

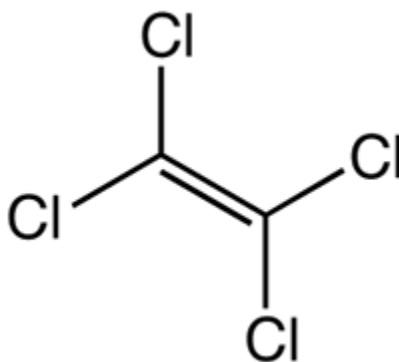


Final Risk Evaluation for Perchloroethylene

Systematic Review Supplemental File:

Data Quality Evaluation of Physical-Chemical Properties Studies

CASRN: 127-18-4



December 2020

EPA’s Office of Pollution Prevention and Toxics (OPPT) developed data quality criteria for physical and chemical property studies. The first version of the criteria was documented in the Application of Systematic Review in TSCA Risk Evaluations document (EPA Document #740-P1-8001). The initial criteria were updated after considering EPA/OPPT’s practical experience and comments from the public. This systematic review supplemental document describes the updated data quality criteria for physical and chemical studies that EPA/OPPT intends to apply for the TSCA risk evaluations. Refer to Appendix B of the [Application of Systematic Review in TSCA Risk Evaluations](#) document for details about the data quality evaluation tools.

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Table 1. Physical Form Study Summary for Perchloroethylene

Study Reference:	Lewis, R.J. Sr. (2007). Hawley's Condensed Chemical Dictionary 15th Edition. John Wiley & Sons, Inc. Hoboken, NJ. HERO ID: 3378175		
Note:	Lewis (2007) reported the physical form of perchloroethylene.		
Domain/Metric	Description/ Definition	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comment
Representativeness	The information or data reflects the data and chemical substance type.	High	The information was measured for the substance of interest.
Appropriateness	The information or data reflects anticipated results based on chemical structural features or behaviors.	High	The information agrees with various sources.
Evaluation/Review	The information or data reported has reliable review.	High	The information is from a recognized data collection.
Reliability/ Unbiased (Method Objectivity)	The method for producing the data/information is not biased towards a particular product or outcome.	Not rated	Data source does not provide information to determine the method objectivity (unbiased method). Thus, the domain/ metric was not rated
Reliability/Analytic Method	The information or data reported is from a reliable method.	Not rated	Rating of this factor is not applicable to this kind of information.
Overall Quality Level			High

Table 2. Melting Point Study Summary for Perchloroethylene

Study Reference:	Lide, DR. (2007). CRC handbook of chemistry and physics: A ready-reference book of chemical and physical data. In DR Lide (Ed.), (88th ed.). Boca Raton, FL: CRC Press. HERO ID: 3827361		
Note:	Lide (2007) reported multiple physical-chemical properties and only the confidence of the melting point is evaluated here.		
Domain/Metric	Description/ Definition	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comment
Representativeness	The information or data reflects the data and chemical substance type.	High	The data was measured for the substance of interest.
Appropriateness	The information or data reflects anticipated results based on chemical structural features or behaviors.	High	The measured value is consistent with the nature of the substance.
Evaluation/Review	The information or data reported has reliable review.	High	The information is from a recognized data collection where data are peer-reviewed by experts in the field and are broadly available to the public for review and use.
Reliability/Unbiased (Method Objectivity)	The method for producing the data/information is not biased towards a particular product or outcome.	Not rated	Data source does not provide information to determine the method objectivity (unbiased method). Thus, the domain/metric was not rated.
Reliability/Analytic Method	The information or data reported is from a reliable method.	Low	Data source does not provide information regarding the analytical method.
Overall Quality Level			High

Table 3. Boiling Point Study Summary for Perchloroethylene

Study Reference:	Lide, DR. (2007). CRC handbook of chemistry and physics: A ready-reference book of chemical and physical data. In DR Lide (Ed.), (88th ed.). Boca Raton, FL: CRC Press. HERO ID: 3827361		
Note:	Lide (2007) reported multiple physical-chemical properties and only the confidence of the boiling point is evaluated here.		
Domain/Metric	Description/ Definition	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comment
Representativeness	The information or data reflects the data and chemical substance type.	High	The data was measured for the substance of interest.
Appropriateness	The information or data reflects anticipated results based on chemical structural features or behaviors.	High	The measured value is consistent with the nature of the substance.
Evaluation/Review	The information or data reported has reliable review.	High	The information is from a recognized data collection where data are peer-reviewed by experts in the field and are broadly available to the public for review and use.
Reliability/Unbiased (Method Objectivity)	The method for producing the data/information is not biased towards a particular product or outcome.	Not rated	Data source does not provide information to determine the method objectivity (unbiased method). Thus, the domain/metric was not rated.
Reliability/Analytic Method	The information or data reported is from a reliable method.	Low	Data source does not provide information regarding the analytical method.
Overall Quality Level			High

Table 4. Density Study Summary for Perchloroethylene

Study Reference:	Lide, DR. (2007). CRC handbook of chemistry and physics: A ready-reference book of chemical and physical data. In DR Lide (Ed.), (88th ed.). Boca Raton, FL: CRC Press. HERO ID: 3827361		
Note:	Lide (2007) reported multiple physical-chemical properties and only the confidence of the density is evaluated here.		
Domain/Metric	Description/ Definition	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comment
Representativeness	The information or data reflects the data and chemical substance type.	High	The data was measured for the substance of interest.
Appropriateness	The information or data reflects anticipated results based on chemical structural features or behaviors.	High	The measured value is consistent with the nature of the substance.
Evaluation/Review	The information or data reported has reliable review.	High	The information is from a recognized data collection where data are peer-reviewed by experts in the field and are broadly available to the public for review and use.
Reliability/Unbiased (Method Objectivity)	The method for producing the data/information is not biased towards a particular product or outcome.	Not rated	Data source does not provide information to determine the method objectivity (unbiased method). Thus, the domain/metric was not rated.
Reliability/Analytic Method	The information or data reported is from a reliable method.	Low	Data source does not provide information regarding the analytical method.
Overall Quality Level			High

Table 5. Vapor Pressure Study Summary for Perchloroethylene

Study Reference:	Riddick, J.A., W.B. Bunger, Sakano T.K. (1985). Techniques of Chemistry 4th ed., Volume II. Organic Solvents. New York, NY: John Wiley and Sons. HERO ID: 3827366		
Note:	Riddick et al. (1985) reported the vapor pressure of perchloroethylene.		
Domain/Metric	Description/ Definition	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comment
Representativeness	The information or data reflects the data and chemical substance type.	High	The data was measured for the substance of interest.
Appropriateness	The information or data reflects anticipated results based on chemical structural features or behaviors.	High	The measured value is consistent with the nature of the substance.
Evaluation/Review	The information or data reported has reliable review.	High	The information is from a recognized data collection in which results have been selected by experts based on their quality and availability. References to the original sources are included.
Reliability/Unbiased (Method Objectivity)	The method for producing the data/information is not biased towards a particular product or outcome.	Not rated	Data source does not provide information to determine the method objectivity (unbiased method). Thus, the domain/metric was not rated.
Reliability/Analytic Method	The information or data reported is from a reliable method.	Low	Data source does not provide information regarding the analytical method.
Overall Quality Level			High

Table 6. Vapor Density Study Summary for Perchloroethylene

Study Reference:	Browning (1965). Toxicity and metabolism of industrial solvents. Amsterdam, The Netherlands: Elsevier Publishing Co. http://dx.doi.org/10.1002/9780470114735 . HERO ID: 29334		
Note:	Browning (1965) reported the vapor density of perchloroethylene.		
Domain/Metric	Description/ Definition	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comment
Representativeness	The information or data reflects the data and chemical substance type.	High	The data was measured for the substance of interest.
Appropriateness	The information or data reflects anticipated results based on chemical structural features or behaviors.	High	The measured value is consistent with the nature of the substance.
Evaluation/Review	The information or data reported has reliable review.	Medium	The value was reported in a known data collection that has been available to the public and was compiled using data from reliable sources. Original sources are not reported; therefore, this metric has been rated medium.
Reliability/Unbiased (Method Objectivity)	The method for producing the data/information is not biased towards a particular product or outcome.	Not rated	Data source does not provide information to determine the method objectivity (unbiased method). Thus, the domain/metric was not rated.
Reliability/Analytic Method	The information or data reported is from a reliable method.	Low	Data source does not provide information regarding the analytical method.
Overall Quality Level			Medium

Table 7. Water Solubility Study Summary for Perchloroethylene

Study Reference:	Horvath AL. (1982) Halogenated hydrocarbons: solubility-miscibility with water. New York, NY: Marcel Dekker, Inc. HERO ID: 194749		
Note:	Horvath (1982) reported the water solubility of perchloroethylene.		
Domain/Metric	Description/ Definition	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comment
Representativeness	The information or data reflects the data and chemical substance type.	High	The data was measured for the substance of interest.
Appropriateness	The information or data reflects anticipated results based on chemical structural features or behaviors.	High	The measured value is consistent with the nature of the substance.
Evaluation/Review	The information or data reported has reliable review.	High	The information is from a data collection where data are peer-reviewed by experts in the field and are broadly available to the public for review and use. Original sources are also referenced.
Reliability/Unbiased (Method Objectivity)	The method for producing the data/information is not biased towards a particular product or outcome.	High	Methodology for producing the information is designed to answer a specific question, and the methodology's objective is clear.
Reliability/Analytic Method	The information or data reported is from a reliable method.	High	Data are obtained by accepted standard analytic methods.
Overall Quality Level			High

Table 8. Octanol-water Partition Coefficient Study Summary for Perchloroethylene

Study Reference:	Hansch, C., Leo, A., D. Hoekman. (1995). Exploring QSAR - Hydrophobic, Electronic, and Steric Constants. Washington, DC: American Chemical Society. HERO ID: 51424		
Note:	Hansch et al. (1995) reported the octanol-water partition-coefficient of perchloroethylene.		
Domain/Metric	Description/ Definition	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comment
Representativeness	The information or data reflects the data and chemical substance type.	High	The data was measured for the substance of interest.
Appropriateness	The information or data reflects anticipated results based on chemical structural features or behaviors.	High	The measured value is consistent with the nature of the substance.
Evaluation/Review	The information or data reported has reliable review.	High	The information is from a recognized data collection that has been compiled by experts and includes references to the original sources. The original source for this value is a peer-reviewed journal.
Reliability/Unbiased (Method Objectivity)	The method for producing the data/information is not biased towards a particular product or outcome.	Not rated	Data source does not provide information to determine the method objectivity (unbiased method). Thus, the domain/metric was not rated.
Reliability/Analytic Method	The information or data reported is from a reliable method.	Low	Data source does not provide information regarding the analytical method.
Overall Quality Level			High

Table 9. Henry's Law Constant Study Summary for Perchloroethylene

Study Reference:	Gossett, J. M. (1987). Measurement of Henry's Law constants for C1 and C2 chlorinated hydrocarbons. Environmental Science and Technology 21(2): 202-208. HERO ID: 732584		
Note:	Gossett (1987) reported the Henry's Law constant for perchloroethylene.		
Domain/Metric	Description/ Definition	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comment
Representativeness	The information or data reflects the data and chemical substance type.	High	The data was measured for the substance of interest.
Appropriateness	The information or data reflects anticipated results based on chemical structural features or behaviors.	High	The measured value is consistent with the nature of the substance.
Evaluation/Review	The information or data reported has reliable review.	High	The information is from a data collection where data are peer-reviewed by experts in the field and are broadly available to the public for review and use. Original sources are also referenced.
Reliability/Unbiased (Method Objectivity)	The method for producing the data/information is not biased towards a particular product or outcome.	High	Methodology for producing the information is designed to answer a specific question, and the methodology's objective is clear.
Reliability/Analytic Method	The information or data reported is from a reliable method.	High	Data are obtained by accepted standard analytic methods.
Overall Quality Level			High

Table 10. Flash Point Study Summary for Perchloroethylene

Study Reference:	NFPA. (2010). Fire protection guide to hazardous materials (14th ed.). Quincy, MA. HERO ID: 2991057		
Note:	NFPA reported the flash point data for perchloroethylene. The confidence of the data has been evaluated using the 13th edition (2002; HERO ID 5882513) since the 14th edition was unavailable, and the data value was unchanged.		
Domain/Metric	Description/ Definition	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comment
Representativeness	The information or data reflects the data and chemical substance type.	High	The data was measured for the substance of interest.
Appropriateness	The information or data reflects anticipated results based on chemical structural features or behaviors.	High	The measured value is consistent with the nature of the substance.
Evaluation/Review	The information or data reported has reliable review.	Medium	The value was reported in a known data collection that has been available to the public and was compiled using data from reliable sources. Original sources are not reported (although they are available upon request) and peer-review has not been performed, therefore this metric has been rated medium.
Reliability/Unbiased (Method Objectivity)	The method for producing the data/information is not biased towards a particular product or outcome.	Not rated	Data source does not provide information to determine the method objectivity (unbiased method). Thus, the domain/metric was not rated.
Reliability/Analytic Method	The information or data reported is from a reliable method.	High	The value was obtained by an accepted analytical method.
Overall Quality Level			High

Table 11. Viscosity Study Summary for Perchloroethylene

Study Reference:	Hickman, JC. (2000). Tetrachloroethylene. In Kirk-Othmer Encyclopedia of Chemical Technology. New York, NY: John Wiley & Sons. http://dx.doi.org/10.1002/0471238961.2005201808090311.a01. HERO ID: 3827362		
Note:	Hickman (2000) reported the viscosity of perchloroethylene.		
Domain/Metric	Description/ Definition	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comment
Representativeness	The information or data reflects the data and chemical substance type.	High	The value was measured for the subject chemical substance.
Appropriateness	The information or data reflects anticipated results based on chemical structural features or behaviors.	High	The value was similar to measured values for chemicals of similar structure.
Evaluation/Review	The information or data reported has reliable review.	High	The value was from a peer-reviewed source.
Reliability/Unbiased (Method Objectivity)	The method for producing the data/information is not biased towards a particular product or outcome.	Not rated	Data source does not provide information to determine the method objectivity (unbiased method). Thus, the domain/metric was not rated.
Reliability/Analytic Method	The information or data reported is from a reliable method.	Low	Data source does not provide information regarding the analytical method.
Overall Quality Level			High

Table 12. Refractive Index Study Summary for Perchloroethylene

Study Reference:	Lide, DR. (2007). CRC handbook of chemistry and physics: A ready-reference book of chemical and physical data. In DR Lide (Ed.), (88th ed.). Boca Raton, FL: CRC Press. HERO ID: 3827361		
Note:	Lide (2007) reported multiple physical-chemical properties and only the confidence of the refractive index is evaluated here.		
Domain/Metric	Description/ Definition	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comment
Representativeness	The information or data reflects the data and chemical substance type.	High	The data was measured for the substance of interest.
Appropriateness	The information or data reflects anticipated results based on chemical structural features or behaviors.	High	The measured value is consistent with the nature of the substance.
Evaluation/Review	The information or data reported has reliable review.	High	The information is from a recognized data collection where data are peer-reviewed by experts in the field and are broadly available to the public for review and use.
Reliability/Unbiased (Method Objectivity)	The method for producing the data/information is not biased towards a particular product or outcome.	Not rated	Data source does not provide information to determine the method objectivity (unbiased method). Thus, the domain/metric was not rated.
Reliability/Analytic Method	The information or data reported is from a reliable method.	Low	Data source does not provide information regarding the analytical method.
Overall Quality Level			High

Table 13. Dielectric Constant Study Summary for Perchloroethylene

Study Reference:	Dean, JA. (1985). Lange's Handbook of Chemistry. McGraw-Hill Book Co. New York, NY. HERO ID: 46951		
Note:	Dean (1985) reported the dielectric constant of perchloroethylene.		
Domain/Metric	Description/ Definition	Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]	Comment
Representativeness	The information or data reflects the data and chemical substance type.	High	The data was measured for the substance of interest.
Appropriateness	The information or data reflects anticipated results based on chemical structural features or behaviors.	High	The measured value is consistent with the nature of the substance.
Evaluation/Review	The information or data reported has reliable review.	High	The information is from a recognized data collection where data are peer-reviewed by experts in the field and are broadly available to the public for review and use.
Reliability/Unbiased (Method Objectivity)	The method for producing the data/information is not biased towards a particular product or outcome.	Not rated	Data source does not provide information to determine the method objectivity (unbiased method). Thus, the domain/metric was not rated.
Reliability/Analytic Method	The information or data reported is from a reliable method.	Low	Data source does not provide information regarding the analytical method.
Overall Quality Level			High