

The **DIPHOTERINE**[®] solution

CAPTURES THE CORROSIVE AND ELIMINATES IT



PREVOR

ANTICIPATE AND SAVE

Toxicology Laboratory & Chemical Risk Management

In accordance with the Standard EN 15154

CE 0459



The chemical burn

Two categories of chemicals can provoke a burn by a direct contact: corrosives and irritants. The seriousness of the chemical burn depends on the number of cells destroyed and will be more significant in the case of corrosives. In some cases, the aggressive product can also have toxic or harmful effects, the consequences of which should not be neglected.

■ The aggressive chemicals

CORROSIVE



Concentrated acids and bases



SIGNIFICANT REACTIONS



IRREVERSIBLE EFFECTS

IRRITANT



Solvents, oils...



WEAK REACTIONS



REVERSIBLE EFFECTS



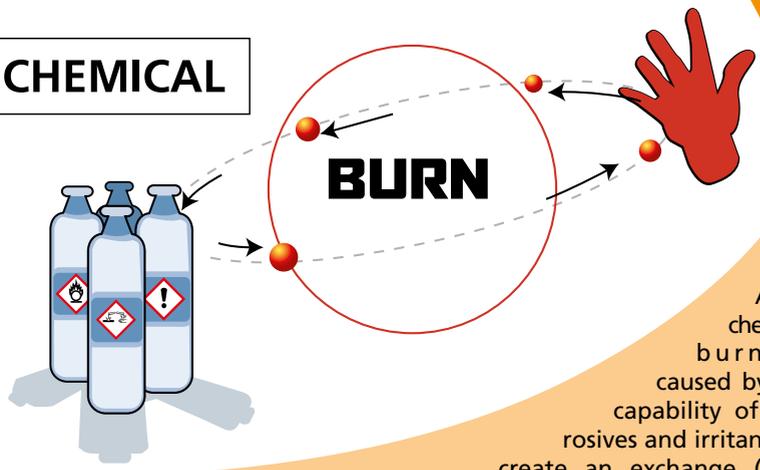
Specific danger if combined with toxic risk
(example - Hydrofluoric acid)

■ The mechanism of a chemical burn

THE EXCHANGE

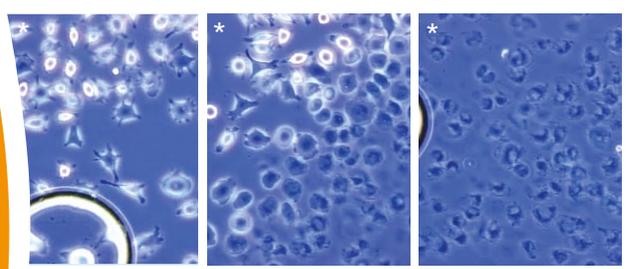
SKIN and EYE

CHEMICAL



A chemical burn is caused by the capability of corrosives and irritants to create an exchange (ion, proton, electron...) with the tissues of the skin or the eye. The degree of the burn will depend on the number of molecules destroyed and on the type of modification (reversible or irreversible)

■ The action of soda NaOH:



Healthy cells as seen under a microscope

Addition of soda 0.5N (2%)

Cells are completely destroyed

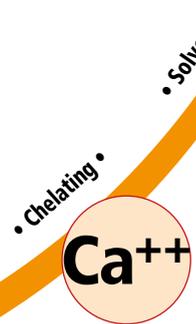
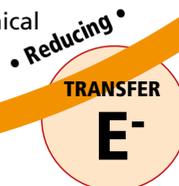
* Picture source: ACTO, Prof. Norbert Schrage, Aachen.



The principles of emergency washing

➔ To stop the aggressive reactions

- There are 6 types of aggressive chemical reactions

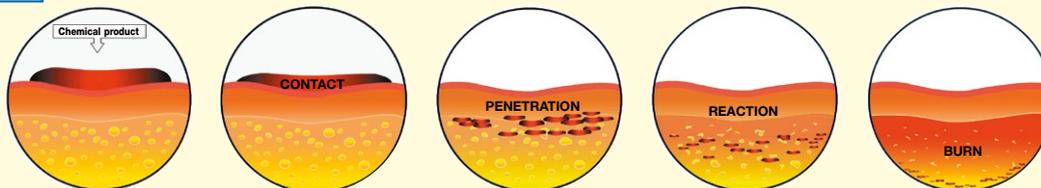


• Solvent •
**ACETONE
ETHANOL**

To be effective regardless of the type of accident and to avoid the risk of error for the victim, it is necessary to be able to stop these 6 aggressive reactions.

A POLYVALENT PRODUCT IS ESSENTIAL

➔ To stop the evolution of the burn



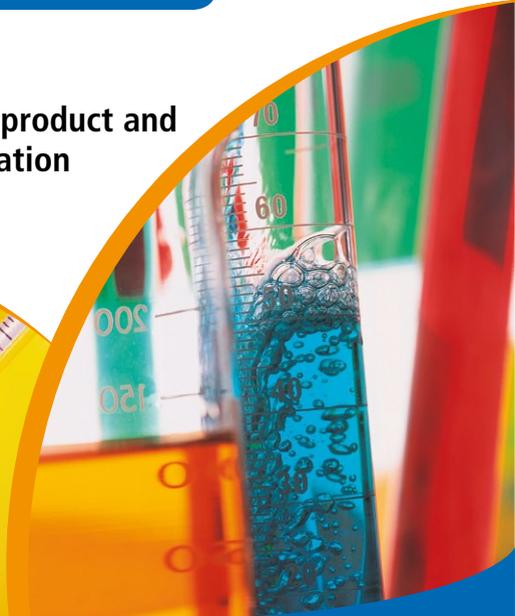
A chemical burn is initiated by the contact between the aggressive product and the skin or the eye. Following this contact, a part of the aggressive chemical will penetrate into the tissue and cause destruction of the cells.

To effectively decontaminate the splash, it will be necessary, not only to decontaminate the product on the surface, but also to control its penetration inside the tissue.

A PRODUCT ABLE TO STOP THE AGGRESSIVE CHEMICAL IS ESSENTIAL

■ Factors influencing the penetration

- The length of exposure time
- The temperature
- The type of product and its concentration



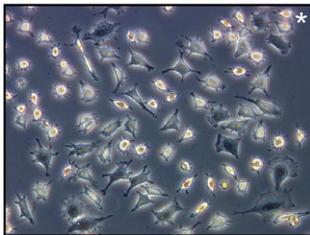
First-aid treatment: From water...

■ The principles of washing with water

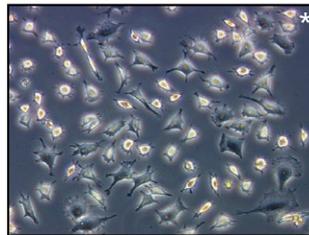
- a washing of the surface to remove quickly the aggressive product
- the dilution of the chemical to reduce its aggressiveness
- a universal product avoids the risks of error at the time of the accident

■ What are its limitations?

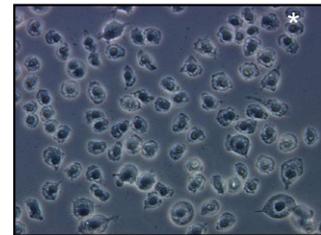
- the concentrated products which penetrate very quickly
- the intervention time of 10 seconds which is not always achievable
- the washing comfort : risk of hypothermia under a water shower
difficulty to open the eye



Healthy cells as seen under a microscope.



The beginning of washing: water penetrates inside the cells and makes them expand.

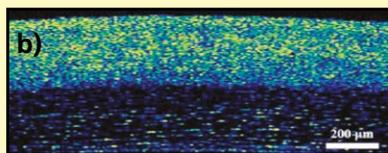
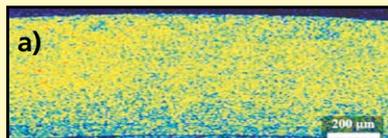


The end of washing : cells are destroyed because water causes them to burst.

*photo : ACTO, Pr. Norbert Schrage, Aix la Chapelle

Ex vivo test on the eye

Efficacy of the active washing with the DIPHOTERINE® solution:
Ex Vivo EVEIT Model - OCT



Rabbit corneas, 16 minutes after an application of 500 µL 1M NaOH for 20 s.

- without any washing
- with a DIPHOTERINE® solution washing

Corrosive penetration is stopped. The structural changes in the stroma are negligible. The endothelium is completely preserved.

Sources : Burgher, Mathieu, Fosse, Rihawi, Gérard, Merle, Schrage, Ocular chemical burn : Experimental proof of the influence of key parameters on the diffusion and the decontamination. 114th Congress of the SFO Paris May 2008.

The ideal product in case

Retain the advantages of water:

- Fast washing of the surface
- Single protocol

EXPERIENCE FEEDBACKS:

Result on the eye with a delayed washing



The DIPHOTERINE® solution for a better healing

> Ammonia ocular burn, washed

- Assessment before washing Roper-Hall scale, which usually
- After a washing with 1 litre splash and 6 months of application without requiring a corneal

Sources : Gérard M, Merle H, Chiambaretta F, R. Ocular burn. Burns 2002;7:670-3.

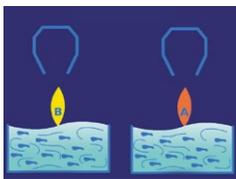
The DIPHOTERINE® solution is recognized as a reference solution by the SFO, F



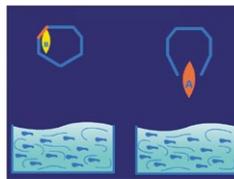
...to the DIPHOTERINE[®] solution

■ The principles of washing with the DIPHOTERINE[®] solution

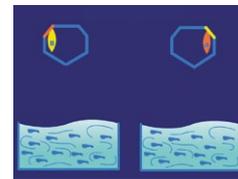
- It is a liquid which enables it to obtain the same effect as water on the surface of the skin or eye.
- The DIPHOTERINE[®] solution is an amphoteric chelating agent, which enables it to stop the aggressiveness of the chemicals in a polyvalent way (*for HF and its derivatives, use the HEXAFLUORINE[®] solution*).
- The DIPHOTERINE[®] solution mechanism can be illustrated as follows:



BASE ACID
The DIPHOTERINE[®] solution will attract the chemical in contact with the tissues.

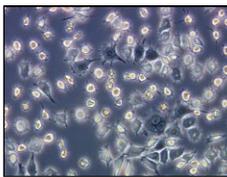


BASE ACID
The acid site of the DIPHOTERINE[®] solution will fix bases to make them harmless.

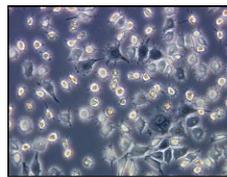


BASE ACID
The basic site of the DIPHOTERINE[®] solution will fix acids to make them harmless.

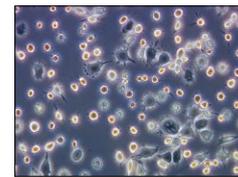
- The DIPHOTERINE[®] solution, unlike water, will **stop the penetration** of the chemical.



Healthy cells as seen under a microscope.



Beginning of the washing with the DIPHOTERINE[®] solution: the cells contract slightly.



End of the washing: the cells are preserved.

of a chemical splash must:

Bring improvements to compensate for the limitations of water:

- Guarantee a total efficacy whatever the product
- Increase the intervention time
- Improve washing comfort to increase the effectiveness

tion retains an interest in delayed washing

ned with the DIPHOTERINE[®] solution after 1 hour

with the DIPHOTERINE[®] solution: grade IV burn on the ally requires a corneal graft to achieve healing.

of the DIPHOTERINE[®] solution within one hour after the appropriate care, the victim regained a visual acuity of 14/20 graft, a first in the history of medicine.

gal Rigal D, Schrage N. An amphoteric rinse used in the emergency treatment of a serious

RESULTS

EXPERIENCE FEEDBACK:

Results on the skin in emergency

Independent retrospective study conducted by Dr Donaghue, chief medical officer of Alcoa Australia (alumina refineries). It covers 180 cases studied from May 1st 2005 to April 30th 2008, specifically on the skin.

Severity scale and associated signs	FIRST AID EMERGENCY SOLUTION	
	First washing with a DIPHOTERINE [®] DAP	First washing with water
1 (no sign)	52,9% (73 cases)	21,4% (9 cases)
2 (erythema)	39,1% (54 cases)	54,8% (23 cases)
3 (blisters)	7,2% (10 cases)	19,0% (8 cases)
4 (more serious)	0,7% (1 case)	4,8% (2 cases)
TOTAL	100% (138 cases)	100% (42 cases)

Criteria used:

- 1 : Time elapsed between the chemical splash and clinical evaluation.
- 2 : Time elapsed between the chemical splash and application of the DIPHOTERINE[®] solution.
- 3 : Percentage of skin surface affected by the chemical.



How to use A sterile washing solution

Dispensers for the skin, in the form of micronised sprays (optimising the surface of contact)

ALL THESE PACKAGES MEET THE NEW EUR



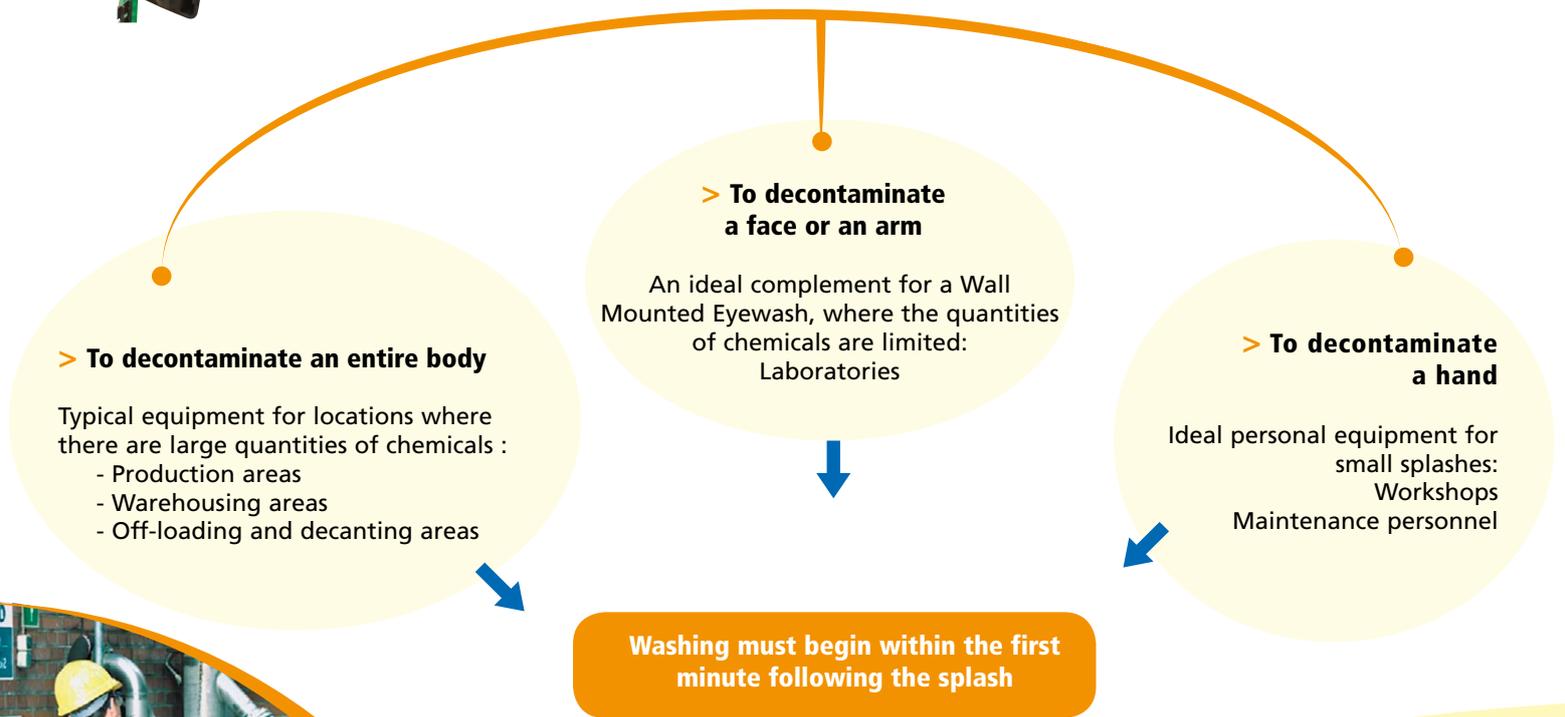
DAP



MINI DAP



MICRO DAP



Protocol for DIPHOTERINE®



1/ Go away from the danger



2/ Get undressed

the DIPHOTERINE[®] solution?

To be used immediately after the accident

Dispensers for the eyes, equipped with an ergonomic eyecup, which assists the opening of the eye for a more effective washing

EUROPEAN STANDARD EN 15154 PARTS 3 AND 4



> To decontaminate an eye

To carry on oneself or to put in the work area:

- Laboratories
- Warehousing areas

Portable eyewash: when the equipment must be mobile: first aid kits, emergency vehicles, infirmaries

> Kit for chemical splashes

In areas where fixed equipments are appropriate:

- Laboratories
- Production areas
- Warehouse areas
- Decanting areas

> Personal equipment to decontaminate an eye:

Ideal for the maintenance personnel
Imperatively worn by individual

Washing must begin within the first 10 seconds following the splash

Washing must begin within the first minute following the splash

or the first aid intervention with the solution in the event of a chemical splash



3/ Wash as quickly as possible, respecting the instructions for use of the DIPHOTERINE[®] solution



4/ Alert



5/ Seek medical advice





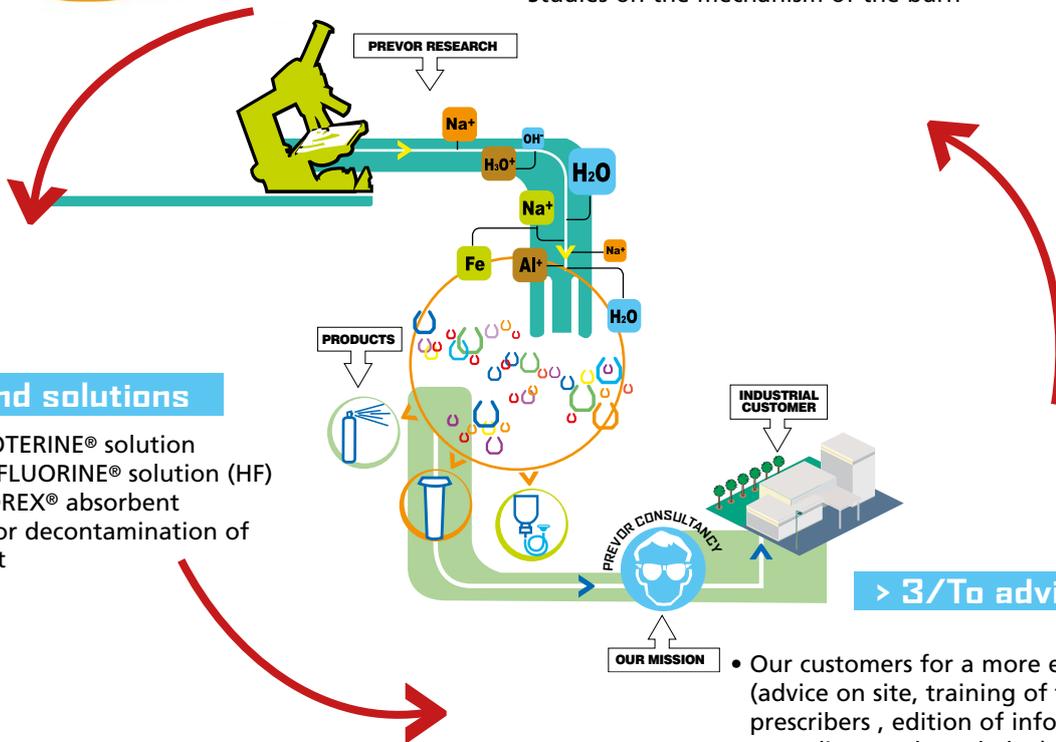
PREVOR

Science to improve the safety

Our Missions

> 1/To understand the chemical products

Research on the toxicity of the products
Studies on the mechanism of the burn



> 2/To find solutions

- => The DIPHOTERINE® solution
- => The HEXAFLUORINE® solution (HF)
- => The TRIVOREX® absorbent
- => Solution for decontamination of equipment

> 3/To advise

- Our customers for a more effective use (advice on site, training of the users and prescribers, edition of informative works regarding our knowledge)
- Institutions involved with the chemical risk

Reference organisations They trust us

AIR LIQUIDE - AKZO NOBEL - AOSTE - AP-HP - ARCELORMITTAL - ARJOWIGGINS
ARKEMA - ASTRAZENECA - BAYER - BONDUELLE - BRENNTAG - CARGILL - CEA
CEPHALON - CLARIANT - COCA COLA - CRISTAL UNION - DANONE - DASSAULT
DCNS - DOW - ECOLAB - EDF - ERAMET - FAREVA - GDF SUEZ - HOLCIM
HUNTSMAN - IBERDROLA - IMERYS - INTERNATIONAL PAPER - IPSEN - IRSN

ITALCEMENTI - LACTALIS - L'OREAL - NESTLE - PREZIOSO - QUARON - RIO TINTO
ROQUETTE - ROULLIER - SAFRAN - SAINT GOBAIN - SAIPOL - SANOFI - SERVIER
SIAAP - SIGMA ALDRICH - SNCF - SOLVAY - SUDZUCKER - TEREOS - TERRENA
THALES - TOTAL - VALEO - VALLOUREC ET MANNESMAN - VEOLIA - VINCI - YARA
YVES ROCHER...



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