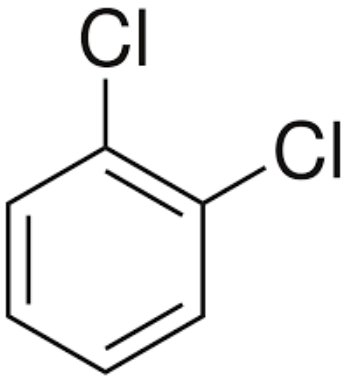
United States
Environmental Protection Agency

April 2026
Office of Chemical Safety and
Pollution Prevention

Draft Data Quality Evaluation Information for Dermal Absorption for *o*-Dichlorobenzene

Systematic Review Support Document for the Draft Risk Evaluation

CASRN 95-50-1



April 2026

This supplemental file contains information regarding the data evaluation results for data sources that met the PECO screening criteria for the *Draft Risk Evaluation for o-Dichlorobenzene (o-DCB)* and were used to characterize dermal absorption. EPA conducted data quality evaluations based on author-reported descriptions and results; additional analyses (*e.g.*, statistical analyses performed during data integration for the risk evaluation) potentially conducted by EPA are not contained in this supplemental file. Key parameters and corresponding data for each condition were extracted from the reference. EPA used the TSCA systematic review process described in the *Draft Systematic Review Protocol Supporting TSCA Risk Evaluations for Chemical Substances* (also referred to as the '2021 Draft Systematic Review Protocol'). Any updated steps in the systematic review process since the publication of the 2021 Draft Systematic Review Protocol will be described in the *Draft Systematic Review Protocol for o-Dichlorobenzene (o-DCB)*.

To evaluate dermal absorption references, EPA consulted several OECD documents when considering quality rankings for individual metrics. Each condition (*e.g.*, individual concentrations tested or different experimental designs) is evaluated independently within a given reference. Therefore each reference may have more than one overall quality determination (OQD) to more appropriately reflect the quality of each condition more appropriately. No OQD is determined for each reference as a whole, if it contains data from more than one condition. A single reference may evaluate only a limited number of conditions (*e.g.*, use of only the neat compound). If all other methods and results are adequate, the study may be considered acceptable for certain conditions of use. However, the study may still be limited for use in the risk evaluation because it may not address other uses (*e.g.*, lower concentrations, certain solvents/diluents).

Table of Contents

Study Citation: Riviere, J. E., Brooks, J. D., Qiao, G. L. (2000). Methods of assessing the percutaneous absorption of volatile chemicals in isolated perfused skin: Studies with chloropentafluorobenzene and dichlorobenzene. Toxicology Methods 10(4):265-281.
Chemical: o-Dichlorobenzene
Exposure Type: Parent compound
HERO ID: 5248663
Unique ID: Cradle chamber-neat

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test substance identity	Low	The test substance was identified as dichlorobenzene (DCB). CASRN was not reported and it is not clear which isomer was used. The neat DCB was identified as liquid, so either o- or m-DCB is the likely isomer used.
	Metric 2:	Test substance source	Low	The source of the test substance was not reported.
	Metric 3:	Test substance purity	Low	The purity of the test substance was not reported.
Domain 2: Test Design				
	Metric 4:	Reference compounds	Low	A reference compound was not included in the study.
	Metric 5:	Assay procedures	Medium	The assay procedure was partially described. A diagram of the cradle chamber was provided and explained. The perfusion flow rate (1 ml/min/flap; 3-7 mL/min/100 g tissue), pH (7.4), temperature (37oC) and relative humidity (60-80%) were reported. The perfusion medium was Krebs-Ringer bicarbonate buffer containing albumin and glucose. 20ul of neat test substance was added to the skin. Chamber was occluded to trap vapor. Samples of vapor were taken; care was taken to avoid vapor loss. Samples were analyzed using gas chromatography. Peaks were quantitated using the external standard area method and linear calibration curves for air, perfusate, and tissue samples. No details or data are provided on standards.
	Metric 6:	Standards for tests	Low	Isolated perfused porcine skin flaps were obtained from Yorkshire pigs using a routine two-stage surgical procedure described in sufficient detail in cited reference (Riviere et al. 1986). Integrity of the skin was not measured. 20 ul of neat DCB was added onto the skin. This would equate to a dose of 25,768 ug. The study reports total amount absorbed over 120 minutes as 616 +/- 31 ug. It is unclear if this is acceptable. OECD guidelines did not provide guidance for IPPSF in this system. Since integrity of the skin was not verified, and standard for absorption are not known with this system, the reliability of the data is not known and therefore the study is deemed low. This was not marked uninformative however because the methods appear appropriate for the system used. Additionally, a normalization procedure was performed to correct for any vapor-to-skin absorption.
Domain 3: Exposure Characterization				
	Metric 7:	Preparation and storage of test substance (chemical)	Low	Preparation and storage of test substance were not adequately reported. The test substance is volatile, and lack of adequate storage may affect results.
	Metric 8:	Consistency of exposure administration	Uninformative	The thickness of the skin was not reported. Area of exposed skin was not reported. The study also states “There was a great deal of variability in these studies, partially attributable to the difficulty of achieving a constant dosing. DCB beaded on the skin surface, making it impossible to achieve uniform dosing. Even with CPFB, the cylindrical geometry of the IPPSF promoted run-off on to dosing templates.”

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Chemical: o-Dichlorobenzene
Exposure Type: Parent compound
HERO ID: 5248663
Unique ID: Cradle chamber-neat

Domain	Metric		Rating	Comments
	Metric 9:	Reporting of concentrations	Low	20ul of neat solution was added to the skin, this would equate to a dose of 25,768 ug. However, the authors state it was difficult to achieve consistent dosing due to the cylindrical shape of the skin. Vapor concentrations were sampled, however study did not report these concentrations.
	Metric 10:	Exposure frequency	Low	The exposure duration was 120 minutes, which was less than standard. Even though the substance is volatile, the enclosed chamber may ensure continuous contact and a longer followup is needed to capture chemical still within the skin tissue.
	Metric 11:	Number of exposure groups and concentration spacing	Low	Only one dose was tested (neat).
Domain 4: Test Model				
	Metric 12:	Test model (skin)	Uninformative	The study reports a routine two-stage procedure was used to obtain IPPSF and cites Riviere et al. 1986. The cited study adequately describes the methods used to obtain the skin flap. However, the author of this study does not provide any details regarding tissue storage, viability, integrity, thickness, or age of animals used. The lack of details makes this study uninformative.
	Metric 13:	Number/Replicates per group	Medium	The number of replicates was appropriate (n=4).
Domain 5: Outcome Assessment				
	Metric 14:	Outcome assessment methodology	Medium	Not all details are provided regarding the outcome assessment methodology. The study measured amount of test substance in the perfusate over time using gas chromatography. Peaks were quantified using the external standard method and linear calibration curves. Volume of perfusate collected was not reported.
	Metric 15:	Consistency of outcome assessment	High	The outcome assessment was carried out consistently across study groups. Assessment of concentration in perfusate was analyzed consistently with gas chromatography.
	Metric 16:	Sampling adequacy and sensitivity	Medium	From presented figure of data, it can be deduced the time points when samples were read. However, because the methods do not specifically state when samples were read, it is not known if the study authors may have not reported some data points. The sampling size was adequate for measurements.
Domain 6: Confounding/Variable Control				
	Metric 17:	Confounding variables in test design and procedures	Low	Skin integrity was not reported. No details were provided regarding the age/number of animals used to obtain the skin.
	Metric 18:	Confounding variables in outcomes unrelated to exposure	Low	Solubility in perfusate was not demonstrated.
Domain 7: Data Presentation and Analysis				
	Metric 19:	Data analysis	Low	Statistical analysis was not performed. Data are not presented in a way in which independent statistics could be run. Percentage absorption could be calculated but was not adequately presented, and the only other results for DCB are the time-series graphs.

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Chemical: o-Dichlorobenzene
Exposure Type: Parent compound
HERO ID: 5248663
Unique ID: Cradle chamber-neat

Domain	Metric	Rating	Comments
	Metric 20: Data interpretation	Medium	Data were interpreted properly. Study looked at concentration in perfusate over time. It did not attempt to quantify percent absorbed, as this was not the purpose of the study.
	Metric 21: Reporting of data	Low	The study presented the amount of test substance in the perfusate over time and in the test chamber. The amount applied directly to the skin is not known (due to dosing concerns study author report), but percentage absorption could be calculated but was not adequately presented, and the only other results for DCB are the time-series graphs.

Overall Quality Determination Uninformative

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Chemical: o-Dichlorobenzene
Exposure Type: Parent compound
HERO ID: 5248663
Unique ID: Dosing dome- neat

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test substance identity	Low	The test substance was identified as dichlorobenzene (DCB). CASRN was not reported and it is not clear which isomer was used. The neat DCB was identified as liquid, so either o- or m-DCB is the likely isomer used.
	Metric 2:	Test substance source	Low	The source of the test substance was not reported.
	Metric 3:	Test substance purity	Low	The purity of the test substance was not reported.
Domain 2: Test Design				
	Metric 4:	Reference compounds	Low	A reference compound was not included in the study.
	Metric 5:	Assay procedures	Medium	The assay procedure was partially described. A diagram of the dosing dome was provided and explained. The perfusion flow rate (1 ml/min/flap; 3-7 mL/min/100 g tissue), pH (7.4), temperature (37oC) and relative humidity (60-80%) were reported. The perfusion medium was Krebs-Ringer bicarbonate buffer containing albumin and glucose. The use of the glass dome allows the skin flap to only come in contact with vapor generated. The test substance was placed into a porous ground-glass frit at the base of the central tube, and the glass stopper was replaced immediately. No details or data are provided on standards.
	Metric 6:	Standards for tests	Low	Isolated perfused porcine skin flaps were obtained from Yorkshire pigs using a routine two-stage surgical procedure described in sufficient detail in cited reference (Riviere et al. 1986). Integrity of the skin was not measured. OECD guidelines did not provide guidance for IPPSF in this system. Since integrity of the skin was not verified, and standard for absorption are not known with this system, the reliability of the data is low. This was not marked uninformative however because the methods appear appropriate for the system used.
Domain 3: Exposure Characterization				
	Metric 7:	Preparation and storage of test substance (chemical)	Low	Preparation and storage of test substance were not adequately reported. The test substance is volatile, and lack of adequate storage may affect results.
	Metric 8:	Consistency of exposure administration	Uninformative	The thickness of the skin was not reported. Area of exposed skin was not reported. Exposure was limited to vapor, therefore issues with run-off of test substance due to cylindrical geometry of IPPSF system.
	Metric 9:	Reporting of concentrations	Uninformative	The study added test substance into a domed chamber and allowed to volatilize. The concentration skin was exposed to was not reported.
	Metric 10:	Exposure frequency	High	The exposure duration was 120 minutes, which was less than standards but sufficient given the volatility of the test substance.
	Metric 11:	Number of exposure groups and concentration spacing	Low	Two volumes were tested (10ul and 20 ul). This is lower than the 3 recommended doses.
Domain 4: Test Model				

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Chemical: o-Dichlorobenzene
Exposure Type: Parent compound
HERO ID: 5248663
Unique ID: Dosing dome- neat

Domain	Metric		Rating	Comments
	Metric 12:	Test model (skin)	Uninformative	The study reports a routine two-stage procedure was used to obtain IPPSF and cites Riviere et al. 1986. The cited study adequately describes the methods used to obtain the skin flap. However, the author of this study does not provide any details regarding tissue storage, viability, integrity, thickness, or age of animals used. The lack of details makes this study uninformative.
	Metric 13:	Number/Replicates per group	Medium	The number of replicates was appropriate (n=4).
Domain 5: Outcome Assessment				
	Metric 14:	Outcome assessment methodology	Medium	Not all details are provided regarding the outcome assessment methodology. The study measured amount of test substance in the perfusate over time using gas chromatography. Peaks were quantified using the external standard method and linear calibration curves. Volume of perfusate collected was not reported.
	Metric 15:	Consistency of outcome assessment	High	The outcome assessment was carried out consistently across study groups. Assessment of concentration in perfusate was analyzed consistently with gas chromatography.
	Metric 16:	Sampling adequacy and sensitivity	Medium	From presented figure of data, it can be deduced the time points when samples were read. However, because the methods do not specifically state when samples were read, it is not known if the study authors may have not reported some data points. Sample size is adequate.
Domain 6: Confounding/Variable Control				
	Metric 17:	Confounding variables in test design and procedures	Low	Skin integrity was not reported. No details were provided regarding the age/number of animals used to obtain the skin.
	Metric 18:	Confounding variables in outcomes unrelated to exposure	Low	Solubility in perfusate was not demonstrated.
Domain 7: Data Presentation and Analysis				
	Metric 19:	Data analysis	Uninformative	Statistical analysis was not performed. Data are not presented in a way in which independent statistics could be run.
	Metric 20:	Data interpretation	Medium	Data were interpreted properly. Study looked at concentration in perfusate over time. It did not attempt to quantify percent absorbed, as this was not the purpose of the study.
	Metric 21:	Reporting of data	Uninformative	Study presented amount of test substance in the perfusate over time, but did not report the concentration in the test chamber or on the skin. No summary statistics of absorption were reported for DCB from the dosing dome.

Overall Quality Determination — Uninformative

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Chemical: o-Dichlorobenzene
Exposure Type: Parent compound
HERO ID: 5248663
Unique ID: Dosing dome- vehicle

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test substance identity	Low	The test substance was identified as dichlorobenzene (DCB). CASRN was not reported and it is not clear which isomer was used. The neat DCB was identified as liquid, so either o- or m-DCB is the likely isomer used.
	Metric 2:	Test substance source	Low	The source of the test substance was not reported.
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Domain 2: Test Design				
	Metric 4:	Reference compounds	Low	A reference compound was not included in the study.
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	Metric 6:	Standards for tests	Low	Isolated perfused porcine skin flaps were obtained from Yorkshire pigs using a routine two-stage surgical procedure described in sufficient detail in cited reference (Riviere et al. 1986). Integrity of the skin was not measured. OECD guidelines did not provide guidance for IPPSF in this system. Since integrity of the skin was not verified, and standard for absorption are not known with this system, the reliability of the data is low. This was not marked uninformative however because the methods appear appropriate for the system used.
Domain 3: Exposure Characterization				
	Metric 7:	Preparation and storage of test substance (chemical)	Low	Preparation and storage of test substance were not adequately reported. The test substance is volatile, and lack of adequate storage may affect results.
	Metric 8:	Consistency of exposure administration	Uninformative	The thickness of the skin was not reported. Area of exposed skin was not reported. Exposure was limited to vapor, therefore issues with run-off of test substance due to cylindrical geometry of IPPSF system.
	Metric 9:	Reporting of concentrations	Uninformative	The study added test substance into a domed chamber and allowed to volatilize. The concentration skin was exposed to was not reported.
	Metric 10:	Exposure frequency	High	The exposure duration was 120 minutes, which was less than standards but sufficient given the volatility of the test substance.
	Metric 11:	Number of exposure groups and concentration spacing	Low	Two volumes were tested (10ul and 20 ul). This is lower than the 3 recommended doses.
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	Metric 21:	Reporting of data	Uninformative	Study presented amount of test substance in the perfusate over time, but did not report the concentration in the test chamber or on the skin. No summary statistics of absorption were reported for DCB from the dosing dome.

Overall Quality Determination — Uninformative