United States
Environmental Protection Agency

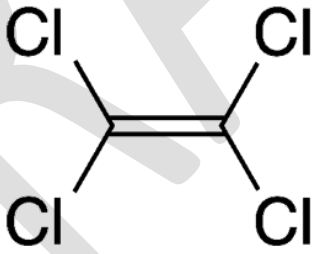
Office of Chemical Safety and
Pollution Prevention

Draft Risk Evaluation for Perchloroethylene

Systematic Review Supplemental File:

Data Quality Evaluation of Physical-Chemical Properties Studies

CASRN: 127-18-4



October 2019

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Table 1. Physical Form Study Summary for Perchloroethylene

Study Reference:	**Lewis, RJ. 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**