



CHEMICAL UPDATE WORKSHEET

Chemical Name:	Propazine
CAS #:	139-40-2
Revised By:	RRD Toxicology Unit
Revision Date:	August 19, 2015

(A) Chemical-Physical Properties

	Part 201 Value	Updated Value	Reference Source	Comments
Molecular Weight (g/mol)	229.75	229.71	EPI	EXP
Physical State at ambient temp	Solid	Solid	MDEQ	
Melting Point (°C)	---	213.00	EPI	EXP
Boiling Point (°C)	---	NA	NA	NA
Solubility (ug/L)	8600	8600	EPI	EXP
Vapor Pressure (mmHg at 25°C)	0.000000131	1.31E-07	EPI	EXP
HLC (atm-m³/mol at 25°C)	4.60E-9	4.60E-09	PP	EST
Log Kow (log P; octanol-water)	2.75	2.93	EPI	EXP
Koc (organic carbon; L/Kg)	505	344.1	EPI	EST
Ionizing Koc (L/kg)		NR	NA	NA
Diffusivity in Air (Di; cm²/s)	0.08	2.49E-02	W9	EST
Diffusivity in Water (Dw; cm²/s)	8.0E-6	6.36E-06	W9	EST

	Part 201 Value	Updated Value	Reference Source	Comments
Soil Water Partition Coefficient (Kd; inorganics)	NR	NR	NA	NA
Flash Point (°C)	NA	NA	NA	NA
Lower Explosivity Level (LEL; unitless)	NA	NA	NA	NA
Critical Temperature (K)		NA	NA	NA
Enthalpy of Vaporization (cal/mol)		NA	NA	NA
Density (g/mL, g/cm ³)		1.162	CRC	EXP
EMSOFT Flux Residential 2 m (mg/day/cm ²)	NA	1.85E-07	EMSOFT	EST
EMSOFT Flux Residential 5 m (mg/day/cm ²)	NA	1.85E-07	EMSOFT	EST
EMSOFT Flux Nonresidential 2 m (mg/day/cm ²)	NA	2.17E-07	EMSOFT	EST
EMSOFT Flux Nonresidential 5 m (mg/day/cm ²)	NA	2.17E-07	EMSOFT	EST

(B) Toxicity Values/Benchmarks

	Part 201 Value	Updated Value	Source/Reference/Date	Comments/Notes/Issues
Reference Dose (RfD) (mg/kg/day)	2.7E-2	1.8E-2	OPP, 2013	
RfD details	2-year rat feeding study; RfD different from IRIS due to different food conversion factor used (0.08 instead of 0.05). Critical effects = decreased body weight. UF = 300, (Ciba Geigy, 1980); [IRIS RfD = 2E-2 mg/kg/d].	<p>Tier 1 Source: USEPA-OPP Basis: The assessment in OPP is more current than the assessment in IRIS. OPP is a Tier 1 source. USEPA-OPP (2006, 2013): chronic RfD = 1.8E-2 mg/kg/d Critical Study: Atrazine used In a study to evaluate the effect of long-term atrazine exposure on the proestrus afternoon luteinizing hormone [LH] surge (MRID 44152102) atrazine, 97.1% a.i., was administered to 360 female Sprague Dawley rats in the diet. Dose levels were 0 (negative control), 25, 50, and 400 ppm (0, 1.80, 3.65, 29.44 mg/kg/day) for 26 weeks (approximately six months) Critical effect: body weight, estrus times (estrous cycle alterations and LH surge suppression). End point or Point of Departure (POD): NOAEL = 1.8 mg/kg/day, based on estrous cycle alterations and LH surge attenuation at the LOAEL of 3.65 mg/kg/day. Uncertainty Factors: 100 (10x for interspecies extrapolation and 10x for intraspecies variations) OPP (USEPA-HQ-OPP-2005-0496-0004) Comment on use of atrazine: <i>Atrazine, propazine and simazine, all triazine herbicides, are being considered together because of their shared chloro metabolites, hazard identification, and hazard characterization.</i> This study was selected as the most appropriate study for endpoint selection for the structurally similar atrazine. Although a similar 6-month study is not available on propazine, the atrazine study is used as bridging data and based on common mechanism of toxicity. The atrazine study is considered protective of propazine’s endocrine-related effects. <u>Acute Dietary (females 13-49):</u> Developmental NOAEL = 30 mg/kg/day; UF = 100; Acute RfD = 0.3 mg/kg/day. LOAEL = 100 mg/kg/day based on decreased ossification.</p> <p>Tier 1 and 2 Sources:</p>	OPP, 2013	Complete



	Part 201 Value	Updated Value	Source/Reference/ Date	Comments/Notes /Issues
		<p>IRIS (10/1/1990): RfD = 2.0E-2 mg/kg/d Critical Study: Ciba-Geigy Corporation. 1980a. MRID No. 00041408, 00076955, 00087893. Available from EPA. Write to FOI, EPA, Washington, DC 20460. (Not published) Method(s): Two hundred and sixty males and 260 female CD rats were selected randomly and given 0, 3, 100 or 1000 ppm of propazine in their diets for 2 years. Seventy animals of each sex were placed in the control and high dose group. Sixty animals of each sex were placed in the low and mid-dose groups. At 1000 ppm there was a significant decrease in body weight in both sexes. There was a significant increase in mammary tumors in females at 1000 ppm. An RfD based on the subchronic dog NOEL of 5 mg/kg/day and a 1000 UF, to account for inter- and intraspecies differences and a subchronic-to-chronic extrapolation, would yield a value similar to the RfD. Critical effect: Decrease in body weight; mammary tumors in females End point or Point of Departure (POD): NOEL = 100 ppm (5 mg/kg/day) Uncertainty Factors: UF = 300; 10 for each for the inter- and intraspecies differences. An additional UF is used to account for the fact that the database on chronic toxicity lacks an adequate second mammalian bioassay (that is, a chronic feeding study in the dog may yield a more sensitive toxicological endpoint). However, since the 90-day studies in rats and dogs do not show an order of magnitude species difference, an additional 3-fold UF is considered appropriate.</p> <p>PPRTV: No PPRTV record available at this time. MRL: No MRL record available at this time.</p> <p>Tier 3 Source: MDEQ: Per DEQ-CCD/RRD (5/20/1987), RfD = 0.027 mg/kg/d. 2-year rat feeding study; RfD different from IRIS due to different food conversion factor used (0.08 instead of 0.05). Critical effects = decreased body weight. UF = 300, (Ciba Geigy, 1980); [IRIS RfD = 2E-2 mg/kg/d]. SUBCHRONIC RfD: The chronic oral RfD was adopted as the subchronic oral RfD.</p>		
<p>Oral Cancer Slope Factor (CSF)</p>	<p>--</p>	<p>NA</p>	<p>MDEQ, 2015</p>	



	Part 201 Value	Updated Value	Source/Reference/Date	Comments/Notes/Issues
(mg/kg-day) ⁻¹)				
CSF details	No RD entry in EPB-CCD (9/16/11). Per IRIS: a quantitative estimate of the carcinogenic risk from oral exposure is not available at this time (9/17/11). The Ciba Geigy (1980) study referenced in the RfD details indicated that there was a significant increase in mammary tumors in females at 1000 ppm. No PPRTV (11/28/11).	<p>Carcinogen Weight-of-Evidence (WOE) Class: Per EPA-OPP TRED 2006; Not Likely to be Carcinogenic to Humans. In accordance with the EPA Final Guidelines for Carcinogen Risk Assessment (March 29, 2005), the Committee classified Propazine as “Not Likely To Be Carcinogenic To Humans.” This decision was based on the following weight-of-evidence that Propazine is not genotoxic and operates via a mode of action for the development of mammary tumors in the female SD rat similar to atrazine and simazine. Atrazine’s mode of action of tumor formation appears to be specific to female rats (which maintain constant estrus) and does not appear to have a counterpart in humans, and thus the mammary gland tumors found in atrazine or propazine treated SD female rats are qualitatively not relevant for human risk assessment. Source: 12-8-2005 Fourth Report of the Cancer Assessment Review Committee, Health Effects Division, EPA-OPP.</p> <p>Tier 1 and 2 Sources: IRIS: No IRIS file available at this time. EPA-OPP-RED: NA; Not likely to be carcinogenic to humans. PPRTV: No PPRTV record available at this time. MRL: NA; MRLs are for non-cancer effects only.</p> <p>Tier 3 Source: MDEQ: Per DEQ-CCD/RRD (1/1/1992), no value at this time. A risk assessment will be reviewed by an EPA work group. Ciba-Geigy study reported an increase in mammary tumors in females @ 1000ppm. Review pending.</p>		Complete
Reference Concentration (RfC) or Initial Threshold Screening Level (ITSL) (µg/m³)	--	NA	MDEQ, 2015	
RfC/ITSL details		Tier 1 and 2 Sources:		



	Part 201 Value	Updated Value	Source/Reference/Date	Comments/Notes/Issues
		<p>IRIS: Per IRIS no inhalation value at this time. EPA-OPP-RED: NA PPRTV: No PPRTV record available at this time. MRL: No MRL record available at this time.</p> <p>Tier 3 Source: MDEQ: Per DEQ-CCD no value at this time.</p>		Complete
Inhalation Unit Risk Factor (IURF) (($\mu\text{g}/\text{m}^3$)⁻¹)	--	NA	MDEQ, 2015	
IURF details		<p>Carcinogen Weight-of-Evidence (WOE) Class: Per EPA-OPP TRED 2006; Not Likely to be Carcinogenic to Humans IRIS WOE Basis: Per EPA-OPP TRED 2006; Propazine was similarly reclassified in 2005 based on weight-of-evidence that it is not genotoxic and operates via a mode of action for the development of mammary and pituitary tumors in female rats similar to atrazine. Consequently, cancer risks have not been assessed in the risk assessment. Source and Date: EPA-OPP TRED 2006</p> <p>Tier 1 and 2 Sources: IRIS: No IRIS file available at this time. EPA-OPP-RED: No value at this time.</p> <p>Tier 2 Sources: PPRTV: No PPRTV record available at this time. MRL: NA; MRLs are for non-cancer effects only.</p> <p>Tier 3 Source: MDEQ: Per DEQ-CCD, no value at this time.</p>		Complete
Mutagenic Mode of Action (MMOA)? (Y/N)	--	NO	USEPA, 2015	



	Part 201 Value	Updated Value	Source/Reference/ Date	Comments/Notes /Issues
MMOA Details	--	Not listed as a carcinogen with mutagenic MOA in the USEPA OSWER List.		
Developmental or Reproductive Effector? (Y/N)	No	No, propazine is not considered a developmental toxicant at this time. Further evaluation may be needed.	USEPA-OPP 2006, 2013	
Developmental or Reproductive Toxicity Details	NA	Per USEPA-OPP; causes a disruption of the hypothalamic-pituitary-gonadal (HPG) axis in the rats by alteration of luteinizing hormone (LH); attenuation of LH surge; pubertal delay		
State Drinking Water Standard (SDWS) (µg/L)	--	NO	SDWA, 1976	
SDWS details	NA	MI Safe Drinking Water Act (SDWA) 1976 PA 399		
Secondary Maximum Contaminant Level (SMCL) (µg/L)	--	NO	SDWA, 1976 and USEPA SMCL List	
SMCL details	NA	MI Safe Drinking Water Act (SDWA) 1976 PA 399 and USEPA SMCL List, 2015		
Is there an Aesthetic Value? (Y/N)	NO	Not evaluated.	NA	
Aesthetic value details	NA	NA		
Is there a Phytotoxicity Value? (Y/N)	NO	Not evaluated.	NA	
Phytotoxicity details	NA	NA		
Others:				



(C) Chemical-specific Absorption Factors

	Part 201 Value	Update	Source/Reference/ Dates	Comments/Notes /Issues
Gastrointestinal absorption efficiency value (ABS _{gi})	---	1.0	MDEQ, 2015/USEPA RAGS-E, 2004	
ABS _{gi} details		RAGS E (USEPA, 2004) Default Value		
Skin absorption efficiency value (AE _d)	---	0.1	MDEQ, 2015	
AE _d details				
Ingestion Absorption Efficiency (AE _i)		1.0	MDEQ, 2015	
AE _i Details				
Relative Source Contribution for Water (RSC _w)		0.2	MDEQ, 2015	
Relative Source Contribution for Soil (RSC _s)		1.0	MDEQ, 2015	
Relative Source Contribution for Air (RSC _A)		1.0	MDEQ, 2015	
Others				

(D) Rule 57 Water Quality Values and GSI Criteria

Current GSI value (µg/L)	NA
Updated GSI value (µg/L)	NA
Rule 57 Drinking Water Value (µg/L)	NA

	Rule 57 Value (µg/L)	Verification Date
Human Non-cancer Values- Drinking water source (HNV-drink)		
Human Non-Cancer Values- Non-drinking water sources (HNV-Non-drink)		
Wildlife Value (WV)		
Human Cancer Values for Drinking Water Source (HCV-drink)		
Human Cancer values for non-drinking water source (HCV-Non-drink)		
Final Chronic Value (FCV)		
Aquatic maximum value (AMV)		
Final Acute Value (FAV)		

Sources:

1. MDEQ Surface Water Assessment Section Rule 57 [website](#)
2. MDEQ Rule 57 [table](#)



(E) Target Detection Limits (TDL)

	Value	Source
Target Detection Limit – Soil ($\mu\text{g}/\text{kg}$)	2,000	MDEQ, 2015
Target Detection Limit – Water ($\mu\text{g}/\text{L}$)	100	MDEQ, 2015
Target Detection Limit – Air (ppbv)	NA	MDEQ, 2015
Target Detection Limit – Soil Gas (ppbv)	NA	MDEQ, 2015

CHEMICAL UPDATE WORKSHEET ABBREVIATIONS:

CAS # - Chemical Abstract Service Number.

Section (A) Chemical-Physical Properties**Reference Source(s):**

CRC	Chemical Rubber Company Handbook of Chemistry and Physics, 95th edition, 2014-2015
EMSOFT	USEPA Exposure Model for Soil-Organic Fate and Transport (EMSOFT) (EPA, 2002)
EPA2001	USEPA (2001) Fact Sheet, Correcting the Henry's Law Constant for Soil Temperature. Office of Solid Waste and Emergency Response, Washington, D.C.
EPA4	USEPA (2004) User's Guide for Evaluating Subsurface Vapor Intrusion into Buildings. February 22, 2004.
EPI	USEPA's Estimation Programs Interface SUITE 4.1, Copyright 2000-2012
HSDB	Hazardous Substances Data Bank
MDEQ	Michigan Department of Environmental Quality
NPG	National Institute for Occupational Safety and Health Pocket Guide to Chemical Hazards
PC	National Center for Biotechnology Information's PubChem database
PP	Syracuse Research Corporation's PhysProp database
SCDM	USEPA's Superfund Chemical Data Matrix
SSG	USEPA's Soil Screening Guidance: Technical Background Document, Second Edition, 1996
USEPA/EPA	United States environmental protection agency's Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment). July, 2004.

W9 USEPA's User Guide for Water9 Software, Version 2.0.0, 2001

Basis/Comments:

EST	estimated
EXP	experimental
EXT	extrapolated
NA	not available or not applicable
NR	not relevant

Section (B) Toxicity Values/Benchmarks**Sources/References:**

ATSDR	Agency for Toxic Substances and Disease Registry
CALEPA	California Environmental Protection Agency
CAL DTSC	California Department of Toxic Substances Control
CAL OEHHA	CAEPA Office of Environmental Health Hazard Assessment
CCD	MDEQ Chemical Criteria Database
ECHA	European Chemicals Agency (REACH)
OECD HPV	Organization for Economic Cooperation and Development HPV Database
HEAST	USEPA's Health Effects Assessment Summary Tables
IRIS	USEPA's Integrated Risk Information System
MADEP	Massachusetts Department of Environmental Protection
MDEQ/DEQ	Michigan Department of Environmental Quality
DEQ-CCD/AQD	MDEQ Air Quality Division
DEQ-CCD/RRD	MDEQ Remediation and Redevelopment Division
DEQ-CCD/WRD	MDEQ Water Resources Division
MNDOH	Minnesota Department of Health

NJDEP	New Jersey Department of Environmental Protection
NYDEC	New York State Department of Environmental Conservation
OPP/OPPT	USEPA's Office of Pesticide Programs
PPRTV	USEPA's Provisional Peer Reviewed Toxicity Values
RIVM	The Netherlands National Institute of Public Health and the Environment
TCEQ	Texas Commission on Environmental Quality
USEPA	United States Environmental Protection Agency
USEPA OSWER	USEPA Office of Solid Waste and Emergency Response
USEPA MCL	USEPA Maximum Contaminant Level
WHO	World Health Organization
WHO IPCS	International Programme on Chemical Safety (IPCS/INCHEM)
WHO IARC	International Agency for Research on Cancers
NA	Not Available.
NR	Not Relevant.

Toxicity terms:

BMC	Benchmark concentration
BMCL	Lower bound confidence limit on the BMC
BMD	benchmark dose
BMDL	Lower bound confidence limit on the BMD
CSF	Cancer slope Factor
CNS	Central nervous system
IURF or IUR	Inhalation unit risk factor
LOAEL	Lowest observed adverse effect level
LOEL	Lowest observed effect level
MRL	Minimal risk level (ATSDR)
NOAEL	No observed adverse effect level
NOEL	No observed effect level

RfC	Reference concentration
RfD	Reference dose
p-RfD	Provisional RfD
aRfD	Acute RfD
UF	Uncertainty factor
WOE	Weight of evidence

Section (C) Chemical-specific Absorption Factors

MDEQ	Michigan Department of Environmental Quality
USEPA RAGS-E	United States Environmental Protection Agency's Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment). July, 2004.

Section (D) Rule 57 Water Quality Values and GSI Criteria

GSI	Groundwater-surface water interface
NA	A value is not available or not applicable.
ID	Insufficient data to derive value
NLS	No literature search has been conducted