

Vinyl Chloride: Chronic Inhalation RfC

Critical Study:	Bi et al. (1984)
Exposures:	rats, inhalation: 0, 10, 100, 300 ppm; 6 months, 6 d/wk, 6 hr/d
Effect:	Liver effects (increased liver/body weight ratio)
Type of data:	Continuous, grouped
Data presented:	Number of subjects, mean response and concentration for each group.
NOAEL:	None identified
LOAEL:	10 ppm
Adjustment:	Daily time-weighted average
Uncertainty Factor:	3000 (10: use of LOAEL, 10: sub-chronic to chronic, 3: animal to human, 10: variability)
Current RfC:	0.8 ppb
PBPK Dose Metric:	Amount metabolized per gram liver

Impact of PBPK Modeling on the RfC for Vinyl Chloride (Preliminary)

- Current RfC: 0.0019 mg/m^3
 $\text{LOAEL}_{[\text{HEC}]} = 5.5 \text{ mg/m}^3$
 $\text{UF} = 10(\text{LOAEL}) \times 10(\text{A-H}) \times 10(\text{SC-C}) \times 10(\text{HIV}) = 3000$
- PBPK RfC: 0.16 mg/m^3
 $\text{LOAEL}_{[\text{HEC}]} = 47.8 \text{ mg/m}^3$
 $\text{UF} = 3(\text{LOAEL}) \times 3(\text{A-H}) \times 3(\text{SC-C}) \times 10(\text{HIV}) = 300$
- Impact: 84-fold increase

Vinyl Chloride: Chronic Inhalation RfC

Critical Study:	Feron et al. (1981)
Exposures:	rats, dietary: 0, 1.7, 5.0, 14.1 mg/kg/d, 2 yrs; gavage: 300 mg/kg/d, 2 yrs, 5 days/week
Effect:	Liver effects (increased liver/body weight ratio)
Type of data:	Quantal, grouped
Data presented:	Number of subjects, number abnormal, and dose for each group.
NOAEL:	1.7 mg/kg/d
LOAEL:	5.0 mg/kg/d
Adjustment:	Daily average (gavage dose)
Uncertainty Factor:	30 (3: animal to human, 10: variability)
PBPK/BMD RfC:	0.7 ppm
PBPK Dose Metric:	Amount metabolized per gram liver

Impact of PBPK and BMD Modeling on the RfC for Vinyl Chloride (Preliminary)

- Current RfC: 0.0019 mg/m^3

$$\text{LOAEL}_{\text{HEC}} = 5.5 \text{ mg/m}^3$$

$$\text{UF} = 10(\text{LOAEL}) \times 10(\text{A-H}) \times 10(\text{SC-C}) \times 10(\text{HIV}) = 3000$$

- PBPK/BMD RfC: 1.8 mg/m^3

$$\text{BMDL}_{10} = 55 \text{ mg/m}^3$$

$$\text{UF} = 3(\text{A-H}) \times \cancel{3(\text{SC-C})} \times 10(\text{HIV}) = 30$$

- Impact: 947-fold increase