Final Risk Evaluation for Asbestos

Part 1: Chrysotile Asbestos

Systematic Review Supplemental File:

Data Quality Evaluation of Physical-Chemical Properties Studies

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Table 1. Essential Composition Study Summary for Asbestos

Study Reference:	Badollet, MS. (1951). Asbestos, a mineral of unparalleled properties. 54: 151-160.			
	HERO ID: <u>3827307</u>			
Note:	Badollet (1951) reported the es	Badollet (1951) reported the essential composition of six asbestos fiber types.		
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	Data are for the subject chemical substance.	
Appropriateness	The information or data reflects anticipated results based on chemical structural features or behaviors.	High	The information is consistent with the nature of the subject chemical substance.	
Evaluation/ Review	The information or data reported has reliable review.	Medium	The report is from an asbestos producer that compiled data through experimental investigation and literature searching; however, while peer-reviewed articles are cited in the references, it is not possible to know what data has been peer-reviewed and what has not.	
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	The analytical method is not known.	
	Overall Quality Level		Medium	

Table 2. Color Study Summary for Asbestos

	Summary for Asbestos	• 1 0	11 1 2 74	
Study Reference:	Badollet, MS. (1951). Asbestos, a mineral of unparalleled properties. 54: 151-160.			
	HERO ID: 3827307			
Note:		Badollet (1951) reported the color of six asbestos fiber types.		
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	Data are for the subject chemical substance.	
Appropriateness	The information or data reflects anticipated results based on chemical structural features or behaviors.	Not rated	This metric is not applicable to this type of information.	
Evaluation/ Review	The information or data reported has reliable review.	Medium	The report is from an asbestos producer that compiled data through experimental investigation and literature searching; however, while peerreviewed articles are cited in the references, it is not possible to know what data has been peer-reviewed and what has not.	
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	This metric is not applicable to this type of information.	
	Overall Quality Level		Medium	

Table 3. Luster Study Summary for Asbestos

Study Reference:	Badollet, MS. (1951). Asbestos, a mineral of unparalleled properties. 54: 151-160. HERO ID: 3827307		
Note:	Badollet (1951) reported the luster of six asbestos fiber types.		
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	Data are for the subject chemical substance.
Appropriateness	The information or data reflects anticipated results based on chemical structural features or behaviors.	Not rated	This metric is not applicable to this type of information.
Evaluation/ Review	The information or data reported has reliable review.	Medium	The report is from an asbestos producer that compiled data through experimental investigation and literature searching; however, while peerreviewed articles are cited in the references, it is not possible to know what data has been peer-reviewed and what has not.
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	This metric is not applicable to this type of information.
	Overall Quality Level		Medium

Table 4. Surface Area Study Summary for Asbestos

Study Reference:	Addison, WE; Neal, GH; White, AD. (1966). Amphiboles—Part IV— Surface properties of amosite and crocidolite. J Am Chem Soc. A: 79-81. HERO ID: 3827309		
Note:	Addison et al. (1966) reported the surface area of three asbestos fiber types (crocidolite; amosite; chrysotile).		
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	Data are measured for the subject chemical substance.
Appropriateness	The information or data reflects anticipated results based on chemical structural features or behaviors.	High	The information or data closely reflects anticipated results based on chemical structural features.
Evaluation/ Review	The information or data reported has reliable review.	Medium	The information or data is from a recognized data collection/repository where data are peer-reviewed by experts in the field, are broadly available to the public for review and use and include references to the original sources.
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. Surface area was measured by BET (Brunauer, Emmett, and Teller) nitrogen adsorption method.
	Overall Quality Level	-	High

Table 5. Hardness Study Summary for Asbestos

Study Reference:	Badollet, MS. (1951). Asbestos, a mineral of unparalleled properties. 54:			
•	151-160.			
	HERO ID: <u>3827307</u>			
Note:	Badollet (1951) reported the		sbestos fiber types.	
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	Data are measured for the subject chemical substance.	
Appropriateness	The information or data reflects anticipated results based on chemical structural features or behaviors.	Not rated	This metric is not applicable to this type of information.	
Evaluation/ Review	The information or data reported has reliable review.	Medium	The report is from an asbestos producer that compiled data through experimental investigation and literature searching; however, while peer-reviewed articles are cited in the references, it is not possible to know what data has been peer-reviewed and what has not.	
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	This metric is not applicable to this type of information.	
	Overall Quality Level Medium			

Table 6. Specific Gravity Study Summary for Asbestos

Study Reference:	Badollet, MS. (1951). Asbestos, a mineral of unparalleled properties. 54: 151-160.			
Note:	HERO ID: 3827307 Radollet (1951) reported the	Badollet (1951) reported the specific gravity of six asbestos fiber types.		
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	Data are measured for the subject chemical substance.	
Appropriateness	The information or data reflects anticipated results based on chemical structural features or behaviors.	High	The information is consistent with the nature of the subject chemical substance.	
Evaluation/ Review	The information or data reported has reliable review.	Medium	The report is from an asbestos producer that compiled data through experimental investigation and literature searching; however, while peer-reviewed articles are cited in the references, it is not possible to know what data has been peer-reviewed and what has not.	
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	The analytical method is not known.	
	Overall Quality Level		Medium	

Table 7. Optical Properties Study Summary for Asbestos

Study Reference:	Badollet, MS. (1951). Asbestos, a mineral of unparalleled properties. 54: 151-160. HERO ID: 3827307		
Note:	Badollet (1951) reported the	e optical properties	of six asbestos fiber types.
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	Data are measured for the subject chemical substance.
Appropriateness	The information or data reflects anticipated results based on chemical structural features or behaviors.	Not rated	This metric is not applicable to this type of information.
Evaluation/ Review	The information or data reported has reliable review.	Medium	The report is from an asbestos producer that compiled data through experimental investigation and literature searching; however, while peer-reviewed articles are cited in the references, it is not possible to know what data has been peer-reviewed and what has not.
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	The analytical method is not known.
Overall Quality Level Medium			

Table 8. Refractive Index Study Summary for Asbestos

Study Reference:	tudy Deferences Dedellet MS (1951) Ashestes a mineral of unparalleled properties 54.		
Study Kelerence:	Badollet, MS. (1951). Asbestos, a mineral of unparalleled properties. 54: 151-160.		
	HERO ID: 3827307		
Note:	Badollet (1951) reported the refractive index of six asbestos fiber types.		
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	Data are measured for the subject chemical substance.
Appropriateness	The information or data reflects anticipated results based on chemical structural features or behaviors.	Not rated	This metric is not applicable to this type of information.
Evaluation/ Review	The information or data reported has reliable review.	Medium	The report is from an asbestos producer that compiled data through experimental investigation and literature searching; however, while peerreviewed articles are cited in the references, it is not possible to know what data has been peerreviewed and what has not.
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	The analytical method is not known.
	Overall Quality Level		Medium

Table 9. Flexibility Study Summary for Asbestos

Study Reference:	Badollet, MS. (1951). Asbestos, a mineral of unparalleled properties. 54:		
	151-160. HERO ID: 3827307		
Note:	Badollet (1951) reported the flexibility of six asbestos fiber types.		
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	Data are measured for the subject chemical substance.
Appropriateness	The information or data reflects anticipated results based on chemical structural features or behaviors.	Not rated	This metric is not applicable to this type of information.
Evaluation/ Review	The information or data reported has reliable review.	Medium	The report is from an asbestos producer that compiled data through experimental investigation and literature searching; however, while peerreviewed articles are cited in the references, it is not possible to know what data has been peerreviewed and what has not.
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	This metric is not applicable to this type of information.
Overall Quality Level			Medium

Table 10. Texture Study Summary for Asbestos

Study Reference:	Badollet, MS. (1951). Asbestos, a mineral of unparalleled properties. 54:			
Study Reference.	151-160.			
	HERO ID: 3827307			
Note:	Badollet (1951) reported the	Badollet (1951) reported the texture of six asbestos fiber types.		
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	Data are for the subject chemical substance.	
Appropriateness	The information or data reflects anticipated results based on chemical structural features or behaviors.	Not rated	This metric is not applicable to this type of information.	
Evaluation/ Review	The information or data reported has reliable review.	Medium	The report is from an asbestos producer that compiled data through experimental investigation and literature searching; however, while peer-reviewed articles are cited in the references, it is not possible to know what data has been peer-reviewed and what has not.	
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	This metric is not applicable to this type of information.	
	Overall Quality Level Medium			

Table 11. Spinnability Study Summary for Asbestos

Study Reference:	Badollet, MS. (1951). Asbestos, a mineral of unparalleled properties. 54: 151-160. HERO ID: 3827307		
Note:	Badollet (1951) reported the	e spinnability of six	x asbestos fiber types.
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	Data are measured for the subject chemical substance.
Appropriateness	The information or data reflects anticipated results based on chemical structural features or behaviors.	Not rated	This metric is not applicable to this type of information.
Evaluation/ Review	The information or data reported has reliable review.	Medium	The report is from an asbestos producer that compiled data through experimental investigation and literature searching; however, while peer-reviewed articles are cited in the references, it is not possible to know what data has been peer-reviewed and what has not.
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	This metric is not applicable to this type of information.
	Overall Quality Level		Medium

Table 12. Tensile Strength Study Summary for Asbestos

Study Reference:	Badollet, MS. (1951). Asbestos, a mineral of unparalleled properties. 54: 151-160. HERO ID: 3827307		
Note:	Badollet (1951) reported the tensile strength of six asbestos fiber types.		
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	Data are measured for the subject chemical substance.
Appropriateness	The information or data reflects anticipated results based on chemical structural features or behaviors.	High	The information is consistent with the nature of the subject chemical substance.
Evaluation/ Review	The information or data reported has reliable review.	Medium	The report is from an asbestos producer that compiled data through experimental investigation and literature searching; however, while peer-reviewed articles are cited in the references, it is not possible to know what data has been peer-reviewed and what has not.
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	The analytical method is not known.
Overall Quality Level			Medium

Table 13. Fiber Size (median true diameter) Study Summary for Asbestos

Study Reference:	Hwang, CY. (1983). Size and shape of airborne asbestos fibres in mines and mills. Br J Ind Med. 40: 273-279. HERO ID: 3083760		
Note:	Hwang (1983) reported the fiber size median true diameter of three asbestos fiber types (Chrysotile, Amosite and Crocidolite).		
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 substances 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 data presented is referenced to a primary source, British Journal of Industrial Medicine, which is a peer reviewed publication of the British Medical Journal Publishing Group Ltd
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 measured data was specific to the endpoint reported.
Reliability/ Analytic Method	The information or data reported is from a reliable method.	High	Measured data were obtained using light optical microscopy and transmission electron microscopy, an acceptable analytical method appropriate for the endpoint.
	Overall Quality Level High		

Table 14. Fiber Size (median true length) Study Summary for Asbestos

Study Reference:	Hwang, CY. (1983). Size and shape of airborne asbestos fibres in mines and mills. Br J Ind Med. 40: 273-279. HERO ID: 3083760		
Note:	Hwang (1983) reported the fiber size median true length of three asbestos fiber types (Chrysotile, Amosite and Crocidolite).		
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 substances 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 data presented is referenced to a primary source, British Journal of Industrial Medicine, which is a peer reviewed publication of the British Medical Journal Publishing Group Ltd.
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 measured data was specific to the endpoint reported.
Reliability/ Analytic Method	The information or data reported is from a reliable method.	High	Measured data were obtained using light optical microscopy and transmission electron microscopy, an acceptable analytical method appropriate for the endpoint.
	Overall Quality Level		High

Table 15. Resistance to Acids or Bases Study Summary for Asbestos

Study Reference:	Badollet, MS. (1951). Asbestos, a mineral of unparalleled properties. 54: 151-160. HERO ID: 3827307		
Note:	Badollet (1951) reported resistance to acids and bases of six asbestos fiber types.		
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	Data are measured for the subject chemical substance.
Appropriateness	The information or data reflects anticipated results based on chemical structural features or behaviors.	High	The information is consistent with the nature of the subject chemical substance.
Evaluation/ Review	The information or data reported has reliable review.	Medium	The report is from an asbestos producer that compiled data through experimental investigation and literature searching; however, while peer-reviewed articles are cited in the references, it is not possible to know what data has been peer-reviewed and what has not.
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	The analytical method is not known.
Overall Quality Level			Medium

Table 16. Zeta Potential Study Summary for Asbestos

Starla Defension Winter D. (2011). Askertan Wink Otherson Francisco de la Chamital			
Study Reference:	Virta, R. (2011). Asbestos. Kirk-Othmer Encyclopedia of Chemical		
	Technology. [online]: John Wiley & Sons.		
	http://dx.doi.org/10.1002/0471238961.0119020510151209.a01.pub3		
DT /	HERO ID: 3827175		
Note:	Virta (2011) reported zeta potential of three asbestos fiber types (chrysotile,		
	amosite, crocidolite).		
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 is measured for the subject chemical substance.
Appropriateness	The information or data reflects anticipated results based on chemical structural features or behaviors.	Not rated	This metric is not applicable to this type of information.
Evaluation/ Review	The information or data reported has reliable review.	High	The data comes from a peer-reviewed article.
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	Details regarding the analytical method are not provided.
Overall Quality Level			High

Table 17. Decomposition Temperature Study Summary for Asbestos

Study Reference:	Virta, R. (2011). Asbestos. Kirk-Othmer Encyclopedia of Chemical		
	Technology. [online]: John Wiley & Sons.		
	http://dx.doi.org/10.1002/0471238961.0119020510151209.a01.pub3		
	HERO ID: <u>3827175</u>		
Note:	Virta (2011) reported decomposition temperatures of three asbestos fiber types		
	(chrysotile, amosite, crocidolite).		
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 is measured for the subject chemical substance.
Appropriateness	The information or data reflects anticipated results based on chemical structural features or behaviors.	High	The data is consistent with the nature of the chemical substance.
Evaluation/ Review	The information or data reported has reliable review.	High	The data comes from a peer-reviewed article.
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	Details regarding the analytical method are not provided.
Overall Quality Level			High