DIPHOTERINE®

The active washing
of chemical splashes

Decreases the severity of the lesion

Relieves the pain

Simplifies the emergency

Reduces maintenance costs

Active

Polyvalent and Safe

Efficient with less volume and less time

Quick intervention

Increases the margin of intervention

Available everywhere

For immediate use in all circumstances

Eliminates the risk of hypothermia

CONFORM EN 15154

PREVOR
ANTICIPATE AND SAVE
Toxicology Laboratory & Chemical Risk Management

PREVOR GROUP

What is a chemical burn?

Chemical lesions are due to the effects of corrosive and irritant chemicals on the skin and the eye.

Despite the scarcity of chemical burns (3%), they are responsible for 30% of burn deaths.(*)

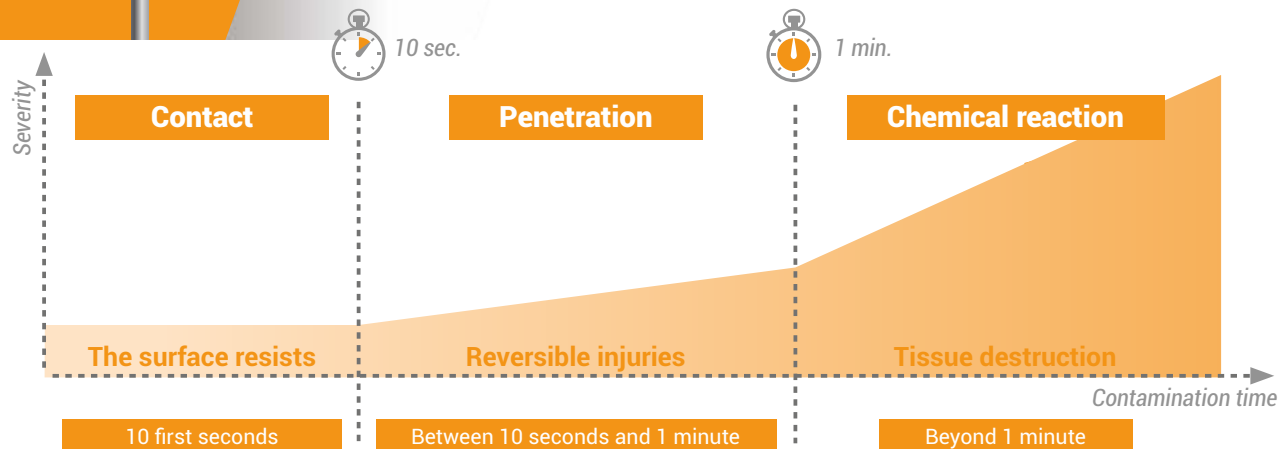
(*) : Annals Burn Fire Disasters 2018 Mars 31 31(1):4-9

Chemicals classified as corrosive and irritant are mainly acids, bases, oxidizers, reducing agents, alkylating substances or solvents.

The formation mechanism of a chemical lesion consists in 3 steps: contact between the tissue and the chemical, penetration of the product into the tissue, and reaction between the product and the targetted biological compounds.

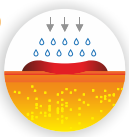
There are 7 types of aggressive chemical reactions

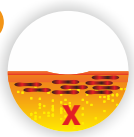
What is the mechanism of a chemical burn?



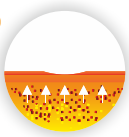
- **The contact phase** : during the first 10 seconds, the surface of the skin and eye resists to the chemical penetration.
- **The diffusion phase** : between the first 10 seconds and 1 minute, the chemical product starts to penetrate but only reversible injuries occur.
- **The chemical reaction phase** starts after 1 minute. In this phase, the injuries are going to develop. They strongly depend on the aggressiveness of the chemical product: in particular the type of chemical, its concentration and its temperature. The injuries might, depending on these factors and on the time of contact, develop in irreversible injuries. Some of them will, as a result, require a surgical intervention.

How can we act against the progression of chemical lesions?

1. 
CONTACT
To remove the chemical from the surface of the tissues, a mechanical effect of washing is needed like the water washing

2. 

PENETRATION
To reduce the development of deep injuries, the diffusion of the chemical product has to be stopped

3. 
REACTION
To avoid the chemical reaction to happen, the chemical product has to be extracted from the tissues

American standards recommend that the water safety shower be installed 10 seconds away from the risk area in order to be effective.

From water to Diphoterine® solution from passive to active rinsing

The basics of water rinsing

- A surface rinsing to quickly remove the aggressive product.
- A dilution of the chemical product to reduce its aggressiveness.
- A universal product to avoid the risk of errors in the event of an accident.

The limitations of water rinsing

- The comfort of rinsing:
  - Risk of hypothermia under a water shower
  - Difficulty opening the eye
- The 10-second response time is not always realistic.
- Concentrated products that penetrate very quickly.

Corneal rinsing comparison

OCT images of rabbit corneas exposed to 1 M caustic soda (NaOH) for 20 seconds.

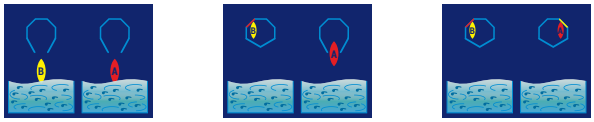
The green/yellow color represents damages to the cells inside the cornea.

Water rinsing: the chemical penetrates the entire depth of the cornea and the strong coloration indicates an eye lesion.

The basics of rinsing with Diphoterine® solution

- It is a liquid that achieves the same effects as water to wash rapidly the surface of the skin or eye with a single protocol.
- Diphoterine® solution is an amphoteric chelator, which allows it to stop and extract chemicals in a polyvalent way (*).

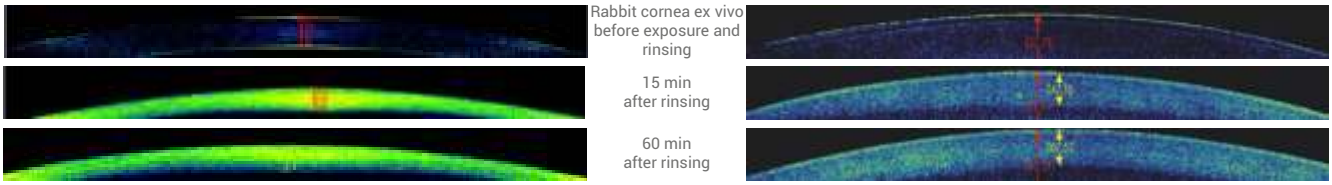
The functioning of Diphoterine® solution can be schematized as follows:



(*): Diphoterine® has a limited action on HF and its derivatives, prefer the use of Hexafluorine®.

- Making improvements to water limitations:
  - o Increase response time
  - o Guarantee maximum efficiency regardless of the product involved
  - o Improve the comfort of washing to gain efficiency
  - o Relieve the pain caused by the chemical product

Rinsing with Diphoterine® solution: the penetration of the chemical product is stopped and the weak coloration indicates no lesions.



Ref. : F. Spöler (1), Michael Foerst (1), Markus Frentz (2), F. Kurz (1) Norbert Schrage (3) EAPCCT Congress Sevilla 2008

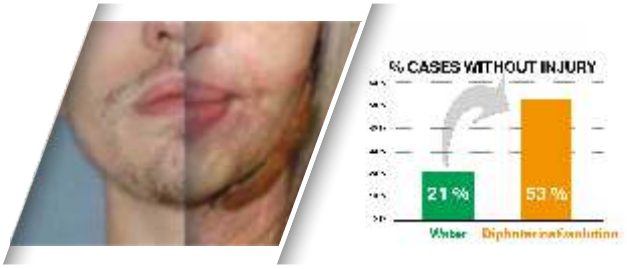
Diphoterine® solution maintains the advantages of water and improves its efficiency

Diphoterine® solution is an active emergency solution that is applied after a splash to remove the product from the surface, stop the penetration and remove the chemical from the tissues. These 3 actions stop the evolution of the chemical lesion. This reduces the related complications and sequelae are less severe. In case of delayed use of Diphoterine® solution on the chemical splash (after 1 minute), it will stop the progression of the lesion and facilitate therapeutic support and secondary care.

Time of intervention with Diphoterine®	Intervention < 1 min.		Intervention - 30 min.		Intervention 1 - 24 hrs.	
	No lesions in most cases		**Reduction of medical treatment**		**Reduction of surgeries**	
	Publication	**Conclusion**	**Publication**	**Conclusion**	**Publication**	**Conclusion**
	• Alan H. et al., 2002, Vet. Human Toxicol. • Nehles J. et Al., 2006, Cutan. Ocul. Toxicol.	• Decrease the severity of lesions • No or little secondary care required • No or little work loss after the accident • Not or little sequelae	• Schrage N., 2018, presentation SFO	• Decrease the severity of lesions • Reduction of hospital costs	• Gérard M., 2002, Burnsh • Merle H., 2005, Burnsi • J.L. Fortin et Al. 2017, A. of Burns and Fire Disasters • Schrage N., 2018, presentation SFO	• Decrease the severity of lesions • Reduction of pain • Reduction of hospital costs • Reduction of healing time, even in case of delayed rinsing
	• Alan H. et al., 2002, Vet. Human Toxicol. • Nehles J. et Al., 2006, Cutan. Ocul. Toxicol. • F. Simon, 2000, presentation SFETB • Donoghue A., 2010, International J. of Dermatology • Cavallini M.,2010, Journal of plastic Dermatol.	• Decrease the severity of lesions • No or little secondary care required • No or little work loss after the accident • Not or little sequelae	• P. Kulkarni, S. Jeffrey, Burns open 2018	• Reduction of pain • Decrease in work loss in the aftermath of the accident • Reduction of hospital costs	• Verbelen J. et Al., 2017, presentation at British Burn Association • J.L. Fortin et Al. 2017, A. of Burns and Fire Disasters	• Reduction of pain • Decrease the severity of lesions • Reduction of hospital costs

Decreases the severity of the lesion

Using Diphoterine® solution in the first minute prevents prolonged contact of the chemical product with the tissues. This reduction of contact thus reduces the seriousness or the risk of sequelae. Even when used late, it reduces the progression of chemical lesions.



« When I had to use Diphoterine® solution for a few drops splashed on an arm, afterwards there were no consequences. As soon as it starts to tingle a little bit, you apply it and you don't feel anything afterwards." *(Bruno Bainville)*

Simplifies the emergency

Thanks to its polyvalence, Diphoterine® solution can be used on almost any chemical product. It has been tested on the 7 types of chemicals. In case of doubt Prevor will verify the effectiveness of the solution on the chemicals you use.

The efficiency of Diphoterine® solution allows you to use containers with small volumes. These have been developed have been developed in an ergonomic way in order to have a conformable and smooth washing.

"It is very easy to use : apply, let it run down and use the entire content down your face." *(Lucie Montignies, Safety communication officer at L'Oréal)*

Quick intervention

As soon as a chemical accident occurs, a time trial is triggered to help the injured worker, who needs to be decontaminated and relieved quickly. With instant action, Diphoterine® solution makes it possible to apply first aid as quickly as possible to a person who has been the victim of a chemical accident. Practical in its use, Diphoterine® solution is a significant time saver compared to water for the victim of a chemical product, while waiting for the arrival of the emergency services.

"It's quicker, that's for sure, there are washing stations in different parts of the plant, we go get what we need right away ." *(Damien Poirot, Beurre d'Isigny)*

Available everywhere

Diphoterine® solution either carried on oneself or used by the intervention teams allows you to always have a first aid solution at hand. You are therefore safe no matter where you are.

"You can have it in your pocket, on site or in emergency vehicles. No questions asked, and the effects are felt directly." *(Lucien Bodson anesthesiologist)*

Eliminates the risk of hypothermia

Water washing standards recommend the use of tempered water to prevent an accident victim from having to stop washing due to cooling and/or hypothermia. The quick washing due to the efficiency of Diphoterine® solution avoids the risk of stopping the washing prematurely.

"Diphoterine® seems much faster to me than water. I have also noticed an absence of side effects" *(Lucien Bodson, anesthesiologist)*

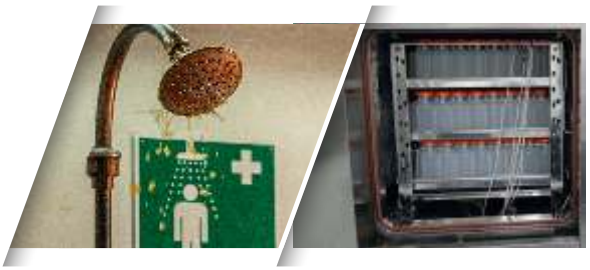
Relieves the pain

By quickly removing the chemical from the tissues, Diphoterine® solution relieves the victim, enabling them to open their eyes and improve the effectiveness of the washing. This allows a calming of the victim and decreases the tension around them.

"When you have it on the premises and apply it, it immediately removes the pain. I am a workplace paramedic. Every time I have had to use it on my co-workers, it has been flawless." *(Damien Poirot, Beurre d'Isigny)*

Reduces maintenance costs

Safety showers are by definition only activated very rarely, at the time of the accident. This lack of activity causes water to stagnate in the shower and in the specific part of the supply. This forms stagnant water that deposits limescale, causes the shower and pipes to rust and finally becomes contaminated with bacteria, which sometimes makes them unusable in an emergency. This is all the more worrying, as the shower has a long specific connection. To avoid this problem, the standards recommend that showers requiring supervision should be operated weekly. Diphoterine® solution, manufactured and packaged in sterile conditions, only needs to be serviced every two years.



"Regarding potability and clogging of the pipes, Diphoterine® has an advantage. This concerns the cleanliness of the piping system, because before you had to run a little water before applying it. With Diphoterine®, it's immediate" *(Sophie Sauvage / Responsable QSE)*

Increases the margin of intervention

With a chemical accident to be managed, the employees involved may lose their means and their reflexes to wash the person who is the victim of an aggressive product. For water to be effective, the optimum intervention time is limited to 10 seconds. Thanks to its active properties, Diphoterine® solution increases this margin of intervention to 1 minute. This extended margin allows an employee equipped with Diphoterine® solution to intervene in time to help his colleague.

"If you're blinded or otherwise hindered, it's not easy to find these water washing devices. With Diphoterine® you can see there is no such problem." *(Norbert Schrage, head of d'ophtalmology)*

For immediate use in all circumstances

Only medical devices of class IIa or higher may be used on an injured eye or skin. Clinical and toxicological studies of Diphoterine® solution have led to this classification. In case of splashes, you can use Diphoterine® solution without having to check if the eye or skin is still in good condition, this saves precious time to start the first aid care and makes it possible to carry out this care with nonspecialized personnel. Diphoterine® solution can be used by everyone, at any time.

"People treated on time following the correct protocol were left unharmed, after an hour there were no traces left." *(Damien Poirot, head of security at Beurre d'Isigny)*

Diphoterine® solution and all of its packaging are CE certified

Individual portable protections

SIEW

Individual equipment to decontaminate an eye

Ideal for maintenance teams, must be carried with you at all times.

Maximum efficiency by starting washing within the first 10 seconds after the splash.

MICRO DAP

Individual equipment to decontaminate a hand

Ideal for small splashes: manufacturing area, maintenance teams.

Maximum efficiency by starting washing within the first minute after the splash.

To keep a chemical accident an incident,
Prevor has developed holsters so that every employee, regardless of location, may begin emergency rinsing within the first few seconds.

Intervention protocol using Diphoterine® solution in case of chemical splashes

Go away from the danger

Undress

and meet the European Standard EN 15154 Parts 3 and 4

Collective mobile protections

To keep a chemical accident an incident,
Prevor has developed specific packaging so that
every employee has access to the full range of products.

WALL-MOUNTED STATION

1 • Wall-mounted washing station
Fixed and central washing point.

2 • Extreme cold Wall-mounted station
Withstands temperatures up to -40°C.

3 • Stainless steel wall-mounted station
Created for clean rooms.

PORTABLE SET

Portable set

COMPLETE STATION

1 • Complete station

2 • Mobile complete station

3 • Extreme cold complete station
Withstands temperatures down to -40°C.

MINI DAP

Equipment to decontaminate a face or an arm
Ideal complement when the quantities of chemicals are reduced such as in laboratories.

Maximum efficiency by starting washing within the first minute after the splash.

LPM

Equipment to decontaminate an eye
To be carried on oneself or to be placed around the workplace, such as laboratories and storage areas.

Maximum efficiency by starting washing within the first minute after the splash.

DAP

Equipment to decontaminate a full body
Common equipment in places where large quantities of chemicals are handled, such as production, storage and decanting areas.

Maximum efficiency by starting washing within the first minute after the splash.

Rinse as quickly as possible following the protocol of Diphoterine® solution

Alert

Seek medical advice

Prevor, is also:

Weekly training sessions on chemical risk management given by our trainers to ensure that employees learn and improve prevention throughout the company.

Registrations available at ***www.prevor.com***

Books to explore chemical risks and improve risk prevention.

University level training programs at the CNAM, combining theoretical courses and practical sessions in order to control chemical hazards. Courses given by Prevor researchers.

Advisors connected to a live chat and video conferencing service to answer your questions and help you ensure your company's day-to-day security.

Chat available on our website ***www.prevor.com***

A **video library** with a multitude of specific subjects on the theme of chemical risk to ensure your prevention training 24 hours a day.

Find our videos on our website ***www.prevor.com***

In-house training to optimize safety and first aid measures.

Monthly inter-regional seminars to optimize safety and first aid measures.

An **e-learning platform** consisting of several modules at the end of which you will obtain a certificate of compliance issued by PREVOR to enable you to train yourself on chemical risk prevention and self-assessment.

Available on ***elearning.prevor.com***

PREVOR ENVIRONMENT
HANDLING AND RESTORATION
Toxicology Laboratory and Chemical Risk Management

Now that you have saved your employees, what can you do about your floors, walls and equipment?

Neutralizing absorbent

TRIVOREX®

Can be used on all chemical products and declassifies corrosive wastes into common wastes.

Chemical decontaminant

SAFUREX®

Liquid chemical decontaminant against corrosive chemicals and/or fluorides.

Versatile absorbent

POLYCAPTOR®

Universal absorbent for common liquids. Leaves a dry, non-slippery floor and thus avoids the risk of slips and falls.

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