

## EYE AND SKIN HYDROFLUORIC ACID SPLASHES : ABOUT 32 CASES RINSED WITH HEXAFLUORINE®

Presented at HPA Chemical Conference 2005 - Wales, December 2005

### Introduction

Hexafluorine® is a first aid rinsing solution for eye and skin splashes due to hydrofluoric acid<sup>1,2,3,4</sup> (HF). It can, thanks to its chelating and hypertonic properties, stop simultaneously the acidity and the toxic acid of fluoride ions and avoid their penetration<sup>5</sup>.

### Methods

A review of all cases of hydrofluoric acid eye and skin splashes that happened in the industry and that were initially rinsed with Hexafluorine®.

### Results

32 cases of eye and skin splashes due to hydrofluoric acid were rinsed with Hexafluorine® as first aid rinsing solution.

#### CASE REPORTS

Year	Number of cases	Compagny/country	Exposure	Body area	Type of rinsing	Consequence
1997	1	Woeste Germany	HF/HCl* bath	Complete immersion	**Hexafluorine® on the body ***Water Eyewash	**Light burns on the abdomen and the back ***Severe burn on the left eye
1996	1	Arc International France	70 % HF vapor	Right	Hexafluorine®	Light and non painful erythema. Ointment with a calcium gluconate gel on the day after, no loss of work
1996	1	Krupp Germany	38 % HF	One eye	Hexafluorine®	No burn, no loss of work
1993	2	Alcan Germany	5%HF	Body	Hexafluorine®	No burn, no loss of work

\* : 30 litres of 31/33% hydrochloric acid and 233 litres of 59% hydrofluoric acid in 1505 litres of water

#### SERIE OF 11 CASES IN MANNESMANN (Remscheid, GERMANY), from 1994 to 1998

Exposure	HF 40%	HF 6% / HNO <sub>3</sub> 15%	HF 40%	HF 6% / HNO <sub>3</sub> 15%
Number of cases	1	1	5	5
% involved area	2 eyes*	1 eye	0.2 - 1 - 4.5 - 4.5 - 16.5*	0.2 - 2.25 - 4 - 4.5 - 10.5
First rinsing	Hexafluorine®	Hexafluorine®	Hexafluorine®	Hexafluorine®
Second rinsing	Hexafluorine®	Hexafluorine®	Hexafluorine®	Hexafluorine®

\* both eye and skin splash due to 40% HF



**Results : There were no after effects, neither secondary care nor losses of work were necessary for all these hydrofluoric acid splashes rinsed in emergency with Hexafluorine®.**

#### SERIE OF 16 CASES IN AVESTA (several plants, Sweden), form 1998 to 1999

Number of cases	Exposure	Body surface	Time of contact	Loss of work (day)
2	70% HF	Left forearm-oral cavity	< 1 min	0 - 1
1	HF (unknown concentration)	1 eye	< 1 min	0
2	HF / HNO <sub>3</sub> pH = 1	1 eye	< 1 min	0 - 0
1	HF / HNO <sub>3</sub> pH = 1*	1 eye	3 - 5 min	3
1	HF / HNO <sub>3</sub> pH = 1	2 eyes	< 1 min	0
1	HF / HNO <sub>3</sub> pH = 1	1 thigh	< 1 min	0
2	HF / HNO <sub>3</sub> pH = 1	2 thighs	1h - 1h30	2 - 2
1	HF / HNO <sub>3</sub> pH = 1*	Face	3 - 5 min	3
2	HF / HNO <sub>3</sub> pH = 1	Face + oral cavity - Forehead	< 1 min	1 - 1
3	HF / HNO <sub>3</sub> pH = 1	Forearm - Arm + hand - Two elbows	< 1 min	0 - 0 - 1
1	HF / HNO <sub>3</sub> pH = 1	Wrists	2 h	0

\* HF / HNO<sub>3</sub> / H<sub>2</sub>SO<sub>4</sub> pH = 1 represents the same ocular and cutaneous splash

**Results : Immediate pain relief, no after effects. In 75% of the cases, including both 70% HF splashes, no secondary were reported and the average of days lost from work is inferior to 1 day ( $\sigma = 1.1$ ).**

All 32 cases due to hydrofluoric acid were rinsed with Hexafluorine® as first aid rinsing solution. No serious burn was noted in any case. It was not necessary to have any prolonged and intensive secondary care.

### Conclusion

The first aid rinsing with Hexafluorine® allowed to stop the appearance of the burn due to hydrofluoric acid or to decrease strongly its seriousness.

### References

- (1) Hall AH, Blomet J, Gross M, Nehles. J SSA Journal Vol 14 - Summer 2000 pp 30-33
- (2) Mathieu L, Nehles J, Blomet J, Hall AH. Vet Hum Toxicol 2001, 43 (5), 263-265
- (3) Peltier A, CND 2000, 178, 37-41
- (4) Söderberg K, Kuusinen P, Mathieu L, Hall AH. Vet Hum Toxicol 2004, 46 (4), 216-218
- (5) Burgher F, Blomet J, Mathieu L 1996 Le Risque Chimique et la Santé au Travail, Ed PREVOR, France, ISBN2-9510211-0-0

Pictures given by Mannesmann