	ACC, (2021). Letter to DGAD, OPPT, USEPA, from Colleen Stevens, ACC, re: Propylene dichloride: In vitro dermal absorption rate testing (CAS No 78-87-5).			
HERO ID:	7474963			
Conditions of Use:	In Vitro Dermal Absorption Rate Testing (can apply to multiple in-scope COUs)			
EXTRACTION				
Parameter	Data			
Chemical concentration:	The chemical concentration of propylene dichloride in the prepared solution for dermal testing was 1,160,000 µg/mL .			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Reliability	Metric 1: Methodology	High	Report uses high quality data and is from an In Vitro Dermal Absorption Rate Testing report submitted to EPA.	
Domain 2: Representativeness	Metric 2: Geographic Scope	High	Data are from the U.S.	
	Metric 3: Applicability	High	Data are for dermal exposures, which can occur for multiple in-scope occupational scenarios.	
	Metric 4: Temporal Representativeness	Medium	The assessment captures operations, equipment, and worker activities that are expected to be reasonably representative of current conditions. The completed exposure or risk assessment is more than 10 years but no more than 20 years old.	
	Metric 5: Sample Size	Medium	Sample distribution characterized by limited statistics (mean) but discrete samples not provided and distribution not fully characterized.	
Domain 3: Accessibility/ Clarity	Metric 6: Metadata Completeness	High	All data sources, methods, results, and assumptions are clearly documented.	
Domain 4: Variability and Uncertainty	Metric 7: Metadata Completeness	Medium	Variability is not addressed, uncertainty is addressed by sample preparation method and sampling method.	
Overall Quality Determination		High		

Study Citation:	DuPont, (2005). Propylene dichloride: In vitro dermal absorption rate testing.			
HERO ID:	7461856			
Conditions of Use:	In Vitro Dermal Absorption Rate Testing (can apply to multiple in-scope COUs)			
EXTRACTION				
Parameter	Data			
Chemical concentration:	The chemical concentration of propylene dichloride in the prepared solution for dermal testing was 1,160,000 µg/mL .			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Reliability	Metric 1: Methodology	High	Report uses high quality data and is from an In Vitro Dermal Absorption Rate Testing report submitted to EPA.	
Domain 2: Representativeness	Metric 2: Geographic Scope	High	Data are from the U.S.	
	Metric 3: Applicability	High	Data are for dermal exposures, which can occur for multiple in-scope occupational scenarios.	
	Metric 4: Temporal Representativeness	Medium	The assessment captures operations, equipment, and worker activities that are expected to be reasonably representative of current conditions. The completed exposure or risk assessment is more than 10 years but no more than 20 years old.	
	Metric 5: Sample Size	Medium	Sample distribution characterized by limited statistics (mean) but discrete samples not provided and distribution not fully characterized.	
Domain 3: Accessibility/ Clarity	Metric 6: Metadata Completeness	High	All data sources, methods, results, and assumptions are clearly documented.	
Domain 4: Variability and Uncertainty	Metric 7: Metadata Completeness	Medium	Variability is not addressed, uncertainty is addressed by sample preparation method and sampling method.	
Overall Quality Determination		High		

Study Citation:	OECD, (2011). Emission scenario document on the chemical industry.			
HERO ID:	6306753			
Conditions of Use:	Manufacture, Formulation of processing aids, processing as a reactant, use of processing aids			
EXTRACTION				
Parameter	Data			
Process description:	General synthesis process consists of reaction, handling/transportation, isolation, handling/transportation, purification, handling/transportation, then either reaction to make another chemical or on to the next life cycle stageFig 5.2			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Reliability	Metric 1:	Methodology	High	Assessment uses high quality data/techniques/methods from frequently-used sources.
Domain 2: Representativeness	Metric 2:	Geographic Scope	Medium	This ESD was not developed by EPA, but another OECD-member country.
	Metric 3:	Applicability	Medium	Data are for multiple in-scope occupational scenarios; however, data is general and not specific to a chemical.
	Metric 4:	Temporal Representativeness	Low	Assessment from 2011 but is based on data greater than 20 years old.
	Metric 5:	Sample Size	N/A	N/A - This metric is not applicable to the data being extracted (process description only)
Domain 3: Accessibility/ Clarity	Metric 6:	Metadata Completeness	High	All data sources, methods, results, and assumptions are clearly documented.
Domain 4: Variability and Uncertainty	Metric 7:	Metadata Completeness	N/A	N/A - This metric is not applicable to the data being extracted (process description only)
Overall Quality Determination		Medium		

Study Citation:	OECD, (2009). Emission scenario document on transport and storage of chemicals.			
HERO ID:	6393282			
Conditions of Use:	Transportation and Storage			
EXTRACTION				
Parameter	Data			
Production, import, or use volume:	11 million tonnes shipped via rail tankers 30 million tonnes shipped via pipelines			
Process description:	On-site storage of chemicals, filling of containers, transport to distributors/downstream users/consumers, containers with residual chemical transported to recycling/cleaning or disposal site, empty/cleaned containers returned to distributor or production site			
Number of sites:	Container cleaning sites in UK: 40 for road tankers; 8 for steel drums; 8 for plastics drums; 6 for fibre drums; 13 for IBCs; 7 for hazardous waste containers			
Physical form:	liquid, solid, gas			
EVALUATION				
Domain		Metric	Rating	Comments
Domain 1: Reliability		Metric 1: Methodology	High	Assessment uses high quality data/techniques/methods from frequently-used sources.
Domain 2: Representativeness		Metric 2: Geographic Scope	Medium	This ESD was not developed by EPA, but another OECD-member country. Data is for an in-scope occupational scenario; however, data is general and not specific to a chemical.
		Metric 3: Applicability	Medium	
		Metric 4: Temporal Representativeness	Low	Assessment is based on data greater than 20 years old.
		Metric 5: Sample Size	Medium	Sample distribution characterized by a range with uncertain statistics.
Domain 3: Accessibility/ Clarity		Metric 6: Metadata Completeness	High	All data sources, methods, results, and assumptions are clearly documented.
Domain 4: Variability and Uncertainty		Metric 7: Metadata Completeness	Medium	Uncertainty not addressed. Variability addressed by considering multiple chemical forms, containers and storage system types.
Overall Quality Determination			Medium	

Study Citation:	OECD, (2015). Emission scenario document (ESD) on industrial use of industrial cleaners.			
HERO ID:	6414932			
Conditions of Use:	Cleaning and furniture care products			
EXTRACTION				
Parameter	Data			
Production, import, or use volume:	1-12,961 tonne/yr (Japan)			
Process description:	Provides descriptions for a variety of cleaning methods including ultrasonic, jet washing, oscillate (rotate) washing, mechanical vibration stirring, bubble washing reduced pressure (vacuum) washing, jet (spray, shower) washing, steam washingsee table 2.16			
Chemical concentration:	Provides conc. estimates based on type of cleaner, not chemical specific. starts on page 24			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Reliability	Metric 1: Methodology	High	Assessment uses high quality data/techniques/methods from frequently-used sources.	
Domain 2: Representativeness	Metric 2: Geographic Scope	Medium	This ESD was not developed by EPA, but another OECD-member country.	
	Metric 3: Applicability	Medium	Data is for an in-scope occupational scenario; however, data is general and not specific to a chemical.	
	Metric 4: Temporal Representativeness	Medium	Assessment is generally based on data greater than 10 years old but no more than 20 years old and industry conditions that are expected to be representative of current industry conditions.	
	Metric 5: Sample Size	Medium	Sample distribution characterized by a range with uncertain statistics.	
Domain 3: Accessibility/ Clarity	Metric 6: Metadata Completeness	High	All data sources, methods, results, and assumptions are clearly documented.	
Domain 4: Variability and Uncertainty	Metric 7: Metadata Completeness	Medium	Uncertainty not addressed. Variability addressed by considering multiple cleaner types	
Overall Quality Determination		High		

Study Citation:	U.S. EPA, (2023). Use of laboratory chemicals - Generic scenario for estimating occupational exposures and environmental releases (Revised draft generic scenario).
HERO ID:	10480466
Conditions of Use:	Use of Laboratory Chemicals

EXTRACTION	
Parameter	Data
Production, import, or use volume:	Provides methodology to estimate annual use rate.
Process description:	Receive chemicals, weigh or measure chemical, add chemical to labware, dilute/add other laboratory chemicals, add sample, run analytical testing, dispose of sample and laboratory chemical waste.
Throughput:	255 grams reagent/site-day (average); 2,000 mL reagent/site-day (average); Table 3-2 gives daily throughput for laboratory stock solutions.
Number of sites:	Provides methodology to estimate number of sites based on chemical production volume, annual throughput - 40,639 total establishments.
Chemical concentration:	Provides conc. estimates based on the chemical function, not chemical specific.

		EVALUATION	
Domain	Metric	Rating	Comments
Domain 1: Reliability	Metric 1: Methodology	High	Assessment uses high quality information/data from frequently-used sources.
Domain 2: Representativeness	Metric 2: Geographic Scope	High	This GS is based on U.S. data
	Metric 3: Applicability	Medium	Data is for an in-scope occupational scenario; however, data is general and not specific to a chemical.
	Metric 4: Temporal Representativeness	High	Assessment is based on current industry conditions and data no more than 10 years old.
	Metric 5: Sample Size	Medium	Sample distribution characterized by a range with uncertain statistics.
Domain 3: Accessibility/ Clarity	Metric 6: Metadata Completeness	High	All data sources, methods, results, and assumptions are clearly documented.
Domain 4: Variability and Uncertainty	Metric 7: Metadata Completeness	Medium	Uncertainty not addressed. Variability addressed by considering different chemical functions.

Overall Quality Determination	High
--------------------------------------	-------------

Study Citation:	U.S. EPA, (2022). Chemical repackaging - Generic scenario for estimating occupational exposures and environmental releases (revised draft).			
HERO ID:	11182966			
Conditions of Use:	Rapackaging			
EXTRACTION				
Parameter	Data			
Production, import, or use volume:	Table B-1 presents PMN data on repackaging rate in kg chemical/site-yr.			
Process description:	Pre-manufacture notices (PMN) submitted from 2010 to 2020 under EPA’s New Chemicals Program indicated imported and repackaged chemicals can be solids or liquids and may be neat or in solutions/mixtures and contained in various packaging types. After they arrive at the repackaging site, repackaging operations occur where the chemical is transferred from the transport container it was imported in to a new one of a different size in order to meet the customer’s needs (JACO, 2021). Chemicals may also be transferred from original containers to intermediate storage containers before packaging into smaller containers (Cooke, 2013; NIOSH, 2009). Chemicals are expected to be received at repackaging sites in drums or larger bulk containers (supersacks, totes, tank trucks, etc.) (Cooke, 2013; NIOSH, 2009). The chemical of interest may be received in its final formulation and transferred directly from these large containers into smaller containers, charged to a temporary storage tank, or it may be charged to a mixing tank and diluted or mixed with other chemicals before it is repackaged. Once the chemical has been formulated to desired specifications, it can be repackaged. Workers may be potentially exposed during the unloading of chemicals from the original transport containers into temporary storage or new transport containers. Releases of chemicals may also occur during this stage, from open container surfaces (e.g., if the chemical is volatile), transfer operations (e.g., if the chemical is volatile or a powder), and original transport container disposal. Repackaging operations for liquid chemicals typically involve pouring or pumping the product from the original containers or mixing /storage tanks into the new containers. A study conducted by the Health and Safety Laboratory in the U.K. investigated two chemical repackaging sites (Cooke, 2013). At both of these sites the chemical was delivered to the site by road tanker and pumped into dedicated storage tanks. One of the sites, a hydrazine supplier, pumped the hydrazine into a mixing vessel where it was diluted with water and packaged into smaller containers for sale to customers. At the other site, trichloroethylene was pumped from storage tanks into a closed loop system where workers using a hydraulic lance connected to a semi-automated filling system transferred the chemical into new containers (Cooke, 2013). The usual process for repackaging solid chemicals differs from the processes for liquids. A NIOSH Health Hazard Evaluation Report (HHE) from 2009 investigated a repackaging facility that was transferring bulk shipments of silane-coated glass beads ranging between 0.2 – 1.2mm in diameter. At this facility, 2,200 lb supersacks of the product are lifted with a forklift over a metal bin, then cutting the bottom of the container with a knife to empty the beads into the bin. The metal bin is then lifted by a forklift, and the glass beads are poured into hoppers. From the hoppers the beads are gravity fed into smaller cardboard boxes or paper sacks that are shipped to customers (NIOSH, 2009). Workers may be potentially exposed during the transfer of chemicals from temporary storage into new transport containers. Releases of chemicals may also occur during this stage from open container surfaces (e.g., if the chemical is volatile), transfer operations (e.g., if the chemical is volatile or a powder), and cleaning any equipment that was used in during the process.			
Number of sites:	Table 1-2 presents the number of repackaging sites based on 2019 U.S. Census data.			
Chemical concentration:	A fraction of completed IRERs from 2010-2020 were reviewed, 21 submissions contained information on chemical repackaging. In these submissions, chemicals were repackaged at concentrations ranging from 1% to 100%, with a 50th percentile of 93%, a 95th percentile of 100%, and a mode of 100%.			
EVALUATION				
Domain	Metric		Rating	Comments
Domain 1: Reliability	Metric 1:	Methodology	High	Assessment uses high quality information/data from frequently-used sources.
Domain 2: Representativeness	Metric 2:	Geographic Scope	High	This GS is based on U.S. data.
	Metric 3:	Applicability	Medium	Data are for an in-scope occupational scenario; however, data is general and not specific to a chemical.
	Metric 4:	Temporal Representativeness	Medium	Assessment is based on data greater than 10 years old but no more than 20 years old and industry conditions that are expected to be representative of current industry conditions.
Continued on next page ...				

General Engineering Assessment

1,2-Dichloropropane

HERO ID: 11182966 Table: 1 of 1

...continued from previous page

Study Citation:	U.S. EPA, (2022). Chemical repackaging - Generic scenario for estimating occupational exposures and environmental releases (revised draft).			
HERO ID:	11182966			
Conditions of Use:	Rackaging			
Domain		Metric	EVALUATION	
			Rating	Comments
Metric 5:		Sample Size	High	Statistical distribution of samples is fully characterized (discrete use amounts provided).
Domain 3: Accessibility/ Clarity				
Metric 6:		Metadata Completeness	High	All data sources, methods, results, and assumptions are clearly documented.
Domain 4: Variability and Uncertainty				
Metric 7:		Metadata Completeness	Medium	Uncertainty not addressed. Variability addressed by considering multiple repackaging facilities.
Overall Quality Determination			High	

Study Citation:	U.S. EPA, (2003). Transportation equipment cleaning - Generic scenario for estimating occupational exposures and environmental releases (draft).			
HERO ID:	6385708			
Conditions of Use:	Disposal			
EXTRACTION				
Parameter	Data			
Production, import, or use volume:	EPA estimates 500,000 IBCs are cleaned annually in the United States. Of this amount, EPA believes 225,000 IBCs are cleaned by Transportation Equipment Cleaning facilities. The remaining 275,000 IBCs are cleaned by drum reconditioning facilities.			
Process description:	Cleaning process generally include reviewing manifests, draining the tank heel, rinsing, washing or using material-specific cleaning methods, rinsing a second time, and drying. Cleaning processes vary between facilities depending on the available cleaning equipment and the commodities last transported in the tanks to be cleaned.			
Throughput:	IBCs are portable plastic and metal containers with 450 liters (199 gallons) to 3,000 liters (793 gallons) capacity. Cleaning time for tank barges typically ranges from four to eight hours. On average, tank trucks, IBCs, or intermodal tank containers requires two hours for cleaning.			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Reliability	Metric 1: Methodology	High	Assessment uses high quality information/data from frequently-used sources.	
Domain 2: Representativeness	Metric 2: Geographic Scope	High	This GS is based on U.S. data.	
	Metric 3: Applicability	Medium	The assessment is for an occupational scenario within the scope of the risk evaluation.; however, data is general and not specific to a chemical.	
	Metric 4: Temporal Representativeness	Medium	Assessment is based on data greater than 10 years old but no more than 20 years old and industry conditions that are expected to be representative of current industry conditions.	
	Metric 5: Sample Size	Medium	Sample distributions characterized by ranges/estimations with uncertain statistics.	
Domain 3: Accessibility/ Clarity	Metric 6: Metadata Completeness	Medium	Methods, results, and assumptions are clearly documented, but underlying data sources are not fully transparent.	
Domain 4: Variability and Uncertainty	Metric 7: Metadata Completeness	Medium	Uncertainty not addressed. Variability addressed by considering multiple container types and cleaning methods.	
Overall Quality Determination		High		

Study Citation:	ACC, (2021). ACC PDC TSCA Consortium Monitoring Data - Letters and data files.		
HERO ID:	13283276		
Conditions of Use:	Manufacturing as a Byproduct; Processing as a Reactant		
EXTRACTION			
Parameter	Data		
Production, import, or use volume:	Annual PVs of 1,2-DCP for 6 sites are presented in Company A’s Excel file. PV ranges from 20.4-270 MMlbs.		
Process description:	Process descriptions for each individual site are provided in the two Excel files.		
Throughput:	Flow rates for 6 sites are provided in Company A's Excel file. Flow rates of 1,2-DCP range from 7-40 klbs/hr.		
Number of sites:	11 facilities included in the test order submission.		
Chemical concentration:	Concentrations range from 5-99.9%. Discrete concentration data is provided in the two Excel files.		
EVALUATION			
Domain	Metric	Rating	Comments
Domain 1: Reliability	Metric 1: Methodology	High	Report uses NIOSH methods and was submitted in response to a test order for the purpose of use in EPA risk evaluations.
Domain 2: Representativeness	Metric 2: Geographic Scope	High	Data are from the U.S.
	Metric 3: Applicability	High	Data are for two in-scope OESs.
	Metric 4: Temporal Representativeness	High	Data are from 2019.
	Metric 5: Sample Size	High	Discrete data for PV, throughput, and concentration are provided in the Excel files.
Domain 3: Accessibility/ Clarity	Metric 6: Metadata Completeness	High	All methods and data are documented in the test order monitoring results.
Domain 4: Variability and Uncertainty	Metric 7: Metadata Completeness	Medium	Variability is addressed by sampling across 11 facilities and different job tasks. Uncertainty is not addressed in these results.
Overall Quality Determination		High	

Study Citation:	ATSDR, (1989). Toxicological profile for 1,2-dichloropropane.			
HERO ID:	5160134			
Conditions of Use:	Manufacture			
EXTRACTION				
Parameter	Data			
Production, import, or use volume:	The domestic production volume of 1,2dichloropropane during 1984 was 59.8 million pounds (IARC 1986). Over 95% of the approximately 75 million pounds produced in 1982 was used on site as a captive chemical intermediate in the production of perchloroethylene and other chlorinated products (EPA 1986c, Dow Chem. Co. 1983) (p. 87) Approximately 3 million pounds per year of dichloropropane was marketed by Dow Chemical in 1982 for use as an industrial solvent for oils, fats, resins, waxes, and rubber, in ion exchange manufacture, in toluene diisocyanate (TDI) production, in photographic film manufacture, for paper coating, and for petroleum catalyst regeneration (HSDB 1988; IARC 1986; EPA 1986c). (p. 87)			
Process description:	High-purity 1,2-dichloropropane, marketed as a solvent, is obtained as a by-product of the synthesis of propylene oxide by the chlorohydrin process. The high-purity product may also be obtained by the reaction of propylene and chlorine in the presence of an iron oxide catalyst at moderate temperature (45°C) and pressure (25-30 psia).			
Number of sites:	1,2-Dichloropropane is produced by Columbia Organics in Cassatt, SC, Dow Chemical in Freeport, TX and Dow Chemical in Plaquemine, LA (SRI 1988; USITC 1987); however, Dow Chemical Company is the only manufacturer of the isolated chemical in the United States (EPA 1986c). The total output of 1,2-dichloropropane by U.S. manufacturers remained relatively stable until 1984 when a major manufacturer, Mannsville Chemical Products Corporation, discontinued production (IARC 1986).. (p. 87)			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Reliability	Metric 1:	Methodology	High	Report uses high quality data from frequently-used sources (compiled by ATSDR).
Domain 2: Representativeness	Metric 2:	Geographic Scope	High	Data are from the U.S.
	Metric 3:	Applicability	High	Data are for manufacturing, an in-scope occupational scenario.
	Metric 4:	Temporal Representativeness	Low	Report is based on data greater than 20 years old and industry conditions that are expected to be outdated.
	Metric 5:	Sample Size	N/A	no sample data
Domain 3: Accessibility/ Clarity	Metric 6:	Metadata Completeness	High	Only results provided - however data sources/methodology from trusted government sources.
Domain 4: Variability and Uncertainty	Metric 7:	Metadata Completeness	Low	Variability and uncertainty are not addressed.
Overall Quality Determination		High		

Study Citation:	Brown, S. L., Chan, F. Y., Jones, J. L., Liu, D. H., Mccaleb, K. E. (1975). Research program on hazard priority ranking of manufactured chemicals (Chemicals 21-40).			
HERO ID:	5251828			
Conditions of Use:	Manufacture			
EXTRACTION				
Parameter		Data		
Production, import, or use volume:		1,3-Dichloropropene, 1,2-dichloropropane mixture - 60 million lb/yr. Diagram indicates that 100% is used as a soil fumigant (p. 295).		
EVALUATION				
Domain		Metric	Rating	Comments
Domain 1: Reliability	Metric 1:	Methodology	Medium	Report uses high quality data that are not from frequently-used sources and there are no known quality issues (compiled by SRI for NSF).
Domain 2: Representativeness	Metric 2:	Geographic Scope	High	Data are from the U.S.
	Metric 3:	Applicability	Low	Data are for manufacturing, an in scope occupational scenario, but not isolated 1,2-DCP. May be outdated since soil fumigant may not occur anymore
	Metric 4:	Temporal Representativeness	Low	Report is based on data greater than 20 years old and industry conditions that are expected to be outdated.
	Metric 5:	Sample Size	N/A	no sample data
Domain 3: Accessibility/ Clarity	Metric 6:	Metadata Completeness	Medium	Methods, results, and assumptions are clearly documented, but underlying data sources are not fully transparent.
Domain 4: Variability and Uncertainty	Metric 7:	Metadata Completeness	Low	Variability and uncertainty are not addressed.
Overall Quality Determination			Medium	

Study Citation:	CalEPA, (1999). Public health goal for 1,2-dichloropropane in drinking water.			
HERO ID:	5155640			
Conditions of Use:	Manufacturing			
EXTRACTION				
Parameter	Data			
Production, import, or use volume:	In the United States, annual production was approximately 41 million pounds in 1972, 84 million pounds in 1975, and 77 million pounds in 1980 (HSDB, 1998).			
Process description:	Since that time, domestic production of isolated 1,2-DCP has been discontinued, although the compound is still in use. (p. 8) 1,2-Dichloropropane is produced by the chlorination of propylene. (p. 8)			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Reliability	Metric 1: Methodology	High	Report uses high quality data from frequently-used sources (originally from HSDB).	
Domain 2: Representativeness	Metric 2: Geographic Scope	High	Data are from the U.S.	
	Metric 3: Applicability	High	Data are for manufacturing, an in-scope occupational scenario.	
	Metric 4: Temporal Representativeness	Low	Report is based on data greater than 20 years old and industry conditions that are expected to be outdated.	
	Metric 5: Sample Size	N/A	No sample data.	
Domain 3: Accessibility/ Clarity	Metric 6: Metadata Completeness	Medium	Methods, results, and assumptions are clearly documented, but underlying data sources are not fully transparent.	
Domain 4: Variability and Uncertainty	Metric 7: Metadata Completeness	N/A	N/A - Process description and PV data.	
Overall Quality Determination		High		

Study Citation:	Consulting,, Integral (2026). Final Study Report for Inhalation Monitoring of 1,2-Dichloropropane [Redacted].				
HERO ID:	13283270				
Conditions of Use:	Manufacturing as a Byproduct; Processing as a Reactant				
EXTRACTION					
Parameter	Data				
Process description:	Exact process descriptions are redacted, but general descriptions of tasks are provided in the raw dataset column AV.				
Number of sites:	4 facilities included in the test order				
Chemical concentration:	Concentrations range from 0.003% to 100% depending on process step. Concentration data are provided in the raw dataset in column M.				
EVALUATION					
Domain	Metric		Rating	Comments	
Domain 1: Reliability	Metric 1:	Methodology	High	Data are from a test order, and are specifically formatted for EPA risk evaluations.	
Domain 2: Representativeness	Metric 2:	Geographic Scope	High	Data are from the U.S.	
	Metric 3:	Applicability	High	Data are for two in-scope occupational OES.	
	Metric 4:	Temporal Representativeness	High	Data are from 2026.	
	Metric 5:	Sample Size	High	Discrete concentration data are provided in the raw dataset.	
Domain 3: Accessibility/ Clarity	Metric 6:	Metadata Completeness	High	Assessment clearly documents sources and assumptions.	
Domain 4: Variability and Uncertainty	Metric 7:	Metadata Completeness	High	Uncertainty is addressed by discussing unusual events during sampling. Variability is addressed by sampling at 4 sites.	
Overall Quality Determination			High		

Study Citation:	Dow Chemical, (1988). Mortality among Dow Chemical employees of a Texas operations per-tet manufacturing plant with cover letter dated 050389.			
HERO ID:	1441931			
Conditions of Use:	Processing as an intermediate			
EXTRACTION				
Parameter	Data			
Process description:	The Per-Tet production plant was built in 1944. It produces carbon tetrachloride (CC4), percllloethylene (PCE) and hydrochloric acid. Feedstocks for the Per-Tet thermochlorination reaction, excluding chlorine, consist of by-:product streams from other chlorinated hydrocarbon production units in Texas Operations (Table 1). While process changes have been few, the sources of feedstock have differed. The major feedstock has been propylene dichloride (PDC). Crude PDC was piped to a PDC Finishing Unit where heavy and light contaminants were removed by distillation. The finished PDC was then fed to the Per-Tet process;’ (p. 7)			
EVALUATION				
Domain		Metric	Rating	Comments
Domain 1: Reliability	Metric 1:	Methodology	High	Report appears to use high quality techniques/sound methods and was submitted to EPA by a company.
Domain 2: Representativeness	Metric 2:	Geographic Scope	High	Data are from the U.S.
	Metric 3:	Applicability	High	Data are for processing as an intermediate, an in-scope occupational scenario.
	Metric 4:	Temporal Representativeness	Low	Report is based on data greater than 20 years old and industry conditions that are expected to be outdated.
	Metric 5:	Sample Size	N/A	N/A - no sample data
Domain 3: Accessibility/ Clarity	Metric 6:	Metadata Completeness	Medium	Assessment or report clearly documents results, methods, and assumptions. Data sources are generally described but not fully transparent.
Domain 4: Variability and Uncertainty	Metric 7:	Metadata Completeness	N/A	N/A - Process description
Overall Quality Determination			High	

Study Citation:	Dow Chemical, (1983). Letter summarizing the EPA/Dow Chemical Co meeting regarding the manufacture of 1,2-dichloropropane.			
HERO ID:	2803587			
Conditions of Use:	Ion exchange manufacturing			
EXTRACTION				
Parameter	Data			
Production, import, or use volume:	Total distributed: 3,000,000 lbs (41% for this COU)			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Reliability	Metric 1: Methodology	High	Report uses high quality data from frequently-used sources.	
Domain 2: Representativeness	Metric 2: Geographic Scope	High	Data are from the U.S.	
	Metric 3: Applicability	Medium	Data are for ion exchange manufacture, which is similar to the in-scope occupational scenario intermediate in all other basic organic chemical manufacturing.	
	Metric 4: Temporal Representativeness	Low	Report is based on data greater than 20 years old and industry conditions that are expected to be outdated.	
	Metric 5: Sample Size	Low	Sample distribution is characterized by no statistics.	
Domain 3: Accessibility/ Clarity	Metric 6: Metadata Completeness	Medium	Methods, results, and assumptions are clearly documented, but underlying data sources are not fully transparent.	
Domain 4: Variability and Uncertainty	Metric 7: Metadata Completeness	Low	Variability and uncertainty are not addressed.	
Overall Quality Determination		Medium		

Study Citation:	Dow Chemical, (1983). Letter summarizing the EPA/Dow Chemical Co meeting regarding the manufacture of 1,2-dichloropropane.			
HERO ID:	2803587			
Conditions of Use:	Paper coating			
EXTRACTION				
Parameter	Data			
Production, import, or use volume:	Total distributed: 3,000,000 lbs (4% for this COU)			
EVALUATION				
Domain	Metric		Rating	Comments
Domain 1: Reliability	Metric 1:	Methodology	High	Report uses high quality data from frequently-used sources.
Domain 2: Representativeness	Metric 2:	Geographic Scope	High	Data are from the U.S.
	Metric 3:	Applicability	Medium	Data are for paper coating, which is similar to the in-scope occupational scenarios related to cleaning.
	Metric 4:	Temporal Representativeness	Low	Report is based on data greater than 20 years old and industry conditions that are expected to be outdated.
	Metric 5:	Sample Size	Low	Sample distribution is characterized by no statistics.
Domain 3: Accessibility/ Clarity	Metric 6:	Metadata Completeness	Medium	Methods, results, and assumptions are clearly documented, but underlying data sources are not fully transparent.
Domain 4: Variability and Uncertainty	Metric 7:	Metadata Completeness	Low	Variability and uncertainty are not addressed.
Overall Quality Determination			Medium	

Study Citation:	Dow Chemical, (1983). Letter summarizing the EPA/Dow Chemical Co meeting regarding the manufacture of 1,2-dichloropropane.			
HERO ID:	2803587			
Conditions of Use:	Intermediate in all other basic organic chemical manufacturing			
EXTRACTION				
Parameter	Data			
Production, import, or use volume:	Total distributed: 3,000,000 lbs (34% for this COU)			
EVALUATION				
Domain	Metric		Rating	Comments
Domain 1: Reliability	Metric 1:	Methodology	High	Report uses high quality data from frequently-used sources.
Domain 2: Representativeness	Metric 2:	Geographic Scope	High	Data are from the U.S.
	Metric 3:	Applicability	Medium	Data are for intermediate in all other basic organic chemical manufacture, which is an in-scope, occupational scenario.
	Metric 4:	Temporal Representativeness	Low	Report is based on data greater than 20 years old and industry conditions that are expected to be outdated.
	Metric 5:	Sample Size	Low	Sample distribution is characterized by no statistics.
Domain 3: Accessibility/ Clarity	Metric 6:	Metadata Completeness	Medium	Methods, results, and assumptions are clearly documented, but underlying data sources are not fully transparent.
Domain 4: Variability and Uncertainty	Metric 7:	Metadata Completeness	Low	Variability and uncertainty are not addressed.
Overall Quality Determination			Medium	

Study Citation:	Dow Chemical, (1984). Comments on 1,2-dichloropropane proposed test rule. Document control number OPTS-42043.			
HERO ID:	6569934			
Conditions of Use:	Manufacture			
EXTRACTION				
Parameter		Data		
Production, import, or use volume:		75 million lbs/year		
Process description:		1,2-DCP is produced and isolated in part as a byproduct during the manufacture of propylene oxide.		
EVALUATION				
Domain		Metric	Rating	Comments
Domain 1: Reliability	Metric 1:	Methodology	Medium	Report uses high quality data/techniques/methods that are not from frequently-used sources and there are no known quality issues.
Domain 2: Representativeness	Metric 2:	Geographic Scope	High	Data are from the U.S.
	Metric 3:	Applicability	High	Data are for manufacturing, an in-scope occupational scenario.
	Metric 4:	Temporal Representativeness	Low	Report is based on data greater than 20 years old and industry conditions that are expected to be outdated.
	Metric 5:	Sample Size	Low	Sample distribution is characterized by no statistics.
Domain 3: Accessibility/ Clarity	Metric 6:	Metadata Completeness	Medium	Methods, results, and assumptions are clearly documented, but underlying data sources are not fully transparent.
Domain 4: Variability and Uncertainty	Metric 7:	Metadata Completeness	Low	Variability and uncertainty are not addressed.
Overall Quality Determination			Medium	

Study Citation:	Earthjustice, (2020). Exhibit 1 to comments of rubbertown emergency action et al., re: TSCA risk evaluations for high-priority substances and substances undergoing manufacturer-requested risk evaluations.			
HERO ID:	10385015			
Conditions of Use:	All			
EXTRACTION				
Parameter	Data			
Number of sites:	Of the 66 highest emitting facilities shown on this map, 22 are in the Houston area, 10 are in the Port Arthur area, and 7 are in the Mossville area			
EVALUATION				
Domain	Metric		Rating	Comments
Domain 1: Reliability	Metric 1:	Methodology	High	The assessment or report uses high quality data and/or techniques or sound methods
Domain 2: Representativeness	Metric 2:	Geographic Scope	High	The data are from the United States
	Metric 3:	Applicability	High	The report is for an occupational scenario within the scope of the risk evaluation.
	Metric 4:	Temporal Representativeness	High	more than 10 years old.
	Metric 5:	Sample Size	Medium	Distribution of samples is characterized by a range with uncertain statistics.
Domain 3: Accessibility/ Clarity	Metric 6:	Metadata Completeness	Medium	Assessment or report clearly documents results, methods, and assumptions. Datasources are generally described but not fully transparent.
Domain 4: Variability and Uncertainty	Metric 7:	Metadata Completeness	Low	The report provides only limited discussion of the variability and uncertainty in the results.
Overall Quality Determination			High	

Study Citation:	ECHA, (2020). Substance infocard: 1,2-dichloropropane.			
HERO ID:	7310678			
Conditions of Use:	Manufacture			
EXTRACTION				
Parameter	Data			
Production, import, or use volume:	1,2-dichloropropane is manufactured in and / or imported to the European Economic Area, at ≥ 1,000 to < 10,000 tonnes per annum.			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Reliability	Metric 1:	Methodology	High	Report uses high quality data from frequently-used sources.
Domain 2: Representativeness	Metric 2:	Geographic Scope	Medium	Data is from Europe.
	Metric 3:	Applicability	High	Data is for manufacture, which is an in-scope occupational scenario.
	Metric 4:	Temporal Representativeness	High	The report is generally no more than 10 years old.
	Metric 5:	Sample Size	Medium	Sample distribution characterized by a range.
Domain 3: Accessibility/ Clarity	Metric 6:	Metadata Completeness	Low	Assessment or report provides results, but the underlying methods, data sources, and assumptions are not fully transparent.
Domain 4: Variability and Uncertainty	Metric 7:	Metadata Completeness	Low	Variability and uncertainty are not addressed.
Overall Quality Determination		Medium		

Study Citation:	Fishbein, L. (1979). Potential halogenated industrial carcinogenic and mutagenic chemicals. III. Alkane halides, alkanols and ethers. Science of the Total Environment 11(3):223-257.			
HERO ID:	18092			
Conditions of Use:	Manufacture			
EXTRACTION				
Parameter		Data		
Production, import, or use volume:		145.1 million pounds in 1974 and 84.2 million pounds in 1975.		
EVALUATION				
Domain		Metric	Rating	Comments
Domain 1: Reliability	Metric 1:	Methodology	Medium	Report uses high quality data that are not from frequently-used sources and there are no known quality issues.
Domain 2: Representativeness	Metric 2:	Geographic Scope	High	Data are from the U.S.
	Metric 3:	Applicability	High	Data are for manufacture, an in-scope occupational scenario.
	Metric 4:	Temporal Representativeness	Low	Report is based on data greater than 20 years old and industry conditions that are expected to be outdated.
	Metric 5:	Sample Size	Low	Sample distribution is characterized by no statistics.
Domain 3: Accessibility/ Clarity	Metric 6:	Metadata Completeness	Medium	Methods, results, and assumptions are clearly documented, but underlying data sources are not fully transparent.
Domain 4: Variability and Uncertainty	Metric 7:	Metadata Completeness	Medium	Variability addressed by data being given from multiple years but uncertainty is not addressed.
Overall Quality Determination			Medium	

Study Citation:	Grzywa, Z., Rudzki, E. (1981). Dermatitis from dichloropropane. Contact Dermatitis 7(3):151-152.			
HERO ID:	684250			
Conditions of Use:	Processing aids, not otherwise listed			
EXTRACTION				
Parameter	Data			
Chemical concentration:	Silform AR-1 (7.4% DCP), AR-2 (11% DCP) and AR-3 (12.7% DCP), 100% DCP for testing.			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Reliability	Metric 1:	Methodology	Medium	Report uses high quality data that are not from frequently-used sources and there are no known quality issues.
Domain 2: Representativeness	Metric 2:	Geographic Scope	Medium	Data are from Poland, an OECD country.
	Metric 3:	Applicability	Medium	Data are for manual spraying of mold release, which is potentially relevant to the in-scope occupational scenario industrial processing aid.
	Metric 4:	Temporal Representativeness	Low	Report is based on data greater than 20 years old and industry conditions that are expected to be outdated.
	Metric 5:	Sample Size	N/A	N/A - no sample data provided
Domain 3: Accessibility/ Clarity	Metric 6:	Metadata Completeness	Medium	Assessment or report clearly documents results, methods, and assumptions. Data sources are generally described but not fully transparent.
Domain 4: Variability and Uncertainty	Metric 7:	Metadata Completeness	N/A	No scope to address variability and uncertainty.
Overall Quality Determination			Medium	

Study Citation:	IARC, (1986). 1,2-Dichloropropane. IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Humans, vol. 41 41(1986):131-147.			
HERO ID:	2797906			
Conditions of Use:	Manufacturing			
EXTRACTION				
Parameter	Data			
Production, import, or use volume:	U.S. Production in 1984 = 27.2 million kg (p. 5)			
Process description:	1 ,2-Dichloropropane, marketed as a solvent, is obtained as a byproduct of the synthesis of propylene oxide (see IARC, 1985) by the chlorohydrin reaction (Mannsville Chemical Products Corp., 1984). 1,2-Dichloropropane may also be produced by the reaction of propylene and chlorine in the presence of an iron oxide catalyst at moderate temperature (45°C) and pressure (25-30 psi; 1.75-2.1 atm). The pesticide products that contain 1,2- dichloropropane (see monograph on 1,3-dichloropropene, p. 113) are distillates from the chlorination of propylene (Sittig, 1980). (p. 4-5)			
Number of sites:	Currently, there is only one US producer of 1,2-dichloropropane. (p. 5)			
Chemical concentration:	Commercial 1,2-dichloropropane is marketed as a high-purity liquid (99-99.5%) for industrial use. Water and oxygenated organic impurities comprise a maximum of 0.05% and 0.1 % of the product, respectively (Bayer AG, 1977; Dow Chemical Co., 1985)... Fumigant products based on 1,3-dichloropropene also contain varying amounts of 1,2-dichloropropane. One such product (D-D) contains approximately 30% 1,2-dichloropropane, while another (Telone II) contains approximately 2% (Yang, 1986). (p. 4)			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Reliability	Metric 1: Methodology	High	Report uses high quality data from frequently-used sources (IARC).	
Domain 2: Representativeness	Metric 2: Geographic Scope	High	Data are from the U.S.	
	Metric 3: Applicability	High	Data are for manufacturing, an in-scope occupational scenario.	
	Metric 4: Temporal Representativeness	Low	Report is based on data greater than 20 years old and industry conditions that are expected to be outdated.	
	Metric 5: Sample Size	N/A	No sample data.	
Domain 3: Accessibility/ Clarity	Metric 6: Metadata Completeness	Medium	Methods, results, and assumptions are clearly documented, but underlying data sources are not fully transparent (only know Farm Chemicals Handbook).	
Domain 4: Variability and Uncertainty	Metric 7: Metadata Completeness	N/A	No scope to address variability and uncertainty.	
Overall Quality Determination		High		

Study Citation:	IARC, (2017). Some chemicals used as solvents and in polymer manufacture.			
HERO ID:	5160036			
Conditions of Use:	Manufacture			
EXTRACTION				
Parameter	Data			
Production, import, or use volume:	Production of 1,2-dichloropropane in the USA decreased in the early 1980s since it was no longer used in paint strippers, furniture finishes, or as an insecticide (IARC, 1986; ATSDR, 1989; ACGIH, 2006). (p. 149) 1,2-Dichloropropane is used primarily as a chemical intermediate in the production of other organic chemicals such as propylene, carbon tetrachloride, and tetrachloroethylene. It has been reported that co-product and raw material uses account for > 99.5% of the total production of 1,2-dichloropropane in the USA and Europe (OECD/SIDS, 2003). (p. 149)2003, the estimated regionalproduction percentages of 1,2-dichloropropane were 64–69%			
Process description:	1,2-Dichloropropane, marketed as a solvent, is obtained as a by-product of the synthesis of propylene oxide by the chlorohydrin reaction (Mannsville Chemical Products Corp., 1984). (p. 148)			
Chemical concentration:	Commercial 1,2-dichloropropane is marketed as a high-purity liquid (purity, 99–99.5%) for industrial use. (p. 148)			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Reliability	Metric 1: Methodology	High	Report uses high quality data from frequently-used sources (IARC).	
Domain 2: Representativeness	Metric 2: Geographic Scope	High	Data are from the U.S.	
	Metric 3: Applicability	High	Data are for manufacturing, an in-scope occupational scenario.	
	Metric 4: Temporal Representativeness	Low	Report is based on data greater than 20 years old and industry conditions that are expected to be outdated.	
	Metric 5: Sample Size	N/A	no sample data	
Domain 3: Accessibility/ Clarity	Metric 6: Metadata Completeness	Medium	Methods, results, and assumptions are clearly documented, but underlying data sources are not fully transparent.	
Domain 4: Variability and Uncertainty	Metric 7: Metadata Completeness	Low	Variability and uncertainty are not addressed.	
Overall Quality Determination		Medium		

Study Citation:	Kleijn, R., Voet, V.D., E., Haes, U.d., H. A. (1994). Controlling substance flows: The case of chlorine. Environmental Management 18(4):523-542.			
HERO ID:	1718788			
Conditions of Use:	Domestic Manufacture			
EXTRACTION				
Parameter	Data			
Production, import, or use volume:	<10,000 (tonnes) (Pg. 12)			
Comments:	Production in the Netherlands in 1988.			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Reliability				
Metric 1:	Methodology	High	Report uses high quality data from frequently-used sources.	
Domain 2: Representativeness				
Metric 2:	Geographic Scope	Medium	Data are from the Netherlands, an OECD country.	
Metric 3:	Applicability	High	Data are for manufacture, an in-scope occupational scenario.	
Metric 4:	Temporal Representativeness	Low	Report is based on data greater than 20 years old and industry conditions that are expected to be outdated.	
Metric 5:	Sample Size	Low	Sample distribution is characterized by no statistics.	
Domain 3: Accessibility/ Clarity				
Metric 6:	Metadata Completeness	Low	Assessment results are provided but underlying methods, assumptions, and data sources are not fully transparent.	
Domain 4: Variability and Uncertainty				
Metric 7:	Metadata Completeness	Low	Variability and uncertainty are not addressed.	
Overall Quality Determination		Medium		

Study Citation:	Li, R., Xu, A., Zhao, Y., Chang, H., Li, X., Lin, G. (2022). Genetic algorithm (GA) - Artificial neural network (ANN) modeling for the emission rates of toxic volatile organic compounds (VOCs) emitted from landfill working surface. Journal of Environmental Management 305:114433.			
HERO ID:	10164739			
Conditions of Use:	Waste Handling, Treatment, and Disposal (Landfills)			
EXTRACTION				
Parameter	Data			
Throughput:	The design capacity of the landfill was 1400 t/d with a service life of 25 years.			
EVALUATION				
Domain	Metric		Rating	Comments
Domain 1: Reliability	Metric 1:	Methodology	High	Methodology is known and expected to be accurate and cover all release sources at the site.
Domain 2: Representativeness	Metric 2:	Geographic Scope	Low	Data are from China, a non-OECD country.
	Metric 3:	Applicability	High	Data are for waste handling (landfills), an in-scope occupational scenario.
	Metric 4:	Temporal Representativeness	High	Data are no more than 10 years old.
	Metric 5:	Sample Size	Medium	Sample distribution characterized by limited statistics (average, standard deviation) but discrete samples not provided and distribution not fully characterized.
Domain 3: Accessibility/ Clarity	Metric 6:	Metadata Completeness	High	All metadata provided.
Domain 4: Variability and Uncertainty	Metric 7:	Metadata Completeness	Medium	Variability addressed by continuous sampling over a nine-month period. but uncertainty is not addressed.
Overall Quality Determination			High	

Study Citation:	OECD, (2006). SIDS Initial Assessment Report: 1,2-Dichloropropane. :219.		
HERO ID:	5160041		
Conditions of Use:	Manufacture		
EXTRACTION			
Parameter	Data		
Production, import, or use volume:	PDC is used primarily as a site-limited or limited-transported co-product/raw material for the manufacture of many chlorinated compounds. Estimated annual global production of PDC in 2001 was about 350 kilotonnes (about 770 million pounds) (p. 4). 64-67 % produced in North America (p. 7) Table of PDC uses based on Swiss Product Register (p. 8) Based on one producer’s information, the co-product/raw material uses account for over 99.5% of total PDC production in the USA and Europe, thus the remaining uses account for less than 0.5% of PDC production in those regions. (p. 8)		
Process description:	Most of the industrial uses for PDC are site-limited, involving transfer via pipelines to either storage tanks or other production facilities on-site. There is some transport via both rail and ship to facilities located elsewhere (p. 7)		
Number of sites:	Major producers: - Asahi Glass, Ltd. - BP Koeln GmbH - The Dow Chemical Company - Solvay - Syndial SpA (formerly Enichem, SpA)* *This former producer no longer produces or uses 1,2-dichloropropane. (p. 7)		
Chemical concentration:	1,2-Dichloropropane is produced at a purity of 99%, with the following identified impurities (ppm): H2O (200 ppm); acidity (50 ppm); iron (15 ppm); oxygenated organic compounds (1200 ppm). Swiss product database identified industrial product at <50% and <10%.(p. 31)		
EVALUATION			
Domain	Metric	Rating	Comments
Domain 1: Reliability	Metric 1: Methodology	High	Report uses high quality data from frequently-used sources (OECD SIDS).
Domain 2: Representativeness	Metric 2: Geographic Scope	Medium	Data are consolidated for North America/North America and Europe, consisting of OECD countries.
	Metric 3: Applicability	High	Data are for manufacturing, an in-scope occupational scenario.
	Metric 4: Temporal Representativeness	Medium	Report is based on data greater than 10 years old but no more than 20 years old and industry conditions that are expected to be representative of current industry conditions.
	Metric 5: Sample Size	N/A	no sample data
Domain 3: Accessibility/ Clarity	Metric 6: Metadata Completeness	Medium	Methods, results, and assumptions are clearly documented, but underlying data sources are not fully transparent.
Domain 4: Variability and Uncertainty	Metric 7: Metadata Completeness	Low	Variability and uncertainty are not addressed.
Overall Quality Determination		Medium	

Study Citation:	Restek Corp, (2026). Safety Data Sheet (SDS): 1,2-Dichloropropane standard.			
HERO ID:	13283273			
Conditions of Use:	Laboratory Chemicals			
EXTRACTION				
Parameter	Data			
Chemical concentration:	0.2%			
EVALUATION				
Domain	Metric		Rating	Comments
Domain 1: Reliability	Metric 1:	Methodology	High	SDS information is primary data from the supplier. SDS does not appear to have quality issues.
Domain 2: Representativeness	Metric 2:	Geographic Scope	High	Product is from a US supplier.
	Metric 3:	Applicability	High	SDS is applicable to an occupational scenario within the scope of the risk evaluation (Laboratory chemicals).
	Metric 4:	Temporal Representativeness	High	Source is from 2026, which is less than 10 years old.
	Metric 5:	Sample Size	Low	Single value - no distribution/statistics.
Domain 3: Accessibility/ Clarity	Metric 6:	Metadata Completeness	Low	Source just provides concentration and does not document how this value was obtained.
Domain 4: Variability and Uncertainty	Metric 7:	Metadata Completeness	Low	Does not address variability or uncertainty.
Overall Quality Determination			Medium	

Study Citation:	RIVM, (2007). Ecotoxicologically based environmental risk limits for several volatile aliphatic hydrocarbons. :217.			
HERO ID:	5159900			
Conditions of Use:	Manufacture			
EXTRACTION				
Parameter	Data			
Production, import, or use volume:	1974: 66*10^6 (kg); 1976: 32.2*10^6 (kg); 1980: 35*10^6 (kg); 1984: 27.1*10^6 (kg) (1984) (Pg. 52)			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Reliability	Metric 1: Methodology	High	Report uses high quality data from frequently-used sources.	
Domain 2: Representativeness	Metric 2: Geographic Scope	High	Data are from the U.S.	
	Metric 3: Applicability	High	Data are for manufacture, an in-scope occupational scenario.	
	Metric 4: Temporal Representativeness	Low	Report is based on data greater than 20 years old and industry conditions that are expected to be outdated.	
	Metric 5: Sample Size	Low	Sample distribution is described qualitatively.	
Domain 3: Accessibility/ Clarity	Metric 6: Metadata Completeness	Medium	Methods, results, and assumptions are clearly documented, but underlying data sources are not fully transparent.	
Domain 4: Variability and Uncertainty	Metric 7: Metadata Completeness	Medium	Variability addressed by giving data from multiple years but uncertainty is not addressed.	
Overall Quality Determination		Medium		

Study Citation:	Scientific,, Fisher (2026). EPA Method 524.2 Volatile Calibration Standard (No Gasses), SPEX CertiPrep.			
HERO ID:	13283274			
Conditions of Use:	Use of Laboratory Chemicals			
EXTRACTION				
Parameter	Data			
Chemical concentration:	200 ug/mL or 0.02%			
EVALUATION				
Domain	Metric		Rating	Comments
Domain 1: Reliability	Metric 1:	Methodology	High	SDS information is primary data from the supplier. SDS does not appear to have quality issues.
Domain 2: Representativeness	Metric 2:	Geographic Scope	High	Product is from a US supplier.
	Metric 3:	Applicability	High	SDS is applicable to an occupational scenario within the scope of the risk evaluation.
	Metric 4:	Temporal Representativeness	High	Source is from 2026, which is less than 10 years old.
	Metric 5:	Sample Size	Low	Single value - no distribution/statistics.
Domain 3: Accessibility/ Clarity	Metric 6:	Metadata Completeness	Low	Source just provides concentration and does not document how this value was obtained.
Domain 4: Variability and Uncertainty	Metric 7:	Metadata Completeness	Low	Does not address variability or uncertainty.
Overall Quality Determination			Medium	

Study Citation:	Sigma-Aldrich, (2026). Safety Data Sheet (SDS): 1,2-Dichloropropane.			
HERO ID:	13283271			
Conditions of Use:	Use of Laboratory Chemicals			
EXTRACTION				
Parameter	Data			
Chemical concentration:	>=80%-<=100%			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Reliability	Metric 1: Methodology	High	SDS information is primary data from the supplier. SDS does not appear to have quality issues.	
Domain 2: Representativeness	Metric 2: Geographic Scope	High	Product is from a US supplier.	
	Metric 3: Applicability	High	SDS is applicable to an occupational scenario within the scope of the risk evaluation.	
	Metric 4: Temporal Representativeness	High	Source is from 2025, which is less than 10 years old.	
	Metric 5: Sample Size	Medium	Characterized by a range with uncertain statistics.	
Domain 3: Accessibility/ Clarity	Metric 6: Metadata Completeness	Low	Source just provides concentration and does not document how this value was obtained.	
Domain 4: Variability and Uncertainty	Metric 7: Metadata Completeness	Medium	Variability addressed by providing a range of potential concentrations. Uncertainty not addressed.	
Overall Quality Determination		High		

Study Citation:	Stangroom, S. J., Collins, C. D., Lester, J. N. (1998). Sources of organic micropollutants to lowland rivers. Environmental Technology 19(7):643-666.			
HERO ID:	659430			
Conditions of Use:	Manufacture			
EXTRACTION				
Parameter	Data			
Production, import, or use volume:	38,200 (tons)			
EVALUATION				
Domain	Metric		Rating	Comments
Domain 1: Reliability	Metric 1:	Methodology	Medium	Report uses high quality data that are not from frequently-used sources and there are no known quality issues.
Domain 2: Representativeness	Metric 2:	Geographic Scope	High	Data from US 1975
	Metric 3:	Applicability	High	Data are for manufacture, an in-scope occupational scenario.
	Metric 4:	Temporal Representativeness	Low	Report is based on data greater than 20 years old and industry conditions that are expected to be outdated.
	Metric 5:	Sample Size	Medium	Sample distribution characterized by limited statistics (mean) but discrete samples not provided and distribution not fully characterized.
Domain 3: Accessibility/ Clarity	Metric 6:	Metadata Completeness	Low	Assessment results are provided but underlying methods, assumptions, and data sources are not fully transparent.
Domain 4: Variability and Uncertainty	Metric 7:	Metadata Completeness	Low	Variability and uncertainty are not addressed.
Overall Quality Determination			Medium	

Study Citation:	Supelco, (2026). Safety Data Sheet (SDS): EPA 8260 volatiles calibration mix.			
HERO ID:	13283272			
Conditions of Use:	Laboratory Chemicals			
EXTRACTION				
Parameter	Data			
Chemical concentration:	>= 0.1 to <= 1 %			
EVALUATION				
Domain	Metric		Rating	Comments
Domain 1: Reliability	Metric 1:	Methodology	High	SDS information is primary data from the supplier. SDS does not appear to have quality issues.
Domain 2: Representativeness	Metric 2:	Geographic Scope	High	Product is from a US supplier.
	Metric 3:	Applicability	High	SDS is applicable to an occupational scenario within the scope of the risk evaluation (laboratory chemicals).
	Metric 4:	Temporal Representativeness	High	Source is from 2026, which is less than 10 years old.
	Metric 5:	Sample Size	Medium	Characterized by a range with uncertain statistics.
Domain 3: Accessibility/ Clarity	Metric 6:	Metadata Completeness	Low	Source just provides concentration and does not document how this value was obtained.
Domain 4: Variability and Uncertainty	Metric 7:	Metadata Completeness	Medium	Variability addressed by providing a range of potential concentrations. Uncertainty not addressed.
Overall Quality Determination			High	

Study Citation:	U.S. BLS, (2023). U.S. Census Bureau of Labor Statistics Data from 2021.			
HERO ID:	11138808			
Conditions of Use:	All			
EXTRACTION				
Parameter	Data			
Number of sites:	Used to develop a method to estimate number of sites and workers.			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Reliability	Metric 1: Methodology	High	BLS is expected to use reliable survey methods.	
Domain 2: Representativeness	Metric 2: Geographic Scope	High	U.S. based economic data.	
	Metric 3: Applicability	High	Data applies to relevant COUs.	
	Metric 4: Temporal Representativeness	High	The BLS OES data are from 2021.	
	Metric 5: Sample Size	High	The BLS OES program provides detailed statistics and estimated relative standard error for each state, industry, and occupation survey conducted (https://www.bls.gov/oes/current/oes_research_estimates.htm).	
Domain 3: Accessibility/ Clarity	Metric 6: Metadata Completeness	Medium	BLS documents results and methods, but underlying survey results not accessible.	
Domain 4: Variability and Uncertainty	Metric 7: Metadata Completeness	Medium	Limited discussion of variability and uncertainty in results.	
Overall Quality Determination		High		

Study Citation:	U.S. EPA, (2020). 2020 CDR: Commercial and consumer use.			
HERO ID:	10366189			
Conditions of Use:	Manufacture and Import			
EXTRACTION				
Parameter	Data			
Production, import, or use volume:	Provides U.S. domestic manufactured and imported PV and %PV to downstream uses.			
Number of sites:	Provides number of manufacturing and import sites.			
Chemical concentration:	Provides concentration.			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Reliability	Metric 1: Methodology	High	EPA is a trusted source.	
Domain 2: Representativeness	Metric 2: Geographic Scope	High	CDR is U.S. based data.	
	Metric 3: Applicability	High	CDR covers chemical manufacturers and importers, which are in scope for all chemicals.	
	Metric 4: Temporal Representativeness	High	EPA used data from the 2020 CDR.	
	Metric 5: Sample Size	Medium	Due to reporting threshold, statistical representativeness is unclear.	
Domain 3: Accessibility/ Clarity	Metric 6: Metadata Completeness	Medium	Submissions do not include method of how production volumes were determined. CDR industry sector codes, industrial processing and use codes, industrial function codes, and commercial product codes provide good metadata; but lack of clarifying information and narratives and occasional misreportings limit clarity of data.	
Domain 4: Variability and Uncertainty	Metric 7: Metadata Completeness	Low	CDR data do not address variability or uncertainty in submitter provided data.	
Overall Quality Determination		High		

Study Citation:	U.S. EPA, (2026). Chemical Data Reporting (CDR): Reporting year 2024.			
HERO ID:	13246149			
Conditions of Use:	Manufacturing as a primary product, Manufacturing as a byproduct, Import-Repackaging, and Processing as a reactant			
EXTRACTION				
Parameter	Data			
Production, import, or use volume:	Provides PV for multiple OES.			
Life cycle description:	Provides %PV to downstream OES uses.			
Number of sites:	Provides number of sites for multiple OES.			
Chemical concentration:	Provides concentration for multiple OES.			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Reliability	Metric 1: Methodology	High	EPA is a trusted source.	
Domain 2: Representativeness	Metric 2: Geographic Scope	High	CDR is U.S. based data.	
	Metric 3: Applicability	High	CDR covers multiple OES, which are in scope for the chemical.	
	Metric 4: Temporal Representativeness	High	EPA used data from the 2024 CDR.	
	Metric 5: Sample Size	Medium	Due to reporting threshold, statistical representativeness is unclear.	
Domain 3: Accessibility/ Clarity	Metric 6: Metadata Completeness	Medium	Submissions do not include method of how production volumes were determined. CDR industry sector codes, industrial processing and use codes, industrial function codes, and commercial product codes provide good metadata; but lack of clarifying information and narratives and occasional misreportings limit clarity of data.	
Domain 4: Variability and Uncertainty	Metric 7: Metadata Completeness	Low	CDR data do not address variability or uncertainty in submitter provided data.	
Overall Quality Determination		High		

General Engineering Assessment

1,2-Dichloropropane

HERO ID: 13283263 Table: 1 of 1

Study Citation:	U.S. EPA, (2024). Toxics Release Inventory (TRI): 1,2-Dichloropropane, reporting years 2019-2023.				
HERO ID:	13283263				
Conditions of Use:	All				
EXTRACTION					
Parameter	Data				
Number of sites: Used to estimate the number of release sites for each mapped COU.					
EVALUATION					
Domain	Metric		Rating		Comments
Domain 1: Reliability	Metric 1:	Methodology	High	EPA is a trusted source.	
Domain 2: Representativeness	Metric 2:	Geographic Scope	High	TRI is U.S. based data	
	Metric 3:	Applicability	High	TRI includes industries included in the scopes of multiple chemicals	
	Metric 4:	Temporal Representativeness	High	TRI data are from 2019-2023	
	Metric 5:	Sample Size	Medium	Due to reporting requirements, statistical representativeness is unclear.	
Domain 3: Accessibility/ Clarity	Metric 6:	Metadata Completeness	Low	TRI sites are on a reporting-basis, so number of sites is not fully transparent	
Domain 4: Variability and Uncertainty	Metric 7:	Metadata Completeness	Low	TRI does not address variability or uncertainty in submitter provided data.	
Overall Quality Determination			High		

Study Citation:	U.S. EPA, (2020). National Emissions Inventory (NEI): 1,2-Dichloropropane, reporting years 2017 and 2020.					
HERO ID:	13283264					
Conditions of Use:	All					
Parameter		Data			EXTRACTION	
Number of sites:		Provides number of sites.				
Domain		Metric		EVALUATION		
Domain 1: Reliability				Rating	Comments	
	Metric 1:	Methodology		Medium	Submitters provide general method used to calculate emissions, but details not provided.	
Domain 2: Representativeness						
	Metric 2:	Geographic Scope		High	NEI is U.S. based data.	
	Metric 3:	Applicability		High	NEI includes industries included in the scopes of multiple chemicals.	
	Metric 4:	Temporal Representativeness		High	NEI data are from 2017 and 2020.	
	Metric 5:	Sample Size		Medium	Universe is limited to units subject to NESHAP with threshold potential to emit, although states may have different requirements; statistical representativeness is unclear.	
Domain 3: Accessibility/ Clarity						
	Metric 6:	Metadata Completeness		High	NEI includes release media and generally also includes daily and annual operating time, specific unit/process that is the source of release, and presence of engineering controls.	
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness		Low	NEI does not address variability or uncertainty in submitter provided data.	
Overall Quality Determination				High		

Study Citation:	U.S. EPA, (2025). EPA Building Assessment Survey and Evaluation (BASE) Study.			
HERO ID:	13283275			
Conditions of Use:	Use of Wax Stone Polishes			
EXTRACTION				
Parameter	Data			
Throughput:	Occupied floor area			
EVALUATION				
Domain	Metric		Rating	Comments
Domain 1: Reliability	Metric 1:	Methodology	High	Report uses high quality data from frequently-used sources.
Domain 2: Representativeness	Metric 2:	Geographic Scope	High	Data are from the U.S.
	Metric 3:	Applicability	High	Data are for use of wax stone polishes, an in-scope occupational scenario.
	Metric 4:	Temporal Representativeness	Medium	Report is based on data greater than 10 years old but no more than 20 years old and industry conditions that are expected to be representative of current industry conditions.
	Metric 5:	Sample Size	Low	Sample distribution is characterized by no statistics.
Domain 3: Accessibility/ Clarity	Metric 6:	Metadata Completeness	High	All data sources, methods, results, and assumptions are clearly documented.
Domain 4: Variability and Uncertainty	Metric 7:	Metadata Completeness	Medium	Variability addressed by indoor air quality data from 100 randomly selected public and commercial office buildings collected using a standardized protocol. Buildings were selected from 10 climatic regions in 37 cities and 25 states. Uncertainty is not addressed.
Overall Quality Determination			High	

Study Citation:	U.S. EPA, (1995). AP-42: Compilation of air pollutant emission factors. Volume I: Stationary point and area sources, fifth edition.			
HERO ID:	46492			
Conditions of Use:	Recycling			
EXTRACTION				
Parameter	Data			
Process description:	A general waste solvent reclamation scheme with emission points is given on PDF Pg. 583.			
EVALUATION				
Domain	Metric		Rating	Comments
Domain 1: Reliability	Metric 1:	Methodology	High	Report uses high quality data from frequently-used sources.
Domain 2: Representativeness	Metric 2:	Geographic Scope	High	Data are from the U.S.
	Metric 3:	Applicability	Medium	Data are for recycling, an in-scope occupational scenario; however, data are not specific to this chemical.
	Metric 4:	Temporal Representativeness	Low	Report is based on data greater than 20 years old and industry conditions that are expected to be outdated.
	Metric 5:	Sample Size	N/A	N/A - process description
Domain 3: Accessibility/ Clarity	Metric 6:	Metadata Completeness	Medium	Methods, results, and assumptions are clearly documented, but underlying data sources are not fully transparent.
Domain 4: Variability and Uncertainty	Metric 7:	Metadata Completeness	N/A	N/A - process description
Overall Quality Determination			Medium	

Study Citation:	U.S. EPA, (2021). National analysis TRI dataset (TRI): Data used for TSCA risk evaluations, reporting year 2019.			
HERO ID:	8347325			
Conditions of Use:	Disposal			
EXTRACTION				
Parameter	Data			
Number of sites:	22 sites reported to the 2020 TRI.			
EVALUATION				
Domain	Metric		Rating	Comments
Domain 1: Reliability	Metric 1:	Methodology	High	Report uses high quality data from frequently-used sources.
Domain 2: Representativeness	Metric 2:	Geographic Scope	High	Data are from the U.S.
	Metric 3:	Applicability	High	Data are for Disposal which is an in-scope occupational scenario.
	Metric 4:	Temporal Representativeness	High	Data are no more than 10 years old.
	Metric 5:	Sample Size	High	Statistical distribution of samples is fully characterized (discrete data provided).
Domain 3: Accessibility/ Clarity	Metric 6:	Metadata Completeness	Medium	Methods, results, and assumptions are clearly documented, but underlying data sources are not fully transparent.
Domain 4: Variability and Uncertainty	Metric 7:	Metadata Completeness	Low	Variability and uncertainty are not addressed.
Overall Quality Determination			High	