United States
Environmental Protection Agency

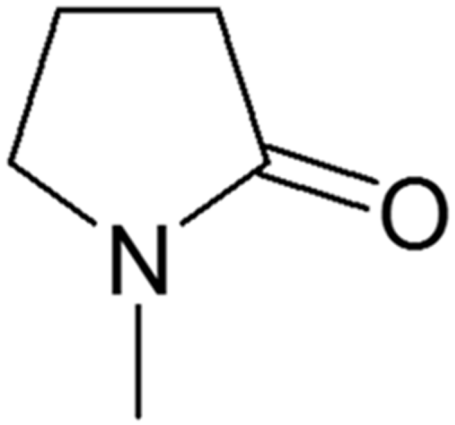
Office of Chemical Safety and
Pollution Prevention

Risk Evaluation for N-Methylpyrrolidone

Systematic Review Supplemental File:

Data Quality Evaluation of
Consumer and General Population Exposure Data Sources

CASRN: 872-50-4



October 2019

1 Monitoring

Study Citation:	Kiefer, M.. 1994.0. Health Hazard Evaluation Report No. HETA-93-0844-2411, Rosebud Company, Atlanta, Georgia.
Data Type	Monitoring
Hero ID	3836708

Domain	Metric		Rating[†]	Score	Comments
Domain 1: Reliability					
	Metric 1:	Sampling Methodology	Medium	2	provided amount of product applied, square footage of floor covered, percent ai in product, application description, nominal air flow rate, sampling duration, activity monitored. No discussion of storage conditions and duration.
	Metric 2:	Analytical Methodology	Low	3	OSHA Stop-gap method M139, no description of method provided. No discussion of laboratory controls, calibrations, operating conditions.
	Metric 3:	Biomarker Selection	N/A	N/A	No Comment.
Domain 2: Representativeness					
	Metric 4:	Geographic Area	High	1	No Comment.
	Metric 5:	Currency	Low	3	1993.0
	Metric 6:	Spatial and Temporal Variability	Low	3	Only 2 trials.
	Metric 7:	Exposure Scenario	Low	3	Use of paint stripper on floor. not sure if a consumer would use an electric buffer and sawdust?
Domain 3: Accessibility/Clarity					
	Metric 8:	Reporting of Results	Medium	2	no raw data reports.
	Metric 9:	Quality Assurance	Low	3	No discussion of breakthrough results for sampling train. Field blanks used. No results of recoveries, blanks, correction if needed, etc.
Domain 4: Variability and Uncertainty					
	Metric 10:	Variability and Uncertainty	Low	3	little discussion of uncertainty.
Overall Quality Determination[*]			Low	2.6	
Extracted			Yes		

[†] High = 3; Medium = 2; Low = 1; Unacceptable = 4; N/A has no value.
[*] If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High=$\geq$ 1 to $<$ 1.7; Medium =$\geq$ 1.7 to $<$ 2.4; Low =$\geq$ 2.4 to $<$ 3.

2 Experimental

Study Citation:	M. Nohr, W. Horn, O. Jann, M. Richter, W. Lorenz. 2015.0. Development of a multi-VOC reference material for quality assurance in materials emission testing. Analytical and Bioanalytical Chemistry.
Data Type	Experimental
Hero ID	2718034

Domain	Metric		Rating†	Score	Comments
Domain 1: Reliability					
	Metric 1:	Sampling Methodology and Conditions	Medium	2	Development of new method. micro chamber.
	Metric 2:	Analytical Methodology	Low	3	No LOQ provided in article. Method described elsewhere.
	Metric 3:	Biomarker Selection	N/A	N/A	No Comment.
Domain 2: Representative					
	Metric 4:	Testing Scenario	Medium	2	The emissions is from volatility in a petri dish. The product was not "applied".
	Metric 5:	Sample Size and Variability	Low	3	Three batches of same product.
	Metric 6:	Temporality	High	1	No Comment.
Domain 3: Accessibility/Clarity					
	Metric 7:	Reporting of Results	Medium	2	No raw data.
	Metric 8:	Quality Assurance	N/A	N/A	not discussed.
Domain 4: Variability and Uncertainty					
	Metric 9:	Variability and Uncertainty	High	1	RSD provided. discussed influence on humidity, chamber flow.
Overall Quality Determination*			Medium	2.0	
Extracted			Yes		

† High = 3; Medium = 2; Low = 1; Unacceptable = 4; N/A has no value.
* If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High=$\geq$ 1 to $<$ 1.7; Medium =$\geq$ 1.7 to $<$ 2.4; Low =$\geq$ 2.4 to $<$ 3.

Study Citation:	Wolkoff, P.. 1998.0. Impact of air velocity, temperature, humidity, and air on long-term VOC emissions from building products. Atmospheric Environment.
Data Type	Experimental
Hero ID	3005854

Domain	Metric		Rating†	Score	Comments
Domain 1: Reliability					
	Metric 1:	Sampling Methodology and Conditions	High	1	No Comment.
	Metric 2:	Analytical Methodology	High	1	No Comment.
	Metric 3:	Biomarker Selection	N/A	N/A	No Comment.
Domain 2: Representative					
	Metric 4:	Testing Scenario	Medium	2	indoor air study. but consumer products are not clarified.
	Metric 5:	Sample Size and Variability	Unacceptable	4	sample size is not reported.
	Metric 6:	Temporality	Low	3	>15 years old
Domain 3: Accessibility/Clarity					
	Metric 7:	Reporting of Results	Unacceptable	4	no results for NMP.
	Metric 8:	Quality Assurance	N/A	N/A	discussed spiked samples, but only limited QC is discussed.
Domain 4: Variability and Uncertainty					
	Metric 9:	Variability and Uncertainty	Medium	2	discussed influence of temperature and other parameters.
Overall Quality Determination*			Unacceptable	4.0	Metric mean score**: 2.4.
Extracted			No		

** Consistent with our *Application of Systematic Review in TSCARisk Evaluations* document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, two of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

† High = 3; Medium = 2; Low = 1; Unacceptable = 4; N/A has no value.

* If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High=$\geq$ 1 to $<$ 1.7; Medium =$\geq$ 1.7 to $<$ 2.4; Low =$\geq$ 2.4 to $<$ 3.

Study Citation:	Bader, M.,Keener, S. A.,Wrbitzky, R.. 2005.0. Dermal absorption and urinary elimination of N-methyl-2-pyrrolidone. International Archives of Occupational and Environmental Health.
Data Type	Experimental
Hero ID	3539719

Domain	Metric		Rating[†]	Score	Comments
Domain 1: Reliability					
	Metric 1:	Sampling Methodology and Conditions	Medium	2	no standard methodology mentioned, but detailed methodology provided.
	Metric 2:	Analytical Methodology	High	1	NMP in urine was analysed according to A ” kesson and Paulsson (1997a, b).. LOQ provided.
	Metric 3:	Biomarker Selection	N/A	N/A	The analyzed NMP in urine, but not for the purpose of exposure to a consumer product, but to look at dermal absorption,
Domain 2: Representative					
	Metric 4:	Testing Scenario	Medium	2	The pure chemical was tested, not a product.
	Metric 5:	Sample Size and Variability	Medium	2	7 volunteers.
	Metric 6:	Temporality	High	1	2005 study, but since experimental time is not critical.
Domain 3: Accessibility/Clarity					
	Metric 7:	Reporting of Results	Medium	2	no raw data
	Metric 8:	Quality Assurance	N/A	N/A	QC not discussed.
Domain 4: Variability and Uncertainty					
	Metric 9:	Variability and Uncertainty	Low	3	No Comment.
Overall Quality Determination[*]			Medium	1.9	
Extracted			No		

[†] High = 3; Medium = 2; Low = 1; Unacceptable = 4; N/A has no value.
[*] If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High=$\geq$ 1 to $<$ 1.7; Medium =$\geq$ 1.7 to $<$ 2.4; Low =$\geq$ 2.4 to $<$ 3.

Study Citation:	Keener, S. A.,Wrbitzky, R.,Bader, M.. 2007.0. Human volunteer study on the influence of exposure duration and dilution of dermally applied N-methyl-2-pyrrolidone (NMP) on the urinary elimination of NMP metabolites. International Archives of Occupational and Environmental Health.
Data Type	Experimental
Hero ID	3539848

Domain	Metric		Rating†	Score	Comments
Domain 1: Reliability					
	Metric 1:	Sampling Methodology and Conditions	High	1	Application of product to hand described in described by Bader et al. (2005a).. The samples were stored at 28"C before analysis.
	Metric 2:	Analytical Methodology	High	1	Analysed as described by J"nsson and "kesson (1997). GC/MS. Calibration standards were prepared from a blank urine pool. The parameters 5-HNMP, 2-HMSI and creatinine in urine were certified within round-robins of the German External Quality Assurance Scheme
	Metric 3:	Biomarker Selection	High	1	No Comment.
Domain 2: Representative					
	Metric 4:	Testing Scenario	Medium	2	Consumer product not applied. Multiple testing scenarios were conducted however (different concentrations).
	Metric 5:	Sample Size and Variability	Low	3	Only 4 volunteers.
	Metric 6:	Temporality	High	1	2007, but temporality not as relevant due to study design.
Domain 3: Accessibility/Clarity					
	Metric 7:	Reporting of Results	Medium	2	no raw data
	Metric 8:	Quality Assurance	N/A	N/A	use of blanks, corrections for recovery rate of NMP in urine (65 percent)
Domain 4: Variability and Uncertainty					
	Metric 9:	Variability and Uncertainty	Medium	2	No Comment.
Overall Quality Determination*			High	1.6	
Extracted			No		

† High = 3; Medium = 2; Low = 1; Unacceptable = 4; N/A has no value.
* If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High=$\geq$ 1 to $<$ 1.7; Medium =$\geq$ 1.7 to $<$ 2.4; Low =$\geq$ 2.4 to $<$ 3.

Study Citation:	Ursin, C.,Hansen, C. M.,Van Dyk, J. W.,Jensen, P. O.,Christensen, I. J.,Ebbehoej, J.. 1995.0. Permeability of commercial solvents through living human skin. American Industrial Hygiene Association Journal.
Data Type	Experimental
Hero ID	3540771

Domain	Metric		Rating[†]	Score	Comments
Domain 1: Reliability					
	Metric 1:	Sampling Methodology and Conditions	High	1	No standard method mentioned, but sapling well described.
	Metric 2:	Analytical Methodology	Low	3	GC method; no details provided.
	Metric 3:	Biomarker Selection	N/A	N/A	No Comment.
Domain 2: Representative					
	Metric 4:	Testing Scenario	Medium	2	permeability of the solvent, not a consumer product.
	Metric 5:	Sample Size and Variability	Low	3	appears to be <5 samples
	Metric 6:	Temporality	High	1	1995 study, but temporality is not key to a lab study.
Domain 3: Accessibility/Clarity					
	Metric 7:	Reporting of Results	Medium	2	No raw data
	Metric 8:	Quality Assurance	N/A	N/A	limited discussion
Domain 4: Variability and Uncertainty					
	Metric 9:	Variability and Uncertainty	Medium	2	No Comment.
Overall Quality Determination[*]			Medium	2.0	
Extracted			No		

[†] High = 3; Medium = 2; Low = 1; Unacceptable = 4; N/A has no value.
[*] If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High=$\geq$ 1 to $<$ 1.7; Medium =$\geq$ 1.7 to $<$ 2.4; Low =$\geq$ 2.4 to $<$ 3.

Study Citation:	U.S, E. P. A.. 1994.0. Consumer exposure to paint stripper solvents.
Data Type	Experimental
Hero ID	3808963

Domain	Metric		Rating†	Score	Comments
Domain 1: Reliability					
	Metric 1:	Sampling Methodology and Conditions	High	1	Test protocol was provided. Each of the selected products was tested in triplicate under controlled environmental conditions inside MAl's Air Consumer Exposure (ACE) Laboratory exposure chamber for a total of 15 experiments. The paint strippers were used according to the manufacturers' instructions printed on the label. The application procedure was consistent with previous laboratory studies conducted at the Lawrence Berkeley Laboratory (Girman and Hodgson, 1986). All pertinent sampling information is provided: test chamber preparation, sampling equipment, test conditions, etc.
	Metric 2:	Analytical Methodology	Medium	2	D. Details of the analytical method were provided in Appendix C. NMP samples were analyzed using a method developed by GAF and partially validated by OSHA.. GAF/OSHA. Gas Chromatography (GC) equipped with FID
	Metric 3:	Biomarker Selection	N/A	N/A	Biomarker is not used.
Domain 2: Representative					
	Metric 4:	Testing Scenario	High	1	Testing conditions closely represent relevant exposure scenarios. The objective of this study is to determine consumer exposure to solvents contained in commercially available paint strippers under typical product-use scenarios.
	Metric 5:	Sample Size and Variability	Medium	2	Moderate sample size. For Wood Finisher's Pride (the product that contained NMP) three test runs were conducted; six samples were collected during each test run: pretest background, test chamber (center, inlet side, and outlet side), breathing zone, and supply to test chamber.
	Metric 6:	Temporality	Low	3	>15 years; Report date 1994
Domain 3: Accessibility/Clarity					
	Metric 7:	Reporting of Results	Medium	2	Test Results for Integrated Air Sampling for Wood Finisher's Pride (NMP product) reported in Table 9.
	Metric 8:	Quality Assurance	N/A	N/A	Blind spikes samples were prepared at MAl and submitted to DataChem Laboratories, Inc. with the regular air sampling media. The blind spikes were prepared by injecting a known volume of each of the target analytes onto the appropriate sorbent tube with a microliter syringe.
Domain 4: Variability and Uncertainty					
	Metric 9:	Variability and Uncertainty	Medium	2	key uncertainties, limitations, and data gaps are not discussed.

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Study Citation:	U.S, E. P. A.. 1994.0. Consumer exposure to paint stripper solvents.
Data Type	Experimental
Hero ID	3808963

Domain	Metric	Rating[†]	Score	Comments
Overall Quality Determination[*]		Medium	1.9	
Extracted		No		

[†] High = 3; Medium = 2; Low = 1; Unacceptable = 4; N/A has no value.
[*] If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High=$\geq$ 1 to $<$ 1.7; Medium =$\geq$ 1.7 to $<$ 2.4; Low =$\geq$ 2.4 to $<$ 3.

Study Citation:	UL Env. 2017.0. Floor Coating VOC Emissions Research Report.
Data Type	Experimental
Hero ID	4440489

Domain	Metric		Rating†	Score	Comments
Domain 1: Reliability					
	Metric 1:	Sampling Methodology and Conditions	Medium	2	No Comment.
	Metric 2:	Analytical Methodology	Medium	2	No Comment.
	Metric 3:	Biomarker Selection	N/A	N/A	No Comment.
Domain 2: Representative					
	Metric 4:	Testing Scenario	High	1	No Comment.
	Metric 5:	Sample Size and Variability	Medium	2	No Comment.
	Metric 6:	Temporality	Medium	2	No Comment.
Domain 3: Accessibility/Clarity					
	Metric 7:	Reporting of Results	Medium	2	No Comment.
	Metric 8:	Quality Assurance	N/A	N/A	No Comment.
Domain 4: Variability and Uncertainty					
	Metric 9:	Variability and Uncertainty	Medium	2	No Comment.
Overall Quality Determination*			Medium	1.9	
Extracted			Yes		

† High = 3; Medium = 2; Low = 1; Unacceptable = 4; N/A has no value.

* If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High=$\geq$ 1 to $<$ 1.7; Medium =$\geq$ 1.7 to $<$ 2.4; Low =$\geq$ 2.4 to $<$ 3.

Study Citation:	Delmaar, J. E.. nan. Emission of chemical substances from solid matrices: a method for consumer exposure assessment.
Data Type	Experimental
Hero ID	4663189

Domain	Metric		Rating[†]	Score	Comments
Domain 1: Reliability					
	Metric 1:	Sampling Methodology and Conditions	Low	3	secondary review article with experimental data cited in support of modeling approach.
	Metric 2:	Analytical Methodology	Low	3	secondary review article with experimental data cited in support of modeling approach.
	Metric 3:	Biomarker Selection	N/A	N/A	No Comment.
Domain 2: Representative					
	Metric 4:	Testing Scenario	Low	3	approach requires equilibrium assumption for article exposure. not all chemicals have article scenarios.
	Metric 5:	Sample Size and Variability	Low	3	No Comment.
	Metric 6:	Temporality	Low	3	point in time estimate for approaches based on regressions and measured data available to date.
Domain 3: Accessibility/Clarity					
	Metric 7:	Reporting of Results	Low	3	No Comment.
	Metric 8:	Quality Assurance	N/A	N/A	No Comment.
Domain 4: Variability and Uncertainty					
	Metric 9:	Variability and Uncertainty	Low	3	No Comment.
Overall Quality Determination[*]			Low	3.0	
Extracted			No		

[†] High = 3; Medium = 2; Low = 1; Unacceptable = 4; N/A has no value.
[*] If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High=$\geq$ 1 to $<$ 1.7; Medium =$\geq$ 1.7 to $<$ 2.4; Low =$\geq$ 2.4 to $<$ 3.

Study Citation:	A. T. Hodgson. 2001.0. Predicted concentrations in new relocatable classrooms of volatile organic compounds emitted from standard and alternate interior finish materials.
Data Type	Experimental
Hero ID	4683360

Domain	Metric		Rating[†]	Score	Comments
Domain 1: Reliability					
	Metric 1:	Sampling Methodology and Conditions	High	1	No Comment.
	Metric 2:	Analytical Methodology	High	1	No Comment.
	Metric 3:	Biomarker Selection	N/A	N/A	no biomarkers
Domain 2: Representative					
	Metric 4:	Testing Scenario	Medium	2	kind of products, test substance, testing methods are described. But exposure control is not discussed, and temperature/pressure are assumed value for estimation of concentration.
	Metric 5:	Sample Size and Variability	Low	3	2 - 4 products samples per product type.
	Metric 6:	Temporality	Low	3	>15 yrs old
Domain 3: Accessibility/Clarity					
	Metric 7:	Reporting of Results	Medium	2	Each results are summarized in each tables. The value in each tables are not raw data though, raw values of concentration are possibly calculated by equation(1). Statistical discussion is missed.
	Metric 8:	Quality Assurance	N/A	N/A	QC discussion is quite limited.
Domain 4: Variability and Uncertainty					
	Metric 9:	Variability and Uncertainty	Low	3	Variability/Uncertainty discussion is quite limited.
Overall Quality Determination[*]			Medium	2.1	
Extracted			Yes		

[†] High = 3; Medium = 2; Low = 1; Unacceptable = 4; N/A has no value.
[*] If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High=$\geq$ 1 to $<$ 1.7; Medium =$\geq$ 1.7 to $<$ 2.4; Low =$\geq$ 2.4 to $<$ 3.

Study Citation:	DTI. 2004.0. Survey of chemical substance in consumer products.
Data Type	Experimental
Hero ID	5035312

Domain	Metric		Rating[†]	Score	Comments
Domain 1: Reliability					
	Metric 1:	Sampling Methodology and Conditions	Low	3	Small number of samples (10); not clear if replicate samples used
	Metric 2:	Analytical Methodology	High	1	No Comment.
	Metric 3:	Biomarker Selection	High	1	No Comment.
Domain 2: Representative					
	Metric 4:	Testing Scenario	High	1	No Comment.
	Metric 5:	Sample Size and Variability	Medium	2	Sample size is low (10)
	Metric 6:	Temporality	N/A	N/A	No Comment.
Domain 3: Accessibility/Clarity					
	Metric 7:	Reporting of Results	High	1	No Comment.
	Metric 8:	Quality Assurance	N/A	N/A	No Comment.
Domain 4: Variability and Uncertainty					
	Metric 9:	Variability and Uncertainty	Medium	2	Greater number of samples and replicate samples could reduce uncertainty
Overall Quality Determination[*]			High	1.6	
Extracted			No		

[†] High = 3; Medium = 2; Low = 1; Unacceptable = 4; N/A has no value.
[*] If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High=$\geq$ 1 to $<$ 1.7; Medium =$\geq$ 1.7 to $<$ 2.4; Low =$\geq$ 2.4 to $<$ 3.

3 Databases Not Unique to a Chemical

Study Citation:	U.S, E. P. A.. 2017.0. STORET: N-methylpyrrolidone.
Data Type	Databases Not Unique to a Chemical
Hero ID	3970048

Domain	Metric		Rating†	Score	Comments
Domain 1: Reliability					
	Metric 1:	Sampling Methodology	High	1	No Comment.
	Metric 2:	Analytical Methodology	High	1	No Comment.
Domain 2: Representative					
	Metric 3:	Geographic Area	High	1	No Comment.
	Metric 4:	Temporal	High	1	No Comment.
	Metric 5:	Exposure Scenario	High	1	No Comment.
Domain 3: Accessibility/Clarity					
	Metric 6:	Availability of DB and Supporting Documents	High	1	No Comment.
	Metric 7:	Reporting Results	High	1	No Comment.
Domain 4: Variability and Uncertainty					
	Metric 8:	Variability and Uncertainty	N/A	N/A	No Comment.
Overall Quality Determination*			High	1.0	
Extracted			No		

† High = 3; Medium = 2; Low = 1; Unacceptable = 4; N/A has no value.
* If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High=$\geq$ 1 to $<$ 1.7; Medium =$\geq$ 1.7 to $<$ 2.4; Low =$\geq$ 2.4 to $<$ 3.

Study Citation:	Consumer Product Information, Database. 2017.0. What's in it? n-methylpyrrolidone.
Data Type	Databases Not Unique to a Chemical
Hero ID	3981162

Domain	Metric		Rating†	Score	Comments
Domain 1: Reliability					
	Metric 1:	Sampling Methodology	Low	3	Webpage provides only very limited info. Brands selected based on market share.
	Metric 2:	Analytical Methodology	N/A	N/A	No Comment.
Domain 2: Representative					
	Metric 3:	Geographic Area	High	1	USA and canada database
	Metric 4:	Temporal	High	1	"Date verified" provided, some <5 yrs old.
	Metric 5:	Exposure Scenario	High	1	Weight fractions of consumer products.
Domain 3: Accessibility/Clarity					
	Metric 6:	Availability of DB and Supporting Documents	Low	3	No info how data collected or QC provided.
	Metric 7:	Reporting Results	High	1	Data is organized. No summary provided, so summary stats not applicable
Domain 4: Variability and Uncertainty					
	Metric 8:	Variability and Uncertainty	N/A	N/A	Based on industry reported weight fraction (e.g., MSDS); not measured data
Overall Quality Determination*			Medium	1.7	
Extracted			No		

† High = 3; Medium = 2; Low = 1; Unacceptable = 4; N/A has no value.
* If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High=$\geq$ 1 to $<$ 1.7; Medium =$\geq$ 1.7 to $<$ 2.4; Low =$\geq$ 2.4 to $<$ 3.

Study Citation:	Bartzis, J.. 2018.0. Prioritization of building materials as indoor pollution sources (BUMA).
Data Type	Databases Not Unique to a Chemical
Hero ID	4663145

Domain	Metric		Rating†	Score	Comments
Domain 1: Reliability					
	Metric 1:	Sampling Methodology	N/A	N/A	Sampling method not discussed - secondary source of info.
	Metric 2:	Analytical Methodology	N/A	N/A	Analytical method not discussed - secondary source of info.
Domain 2: Representative					
	Metric 3:	Geographic Area	High	1	No Comment.
	Metric 4:	Temporal	Medium	2	Data of various ages.
	Metric 5:	Exposure Scenario	Medium	2	Not an exact match except for NMP
Domain 3: Accessibility/Clarity					
	Metric 6:	Availability of DB and Supporting Documents	High	1	No Comment.
	Metric 7:	Reporting Results	High	1	References listed. Emission rates were from fits to concentration data.
Domain 4: Variability and Uncertainty					
	Metric 8:	Variability and Uncertainty	N/A	N/A	No Comment.
Overall Quality Determination*			High	1.4	
Extracted			Yes		

† High = 3; Medium = 2; Low = 1; Unacceptable = 4; N/A has no value.
* If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High=$\geq$ 1 to $<$ 1.7; Medium =$\geq$ 1.7 to $<$ 2.4; Low =$\geq$ 2.4 to $<$ 3.

4 Completed Exposure Assessments

Study Citation:	Rivm,. 2013.0. Annex XV Restriction Report: Proposal for a Restriction.
Data Type	Completed Exposure Assessment
Hero ID	3809440

Domain	Metric	Rating†	Score	Comments
Domain 1: Reliability				
	Metric 1: Methodology	Medium	2	lit search or data collection methods are not described.
Domain 2: Representative				
	Metric 2: Exposure Scenario	Medium	2	scenario interest. relatively new study.(within 5 yrs) but not the US.
Domain 3: Accessibility/Clarity				
	Metric 3: Documentation of References	High	1	No Comment.
Domain 4: Variability and Uncertainty				
	Metric 4: Variability and Uncertainty	Low	3	variability/uncertainty is not discussed well.
Overall Quality Determination*		Medium	2.0	
Extracted		No		

† High = 3; Medium = 2; Low = 1; Unacceptable = 4; N/A has no value.
* If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High=$\geq$ 1 to $<$ 1.7; Medium =$\geq$ 1.7 to $<$ 2.4; Low =$\geq$ 2.4 to $<$ 3.

Study Citation:	Who,. 2001.0. Concise International Chemical Assessment Document 35: N-Methyl-2-Pyrrolidone.
Data Type	Completed Exposure Assessment
Hero ID	3809476

Domain	Metric	Rating[†]	Score	Comments
Domain 1: Reliability				
	Metric 1: Methodology	Medium	2	No discussion of lit search techniques
Domain 2: Representative				
	Metric 2: Exposure Scenario	High	1	No Comment.
Domain 3: Accessibility/Clarity				
	Metric 3: Documentation of References	High	1	waste water effluent
Domain 4: Variability and Uncertainty				
	Metric 4: Variability and Uncertainty	Low	3	No Comment.
Overall Quality Determination[*]		Medium	1.8	
Extracted		No		

[†] High = 3; Medium = 2; Low = 1; Unacceptable = 4; N/A has no value.
[*] If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High=$\geq$ 1 to $<$ 1.7; Medium =$\geq$ 1.7 to $<$ 2.4; Low =$\geq$ 2.4 to $<$ 3.

Study Citation:	Danish EPA. 2015.0. List of Undesirable Substances (LOUS): Survey of 1-methyl-2-pyrrolidone.
Data Type	Completed Exposure Assessment
Hero ID	3827507

Domain	Metric	Rating[†]	Score	Comments
Domain 1: Reliability				
	Metric 1: Methodology	Medium	2	No Comment.
Domain 2: Representative				
	Metric 2: Exposure Scenario	High	1	No Comment.
Domain 3: Accessibility/Clarity				
	Metric 3: Documentation of References	High	1	No Comment.
Domain 4: Variability and Uncertainty				
	Metric 4: Variability and Uncertainty	Medium	2	No Comment.
Overall Quality Determination[*]		High	1.5	
Extracted		No		

[†] High = 3; Medium = 2; Low = 1; Unacceptable = 4; N/A has no value.
[*] If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High=$\geq$ 1 to $<$ 1.7; Medium =$\geq$ 1.7 to $<$ 2.4; Low =$\geq$ 2.4 to $<$ 3.

Study Citation:	Echa,. 2014.0. Background document to the opinion on the annex XV dossier proposing restrictions on 1-methyl-2-pyrrolidone (NMP).
Data Type	Completed Exposure Assessment
Hero ID	3827511

Domain	Metric	Rating[†]	Score	Comments
Domain 1: Reliability				
	Metric 1: Methodology	High	1	No Comment.
Domain 2: Representative				
	Metric 2: Exposure Scenario	High	1	No Comment.
Domain 3: Accessibility/Clarity				
	Metric 3: Documentation of References	High	1	No Comment.
Domain 4: Variability and Uncertainty				
	Metric 4: Variability and Uncertainty	High	1	No Comment.
Overall Quality Determination[*]		High	1.0	
Extracted		No		

[†] High = 3; Medium = 2; Low = 1; Unacceptable = 4; N/A has no value.
[*] If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High=$\geq$ 1 to $<$ 1.7; Medium =$\geq$ 1.7 to $<$ 2.4; Low =$\geq$ 2.4 to $<$ 3.

Study Citation:	Australian Government Department of, Health. 2016.0. Human health tier III assessment for 1-methyl-2-pyrrolidinone.
Data Type	Completed Exposure Assessment
Hero ID	3969286

Domain	Metric	Rating†	Score	Comments
Domain 1: Reliability				
	Metric 1: Methodology	High	1	No Comment.
Domain 2: Representative				
	Metric 2: Exposure Scenario	Medium	2	in Australia.
Domain 3: Accessibility/Clarity				
	Metric 3: Documentation of References	High	1	No Comment.
Domain 4: Variability and Uncertainty				
	Metric 4: Variability and Uncertainty	Medium	2	multiple weight fractions are discussed though, variability/ uncertainty is not described clearly.
Overall Quality Determination*		High	1.5	
Extracted		Yes		

† High = 3; Medium = 2; Low = 1; Unacceptable = 4; N/A has no value.
* If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High=$\geq$ 1 to $<$ 1.7; Medium =$\geq$ 1.7 to $<$ 2.4; Low =$\geq$ 2.4 to $<$ 3.

Study Citation:	Environment, Canada. 2017.0. Draft screening assessment: 2-Pyrrolidinone, 1-methyl0 (NMP) and 2-Pyrrolidinone, 1-ethyl (NEP).
Data Type	Completed Exposure Assessment
Hero ID	3969287

Domain	Metric	Rating[†]	Score	Comments
Domain 1: Reliability				
	Metric 1: Methodology	High	1	No Comment.
Domain 2: Representative				
	Metric 2: Exposure Scenario	High	1	No Comment.
Domain 3: Accessibility/Clarity				
	Metric 3: Documentation of References	High	1	No Comment.
Domain 4: Variability and Uncertainty				
	Metric 4: Variability and Uncertainty	Low	3	No Comment.
Overall Quality Determination[*]		High	1.5	
Extracted		No		

[†] High = 3; Medium = 2; Low = 1; Unacceptable = 4; N/A has no value.
[*] If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High=$\geq$ 1 to $<$ 1.7; Medium =$\geq$ 1.7 to $<$ 2.4; Low =$\geq$ 2.4 to $<$ 3.

Study Citation:	H. Willem, B. Singer. 2010.0. Chemical emissions of residential materials and products: Review of available information.
Data Type	Completed Exposure Assessment
Hero ID	4683373

Domain	Metric	Rating[†]	Score	Comments
Domain 1: Reliability				
	Metric 1: Methodology	High	1	No Comment.
Domain 2: Representative				
	Metric 2: Exposure Scenario	Low	3	US report. but a bit old report(> 5yrs) and no chemicals interest.
Domain 3: Accessibility/Clarity				
	Metric 3: Documentation of References	High	1	No Comment.
Domain 4: Variability and Uncertainty				
	Metric 4: Variability and Uncertainty	High	1	No Comment.
Overall Quality Determination[*]		High	1.5	
Extracted		No		

[†] High = 3; Medium = 2; Low = 1; Unacceptable = 4; N/A has no value.
[*] If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High=$\geq$ 1 to $<$ 1.7; Medium =$\geq$ 1.7 to $<$ 2.4; Low =$\geq$ 2.4 to $<$ 3.

5 Survey

Study Citation:	U.S, E. P. A.. 1987.0. Household solvent products: A national usage survey.
Data Type	Survey
Hero ID	1005969

Domain	Metric		Rating[†]	Score	Comments
Domain 1: Reliability					
	Metric 1:	Data Collection Methodology	High	1	No Comment.
	Metric 2:	Data Analysis Methodology	High	1	No Comment.
Domain 2: Representative					
	Metric 3:	Geographic Area	High	1	Nationwide (U.S.A.) survey with outreach via random dialing and willingness to provide address and respond to survey.
	Metric 4:	Sampling / Sampling Size	High	1	No Comment.
	Metric 5:	Response Rate	Medium	2	No Comment.
Domain 3: Accessibility/Clarity					
	Metric 6:	Reporting of Results	High	1	No Comment.
	Metric 7:	Quality Assurance	Medium	2	No Comment.
Domain 4: Variability and Uncertainty					
	Metric 8:	Variability and Uncertainty	N/A	N/A	No Comment.
Overall Quality Determination[*]			High	1.3	
Extracted			Yes		

[†] High = 3; Medium = 2; Low = 1; Unacceptable = 4; N/A has no value.
[*] If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High=$\geq$ 1 to $<$ 1.7; Medium =$\geq$ 1.7 to $<$ 2.4; Low =$\geq$ 2.4 to $<$ 3.

Study Citation:	Abt. 1992.0. Methylene chloride consumer use study survey findings.
Data Type	Survey
Hero ID	1065590

Domain	Metric		Rating[†]	Score	Comments
Domain 1: Reliability					
	Metric 1:	Data Collection Methodology	Medium	2	Data collection instrument was described. The protocols for field personnel was not.
	Metric 2:	Data Analysis Methodology	Medium	2	Weighted summary stats provided, and unweighted counts provided in appendix. Could not find a discussion on sampling and non sampling errors.
Domain 2: Representative					
	Metric 3:	Geographic Area	High	1	No Comment.
	Metric 4:	Sampling / Sampling Size	High	1	No Comment.
	Metric 5:	Response Rate	Medium	2	for the questionaire, response rate was about 40 percent.
Domain 3: Accessibility/Clarity					
	Metric 6:	Reporting of Results	High	1	No Comment.
	Metric 7:	Quality Assurance	Low	3	No discussion of QC
Domain 4: Variability and Uncertainty					
	Metric 8:	Variability and Uncertainty	N/A	N/A	limited discussion
Overall Quality Determination[*]			Medium	1.7	
Extracted			Yes		

[†] High = 3; Medium = 2; Low = 1; Unacceptable = 4; N/A has no value.
[*] If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High=$\geq$ 1 to $<$ 1.7; Medium =$\geq$ 1.7 to $<$ 2.4; Low =$\geq$ 2.4 to $<$ 3.

6 Modeling

Study Citation:	UL Env. 2017.0. Floor Coating VOC Emissions Research Report.
Data Type	Modeling
Hero ID	4440489

Domain	Metric		Rating†	Score	Comments
Domain 1: Reliability					
	Metric 1:	Mathematicl Equations	Medium	2	Emission rates of TVOC were used in a computer model todetermine potential air concentrations of the pollutants. The computer model used the measured emission rate changes over the one-week time period to determine the change in air concentrations that would accordingly occur. The emission factor can be modeled according to a first-order decay.
	Metric 2:	Model Evaluation	Medium	2	The emission rates calculated from these samples were used in a mathematical model to predict the concentration that would occur in an office environment. The model parameters were 11.1 m2 of flooring in a 30.6 m3 room with an outdoor air change rate of 0.68/hr.
Domain 2: Representative					
	Metric 3:	Exposure Scenario	High	1	<5 years (2017 pub date) Table 5 reports predicted concentrations of NMP from time of application to one week for floor coatings W7 and W3 (floor loading in office)
Domain 3: Accessibility/Clarity					
	Metric 4:	Model and Model Documentation Availability	High	1	There is sufficient documentation in the data source
	Metric 5:	Model Inputs and Defaults	Medium	2	Data quality acceptance criteria are not discussed but inputs appear appropriate. The emission factor can be modeled according to a first-order decay: EFm = EF0 e-kt where, EFm = modeled emission factor ("g/m"hr) or ("g/unit"hr) EF0 = initial emission factor ("g/m"hr) or ("g/unit"hr) k = rate constant (hr-1) t = time (hr)
Domain 4: Variability and Uncertainty					
	Metric 6:	Variability and Uncertainty	Low	3	No Comment.
Overall Quality Determination*			Medium	1.8	
Extracted			Yes		

† High = 3; Medium = 2; Low = 1; Unacceptable = 4; N/A has no value.
* If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High=≥ 1 to < 1.7; Medium =≥ 1.7 to < 2.4; Low =≥ 2.4 to < 3.