

6/1/2010

Review: NIOSH Skin Notations Review - Group A

Profile Number: 03

Profile Title: Hydrogen Fluoride (HF)

Summary

Both reviewers generally agreed that the document clearly outlines the systemic health hazards, direct health hazards, and immune-mediated responses associated with exposures of the skin to Hydrogen Fluoride. Reviewer 1 specifically points out fatalities from systemic reactions. The scientific rationale was clearly described and judged to adequately support the skin notation assignments.

Recommendations

- Insert a sentence in the corrosion section on the topical antidote for chemical burns from HF, calcium gluconate. (Q10, Reviewer 2)
- Replace "hydrogen fluoride" with "hydrofluoric acid" for clarification, since a gas cannot be a solvent. (Q11, Q12 Reviewer 2)
- Note that HF is routinely used in analytical chemistry labs to decompose siliceous materials in digestions for metals and elements. Lab personnel comprise an important workforce. (Q12, Reviewer 2)
- Regarding Production and Uses: suggest a Potential Exposure Workforces subheading be inserted to guide industrial hygienists as to what worker types might be exposed to HF starting with "All workers who handle HF." (Q12, Reviewer 2)
- Write-up should be more industrial hygienist friendly. (Q13, Reviewer 2)

Verbatim Reviewer Comments

1. Does this document clearly outline the systemic health hazards associated with exposures of the skin to the chemical? If not, what specific information is missing from the document?

Reviewer 1:

This document presents detailed information about the systemic health hazards that can result from exposures of the skin to HF. Fatalities following occupational dermal exposure, fatalities following exposure to HF in household products, the mechanism of death following dermal exposure, numerous animal studies of dermal exposure causing death, and case reports of single dermal exposures causing death are clearly discussed in this document.

Reviewer 2:

Yes

2. If the SYS or SYS (FATAL) notations are assigned, is the rationale and logic behind the assignment clear? If not assigned, is the logic clear why it was not (e.g., insufficient data, no identified health hazard)?

Reviewer 1:

The SK:SYS (FATAL) notation is assigned to HF. The rationale and logic justifying this assignment are clearly presented in this document and include a discussion of the evidence from case reports and from

animal studies that HF is easily absorbed through the skin and can lead to systemic effects that include systemic fluorosis, hypocalcemia, hyperkalemia, hypomagnesemia, which can cause cardiac arrhythmia and eventual death.

Reviewer 2:

Yes

3. Does this document clearly outline the direct (localized) health hazards associated with exposures of the skin to the chemical? If not, what specific information is missing from the document?

Reviewer 1:

This document clearly presents the direct health hazards associated with exposures of skin to HF. It describes numerous case reports and animal studies that provide an abundance of evidence that HF is corrosive to the skin.

Reviewer 2:

Yes

4. If the DIR, DIR (IRR), or DIR (COR) notations are assigned, is the rationale and logic behind the assignment clear? If not assigned, is the logic clear why it was not (e.g., insufficient data, no identified health hazard)?

Reviewer 1:

The rationale and logic for assigning the SK:DIR (COR) notation to HF are clearly presented by discussing the data from case reports and animal studies reported in the literature that demonstrate the corrosivity of HF.

Reviewer 2:

Yes

5. Does this document clearly outline the immune-mediated responses (allergic response) health hazards associated with exposures of the skin to the chemical? If not, what specific information is missing from the document?

Reviewer 1:

This document clearly reports that there are no occupational exposure studies or diagnostic patch tests in humans or predictive tests in animals demonstrating an immune-mediated response to dermal exposure to HF.

Reviewer 2:

None found.

6. If the SEN notation is assigned, is the rationale and logic behind the assignment clear? If not assigned, is the logic clear why it was not (e.g., insufficient data, no identified health hazard)?

Reviewer 1:

The SK:SEN notation is not assigned to HF.

Reviewer 2:

Not assigned

7. If the ID^(SK) or SK were assigned, is the rationale and logic outlined within the document?

Reviewer 1:

These notations were not assigned to HF.

Reviewer 2:
Not assigned

8. Are the conclusions supported by the data?

Reviewer 1:
In each area of this document the conclusions are supported by the data. I agree with the composite skin notation of SK:SYS (FATAL)-DIR (COR) for HF.

Reviewer 2:
Yes

9. Are the tables clear and appropriate?

Reviewer 1:
The tables are clear and appropriate in this document.

Reviewer 2:
Yes

10. Is the document organized appropriately? If not, what improvements are needed?

Reviewer 1:
This document is organized very well and appropriately.

Reviewer 2:
Good organization.

I would insert a sentence in the corrosion section on the topical antidote for chemical burns from HF: calcium gluconate.

11. Is the language of the manuscript acceptable as written? If not, what improvements are needed?

Reviewer 1:
The language used in this manuscript is clear and concise.

Reviewer 2:
1. Production and uses. I suggest you replace "hydrogen fluoride" with "hydrofluoric acid" for clarification purposes, since a gas cannot be a solvent.

12. Are you aware of any scientific data reported in governmental publications, databases, peer reviewed journals, or other sources that should be included within this document?

Reviewer 1:
I am not aware of any additional scientific data that should be included in this document.

Reviewer 2:
1. Re Chemical: Hydrogen fluoride (HF). I would suggest a brief notation like. "Hydrogen fluoride is a gas. Its aqueous solution is called hydrofluoric acid. Hydrogen fluoride gas in the presence of steam, or water mist may form hydrofluoric acid. The current report mostly concerns hydrofluoric acid."
2. Re Production and Uses: It should be noted that HF is routinely used in analytical chemistry laboratories to decompose siliceous materials in digestions for metals and elements. This is an important use that should be mentioned. Laboratory personnel comprise an important workforce.
3. Re Production and Uses: I suggest a Potential Exposure Workforces subheading be inserted here to

help guide industrial hygienists as to what worker types might be exposed to HF starting with "All workers who handle HF"

13. What is your final recommendation for this manuscript? (Do you agree with the scientific rationale that serves as a basis for the skin notation assignments?)

Reviewer 1:

I recommend that this document be accepted as the final SK Profile for HF. I believe the scientific rationale used in this document supports the notation assignments made for HF.

Reviewer 2:

Yes I agree with the scientific rationale. The write-up should be more industrial hygienist friendly.