PLATINUM, METAL AND SOLUBLE SALTS

CAS number: 7440-06-4

Synonyms: —

Chemical formula: Pt

Structural formula: —

Workplace exposure standard (retained)

TWA: **1.0 mg/m^3 (Platinum, metal);**
0.002 mg/m^3 (Platinum soluble salts as Pt)

STEL: —

Peak limitation: —

Notations: —

IDLH: —

Sampling and analysis: The recommended value is quantifiable through available sampling and analysis techniques.

Recommendation and basis for workplace exposure standard

A TWA of 1.0 mg/m^3 (platinum, metal) and 0.002 mg/m^3 (platinum soluble salts as Pt) are recommended to protect for respiratory irritation, respiratory sensitisation and asthma in exposed workers.

Discussion and conclusions

Platinum is used in the laboratory, in the electronics industry, in the glass industry, in jewellery, for dental and medical uses, and as a catalyst.

Critical effects of exposure are respiratory irritation and respiratory sensitisation, and asthma on exposure to soluble salts.

Limited data are available in humans and animals. Rhinorrhoea in 52 of 91 exposed workers is reported in a study of four platinum refineries. Platinum levels ranged from 900 mg/m^3 to 1,700 g/m^3. Platinum salts are recognised as the etiologic agents in certain asthmatic attacks and evidence of irritation and bronchial asthma are reported in workers (ACGIH, 2018). No toxicity and no allergic reactions reported in workers exposed to soluble salt tetraammineplatinum dichloride below 0.5 µg/m^3, but occasionally higher than 2 or 10 µg/m^3 (SCOEL, 2011; HCOTN, 2008).

Given the limited data, the SWA TWA of 1.0 mg/m^3 (platinum, metal) and a TWA of 0.002 mg/m^3 (platinum soluble salts as Pt) by ACGIH and the HCOTN are recommended to be retained. The potential for the identified critical effects is reduced at these concentrations (ACGIH, 2018).

Recommendation for notations

Not classified as a carcinogen according to the Globally Harmonized System of Classification and Labelling of Chemicals (GHS).

Not classified as a skin sensitiser or respiratory sensitiser according to the GHS. A review of the sensitisation classification is recommended based on evidence of respiratory sensitisation in workers.

There are insufficient data to recommend a skin notation.

APPENDIX

Primary sources with reports

Source	Year set	Standard
SWA	***1991***	***TWA: 1.0 mg/m³ (Platinum, metal); TWA: 0.002 mg/m³ (Platinum soluble salts as Pt)***
No report.		
ACGIH	***2001***	***TLV-TWA: 1.0 mg/m³ (Platinum, metal); TLV-TWA: 0.002 mg/m³ (Platinum soluble salts as Pt)***
TLV-TWA (metal) recommended to minimise the potential for respiratory tract irritation, dermatitis and irritation. TLV-TWA (soluble salts) recommended to minimise the potential for Pt salt-induced asthma and sensitisation, respiratory irritation and dermatitis. Summary of data: • Review for both soluble salts and metal dust combined. Human data: • Exposure to Pt salts is known to result in complaints of respiratory distress in workers • Pt salts well recognised as the etiologic agents in certain asthmatic attacks • 16 female workers handling Pt salts experienced coughing and nose and throat irritation: o 8 had nasal ulceration and 1 had bronchial asthma o time employed range from 2–10 mo, no further details • Rhinorrhoea in 52/91 exposed workers employed in four Pt refineries: o air monitoring of Pt levels ranged from 900 mg/m³ to 1,700 g/m³ • Report of platinosis in laboratory workers using and refining Pt: o progressive, allergic reaction leading to pronounced asthmatic symptoms • Published reports of allergic skin disease in workers exposed to soluble Pt salts; once allergy to the soluble Pt salts has developed, it generally precluded continued occupational exposure.		
DFG	***NA***	***NA***
No report.		
SCOEL	***2011***	***Not assigned***
Data on the toxicity of Pt metal, insoluble Pt compounds and soluble Pt compounds are insufficient to allow recommendation of a health-based OEL. Summary of additional data: • No data in humans reported about Pt metal and insoluble Pt compounds, other than one case of dermatitis due to a Pt ring and one case of contact stomatitis due to Pt in a dental alloy • Most significant risks from occupational exposure to water-soluble Pt salts are respiratory sensitisation and skin effects • Exposure to chloroplatinates at levels below 10 ng/m³ is not expected to cause sensitisation; no further information		

Source	Year set	Standard
• Exposure to levels of tetraammineplatinum dichloride mostly below 0.5 µg/m^3 but occasionally higher than 2 or 10 µg/m^3 did not result in allergic reactions in workers; no further information • Data in animals indicates soluble chloroplatinates are sensitising agents.		
OARS/AIHA	***NA***	***NA***
No report.		
HCOTN	***2008***	***TWA: 1.0 mg/m^3 (metallic platinum)***
A legally binding limit for metallic Pt in line with European Commission directives. No limit values for Pt compounds. Summary of additional data: • The toxicological database does not allow the recommendation of a health-based OEL for soluble platinum compound • Study in workers indicate that an OEL of 0.5 µg/m^3 for tetraammineplatinum dichloride is not associated with toxicity; could be used as an upper limit for workers (cited by SCOEL, 2011).		

Secondary source reports relied upon

NIL.

Carcinogenicity — non-threshold based genotoxic carcinogens

Is the chemical mutagenic?	No

The chemical is not a non-threshold based genotoxic carcinogen.

Notations

Source	Notations
SWA	NA
HCIS	NA
NICNAS	NA
EU Annex	NA
ECHA	NA
ACGIH	—
DFG	NA
SCOEL	—
HCOTN	—
IARC	NA

Source	Notations
US NIOSH	NA

NA = not applicable (a recommendation has not been made by this Agency); — = the Agency has assessed available data for this chemical but has not recommended any notations

Skin notation assessment

Calculation
Insufficient data to assign a skin notation.

IDLH

Is there a suitable IDLH value available?	No

Additional information

Molecular weight:	195.08
Conversion factors at 25°C and 101.3 kPa:	1 ppm = Number mg/m^3; 1 mg/m^3 = Number ppm
This chemical is used as a pesticide:	☐
This chemical is a biological product:	☐
This chemical is a by-product of a process:	☐
A biological exposure index has been recommended by these agencies:	☐ ACGIH ☐ DFG ☐ SCOEL

Workplace exposure standard history

Year	Standard
Click here to enter year	

References

American Conference of Industrial Hygienists (ACGIH®) (2018) TLVs® and BEIs® with 7th Edition Documentation, CD-ROM, Single User Version. Copyright 2018. Reprinted with permission. See the *TLVs® and BEIs® Guidelines section* on the ACGIH website.

EU Scientific Committee on Occupational Exposure Limits (SCOEL) (2011) Recommendation from the Scientific Committee on Occupational Exposure Limits for Platinum and Platinum compounds. SCOEL/SUM/150.

Health Council of the Netherlands (HCOTN) (2008) Platinum and platinum compounds. Health-based calculated occupational cancer risk values. The Hague: Health Council of the Netherlands; publication no. 2008/12OSH.