Chemical	**Titanium dioxide**
CAS Number	13463-67-7
Category	Category III
Cancer Classification	EPA: Not Evaluated IARC: Group 3; unclassifiable as to carcinogenicity to humans NTP: TR-97 (Diet study) No evidence of carcinogenic activity by oral route for both sexes of Fischer 344 rats or $B6C3F_1$ mice.
Proposed HAAS	5.95 ug/m^3
Basis of Proposed HAAS	Information cited in ACGIH TLV documentation
Basis of Value used to derive Proposed HAAS	Critical Effect: Pulmonary irritation Study Animal: Rat Exposure Route: Intermittent Inhalation, 6 hours per day, 5 days per week for 2 years
Dose Extrapolation Method	NOAEL,LOAEL
Notes	At the conclusion of the same study, squamous cell carcinomas were noted in rats in the 250,000 ug/m^3 dose group (HDT). The authors considered this type of carcinoma to be unique, experimentally induced tumor in rats and of questionable relevance for humans. At 10,000 ug/m^3 architecture of lung air spaces were noted to remain intact, no significant formation of scar tissue and tissue reactions were potentially reversible. This level was employed as a LOAEL in the derivation of the HAAS.
Additional Tox and/or Occupational Values	VOSHA 1910.1 PEL Total Dust 10,000 ug/m^3 TWA Respirable Fraction 5,000 ug/m^3 TWA NIOSH REL: Noted to be Carcinogen, see Appendix A Potential Occupational Carcinogen IDLH 5,000,000 ug/m^3 ACGIH TLV-TWA 10,000 ug/m^3
Comparison Values	

Derivation of HAAS:

10,000 ug/m^3 × 6hr/24hr ×5d/7d ≅ 1785.7143 ug/m^3

$$\text{HAAS (ug/m}^3\text{)} = \frac{LOAEL}{UF \times MF}$$

UF = 3 for inter-species variability
UF = 3 for intra-species variability
UF = 3 for lack of NOAEL, use of LOAEL
MF = 10 for limited data, question of potential carcinogenicity

$$= \frac{1785.7143}{3 \times 3 \times 3 \times 10}$$

(For purposes of this evaluation, application of two factors of 3 is rounded to 10)

≅ 5.95 ug/m^3