

**FLAMARK®**  
wins over fire!



Research, developmet and manufacturing  
of exceptional fire fighting products

## Flamark – one Eco-Friend company

Flamark is the leading company in the research, development and manufacturing of advanced fire fighting systems and devices. All of our products are tested and certified by a large number of state and independent certifying organizations in different countries around the world. The effectiveness of Flamark's products has been widely proven in practice.

In Flamark's product portfolio lie products which extinguishes various classes of fire, from A to F, and which are suitable to extinguish fires on electrical equipment. Some of products are automatic extinguishers, like Mabo (passive fire protection), while others are designed for manual use (active fire protection), and for different environments and situations.

Flamark's products are environmentally friendly and production is certified in accordance with ISO 9001, ISO 14001 and ISO OHSAS 18001 standards.

### Past and present

Company founder have a long experience in fire-fighting industry, and new management had solid basis to develop modern, high technologic company, which from 2004, year after year, come with leading solutions to hot fire-fighting market. Company's headquarter is now in Zagreb, Croatia (EU), where Flamark, in his own research laboratory, develop new products, improve



Product development

efficiency of existing products and made them even more environmental friendly.

### Corporate social responsibility

From a first day company acted with a highest corporate social responsibility. Production is certified according to ISO 14001, which means it is environmentally friendly, without pollution and without dangerous materials in production process.

The products themselves belong to **Eco-friend** category, which means full safety for soil, plants, animals and people, and have not side effects for safety or health. All products are environmentally certified and marked with **Green leaf** from Intertek, Germany.



Quality control

Flamark is sponsor of events important for professional and volunteer fire-fighters community and supports the adoption of new knowledge in fire-fighting.

### Worldwide presence

Flamark's advanced fire fighting systems and devices extinguish fires on all worlds continents. Worldwide distribution network is present in more than 50 countries and it is expanding every day.



## Certificates

In fire fighting certificates means all – they show the real nature of fire-fighting agents and devices and confirms their actual value in fight against fire.

Flamark recognized the importance of certificates in further work and development, so every product is certified in respectable laboratories all over the world on different usage characteristics. There are also many laboratory tests that measure individual parameters of each product and indicate its suitability for specific purposes.

Today are Flamark's products certified, among others, according to Green Leaf Mark, from Intertec, Germany for extremely low environmental impact, and according to CRS (Croatian Register of Ships) for use on boats and in marines instead of classic extinguishers.

Flamark as a company is also certified in accordance with ISO 9001, ISO 14001 and OHSAS 18001.

In the following table lists the certificates held by each individual Flamark's product:

Issuing Institution	Certificate or Test Report	Certificate Issuing Country	Flamark Ltd.	Mabo	Flamauto	Mab	Fire delete	Mar 1	Mar 2
QS	ISO 9001	Switzerland	●						
QS	ISO 14001	Switzerland	●						
QS	OHSAS 18001	Switzerland	●						
Al Hoty Stanger - Independent laboratory and material testing	Chemical analysis	Kingdom of Saudi Arabia		●		●		●	●
ANPI	Fire extinguisher performance test report	Belgium /EU		●		●		●	
Civil Defense	Approval certificate/Test report	Greece/EU		●					
Croatian Register of Shipping	Certificate of approval	Croatia/EU	●	●		●			
EMS - Fire Department	Fire extinguisher performance test report	South African Republic		●		●		●	●
Germanischer Lloyd	Approval certificate	Germany/EU		●		●			
Institute of Public Health	Biodegradability analysis	Croatia/EU		●		●		●	●
Institute of Public Health	Ecotoxicological analysis	Croatia/EU		●	●	●	●	●	●
Intertek	Green Leaf Mark	Germany/Denmark/EU		●	●	●	●	●	●
Intertek	Pre-export verification conformity program	France/Kingdom of Saudi Arabia		●		●		●	●
Intertek	The Product Safety Data Sheets	Denmark/Italy/EU		●	●	●	●	●	●
INZO Tuzla - Public Institute for Safety, Ecology and Standardiz.	Certificate of conformity	Bosnia and Herzegovina		●					
Ministry of Interior - Fire Fighting Institute	Fire extinguisher Performance certificate	Slovakia/EU		●		●		●	●
Ministry of Interior - Protection and Safety Directorate	Official opinion and approval	Kingdom of Bahrain		●		●			
SGS	Pre-export verification conformity program	Croatia/EU/Switzerland		●		●	●	●	●

For more information about certificates visit our web site [www.flamark.hr](http://www.flamark.hr).

## How it works

Flamarks products, like all good things, works on very simple principles. When liquid is thrown on a burned area, it happens quick and extremely strong cooling and suffocating effect. In a very short time temperature of the surface lowers to +3°C. Because the surface is no longer hot, it is not possible to re-ignite.

To complete a process of successfully fire extinguishing, all Flamark's products heavily eliminates smoke in area of extinguishing, so if there are any persons in the room, they can breathe without problems.

There are no any side effects or collateral damages for the persons or for the rooms.

### Detailed description of the action:

**1. Rapid cooling down effect** – here the liquid droplets cools burning material by rapidly absorbing heat from burning material, turns to steam and evaporates.

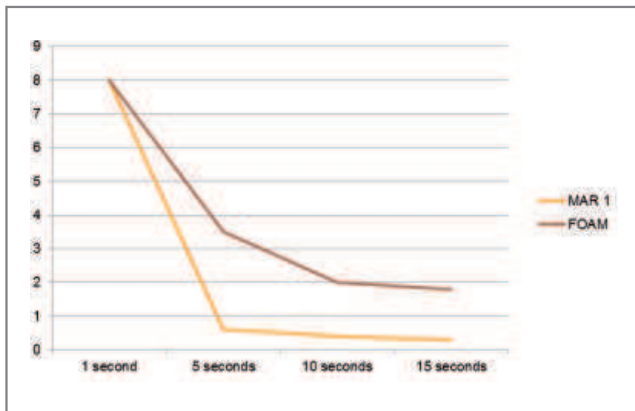


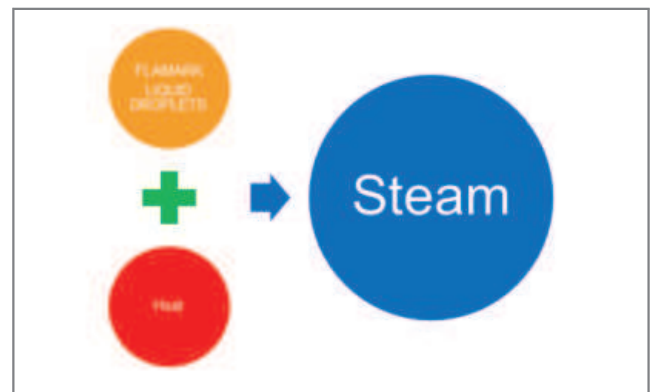
Diagram showing the temperature cooling down effect from 900°C to 30°C inside 10 seconds of Mar 1 fire fighting liquid solution.

**2. Inert steam** – it bounds free burning radicals and toxic gases with Flamark Inert Steam, so if there are any persons in the area, they can breathe without problems. That way creates an operator friendly environment, which is especially important effect.

**3. Adiabatic cooling process** – demonstrate unique effective process which is cooling the air by evaporation of Flamark liquid solutions. Flamark liquid solutions evaporation is the process by which Flamark liquid agent is quickly converted from liquid form to its vapor

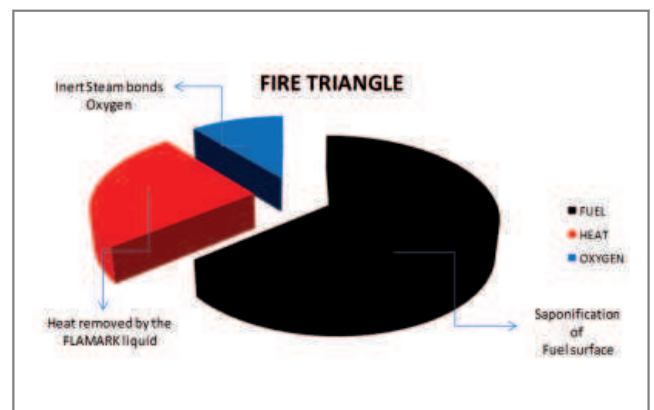
form, transferring its liquid mass to the atmosphere and removing heated air away from burning materials. During Flamark liquid solutions droplets evaporations, three simultaneous processes are going on:

- Transfer of heat to the Flamark liquid droplet surface.
- Transfer of liquid mass from the Flamark droplet surface.
- Flamark droplets liquid mass with heat becomes airborne steam (effect name: Latent heat of evaporation, which we meet every day in nature: sun-rain-sun).



**4. Flamark fire fighting mechanisms** – activates and removes the 3 basic fire triangle elements (Heat – Oxygen – Fuel).

- Flamark liquid droplets evaporations process *removes heat*.
- Flamark Inert Steam *creating lack of oxygen supply to fuel* but in same time the oxygen is not removed for people (operators).
- Flamark liquid solution *saponify the burning fuel* and do not allow free radicals and gases to become airborne and bond with oxygen in air.



## Product's features

All Flamarks products have a different purpose, but all have some shared features, extremely positive.

All products are:

- Extremely effective in fire fighting
  - Quick and extremely strong cooling effect
  - Flame *knock down* in total fire extinguishing, thus prevention of any re-ignition
  - Heavy toxic smoke elimination effect
  - Excellent extinguishing performances
- Extremely easy to install or use
  - Anyone can install and use Flamark products
- Extremely friendly to the environment - water based and highly ecologic
  - Products are clean, non-toxic, non harmful
  - Rapidly and completely biodegradable
  - No dangerous for ozone layer (ODP)
  - Zero global warming (GWP)
- Extremely collateral damage free
  - No water caused damages
  - Saves the most of the furniture and other things
- Extremely cost effective

## Ecological nature of Flamark's products

All Flamark's product, at their deepest nature, was ecologically designed. All components used in the production and in the products are natural and biodegradable.

Production process is certified according to ISO 14001, that means Flamark use only ecologically acceptable working procedures and materials, and don't make any harmful pollution to the nature.

For all this reasons all Flamark's products are completely suitable for use in the most sensitive natural environments, like Natural parks, Zoo parks, near the sources of drinking water, near the rivers, lakes and

the sea.

For example, Mar 2, fire-fighting agent specially designed for extinguishing of forest fires, have pH 8,2 which is optimal natural living environment for many species of trees. If fire do not destroy a tree, either Mar 2 will not do it.

Year 2014 Swedish government did great environmental research in areas which was used for fire fighting drills with foam, and found damaged environment and polluted drinking water full of dangerous substances. If drills was done with Mar 2, it would never be so.



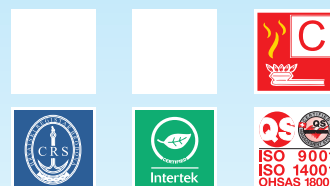
## Mabo

When it is important to protect people, valuable facilities and items with automatic fire extinguisher that provides immediate response and have great extinguishing power along with ecologically features, Mabo is a first choice. It meets all this demands and even more.

Mabo is an automatic fire extinguisher which activates and extinguishes fire when the solution reaches the temperature of 84°C. The glass ampoule automatically burst/open, the dispersed solution instantly extinguishes the fire and eliminates smoke in extinguishing area.

Solution remains on the extinguished surfaces as a coating which prevents re-ignition.

Mabo is designed for indoor use only.



### Why just Mabo?

- Easy to place
- Reliable automatic activation
- Easy and economical to maintain
- Safe to use
- Great extinguishing power and wide scope of operation
- No collateral damages
- Eco-friendly product

### Technical data:

- Classes of fire: A, B, C
- Protected area: up to 16 m<sup>3</sup> enclosed space per unit depending of fire protection demands
- Operating temp: -20°C to 70°C
- Storage temp: -20°C to 70°C
- Volume: 580 ml active solution
- Material: glass (ampoule), tin (holder)
- Warranty: 10 years



## Flamauto

Classical sprinkler systems fire extinguishers are very expensive, demands regular maintenance and makes extensive collateral damages when operates. The best alternative to this solution is Flamauto.

Flamauto is an automatic fire extinguisher, specially developed as a part of fire protection systems for professional electrical equipment, like transformers, coils, electric motors and other devices, but can also protect IT servers and other sensitive IT equipment, without collateral damages. It can also be used in manufacturing plants to protect machines with electric motors and electronic control units.

It activates and extinguishes fire when the solution reaches the temperature of 84 °C. The glass ampoule automatically bursts/open the dispersed solution instantly extinguishes the fire and eliminates smoke in extinguishing area practically without collateral damages.

Solution remains on the extinguished surfaces as a coating which prevents re-ignition.

Flamauto is designed for indoor use only.



### Technical data:

Classes of fire:	A, B, C, F and electrical devices
Protected area:	up to 16 m <sup>3</sup> enclosed space per unit depending of fire protection demands
Operating temp:	-20°C to 70°C
Storage temp:	-20°C to 70°C
Volume:	580 ml active solution
Material:	glass (ampoule), tin (holder)
Warranty:	10 years



## Mab

Most fires can be stopped if reaction to fire is fast enough, which means, in the initial stage of fire. Quick reaction is the most important matter in fire fighting. Classical, heavy weight fire extinguishers, with complicated handling and activating, which requires reading of long manual, seldom can help to quick reactions.

Opposite to this, Mab is an instantly usable fire extinguisher hand grenade, intended to extinguish initial fires. Mab does not require any learning, activation or preparation to use. It just throws into the fire, extinguishes it immediately, and eliminates smoke in extinguishing area. This allows fire fighters and other persons to breathe in a space which was in fire, just few seconds ago.

Unlike traditional extinguishers, with Mab, there are not any side effects, significant collateral damages or environmentally problems of any type.

Mab is unique by design and especially suitable for extinguishing of electrical installations, equipment and appliances, because it throws from distance, and user is completely protected from electric shock.

Mab can also break the way for evacuation from burning buildings, because surface extinguished by Mab is no longer possible to ignite.

It is ideal for use in civil airplanes (as part of equipment, under the seat), because it is lightweight and easy to use, can stop every fire in the cabin of the aircraft, and can remove smoke immediately. At the same time, weight of entire aircraft increases for a weight of only a single traveller.

Mab can extinguish advanced fires also, but in that case, it is recommended to dilute grenades content in the water, with ratio of 1:16 for even better result.

Solution remains on the extinguished surfaces as a coating which prevents re-ignition.

Mab is designed for indoor and outdoor use.



### Technical data:

Classes of fire:	A, B, C and electrical devices
Operating temp:	-20°C to 70°C
Storage temp:	-20°C to 70°C
Volume:	500 ml active solution
Material:	plastics
Warranty:	5 years

### Why just Mab?

- Easy to place and access
- Instantly usable
- Easy to use and maintain
- Safe to use
- Great extinguishing power and wide scope of operation
- No collateral damages
- Eco-friendly product



## FIRE DELETE

Fire Delete is fire extinguishing spray for extinguishing of minor and initial fires, whatever their cause. It is extremely practical and easy to use for any person without any fire fighting training or education, even for child and very old and infirm persons.

The dispersed solution instantly extinguishes the fire, and eliminates smoke in extinguishing area. Solution remains on the extinguished surfaces as a coating which prevents re-ignition.

It is possible to mount Fire Delete on the wall, with practical holder, and to use it as replacement for traditional fire extinguishers. Maintenance is not necessary for 5 years.

Fire Delete fire extinguishing spray uses for extinguishing of solids – fire class A (wood, paper, textiles...) and liquids – fire class B (gasoline, diesel fuel ...) as well as for edible fats and oil – fire class F, and can also be used to extinguish fire at live electrical equipment with voltages up to 1.000 Volts if the minimum distance of 1 m is maintained.

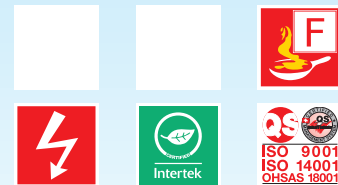
Cooling effect of Fire Delete fire extinguishing spray can be used to cool surfaces and protect some items from fire.

**Fire Delete fire extinguishing spray is most suitable to use in following cases:**

- **If some person is affected by fire**
- **If some materials or equipments burns**
- **If cars, motorcycles, trucks, busses and other vehicles burns**
- **If boats (or their motors) burns**
- **If parts of residential areas (kitchens, rooms an so on) burns**
- **If parts of business areas (workshops, offices, stores) burns**

Fire Delete extinguishing spray is especially suitable for use in police or military rescue actions. Because of its environmental features, Fire Delete spray can be used in National parks and in water protection areas.

Fire Delete is designed for indoor and outdoor use.



### Technical data:

Classes of fire:	A, B, F and low voltage electrical devices (up to 1.000 V)
Range of action:	up to 6 m
Discharge time:	at least 20 seconds
Propellant:	nitrogen (N)
Operating temp:	-5°C to 55°C
Storage temp:	-5°C to 55°C
Volume:	400 ml active solution, 650 ml total volume
Weight:	500 g
Dimensions:	253 mm (height), 66 mm diameter
Material:	aluminium (tank), plastics (other parts)

### Why just Fire Delete?

- **Easy to place and access**
- **Instantly usable**
- **Easy to use and maintain**
- **Safe to use**
- **Great extinguishing power and wide scope of operation**
- **No collateral damages**
- **Eco-friendly product**

## Mar 1

Mar 1 is water additive firefighting agent and eco-retardant, specially designed for A, B, C and F fire classes, mainly for professional use.

When added to water in proper quantities, Mar 1 water additive suppresses, cools, mitigates fire and vapours, and provides insulating properties for fuels exposed to radiant heat or direct flame impingement.

Mar 1 water additive reduce water's surface tension and increase its penetrating and spreading abilities, provide enhanced cooling, emulsification, and foaming characteristics. This creates faster penetration and better fire control when attacking combustible class A, B, C and F fires. Mar 1 cools 21 times faster than water, and works to remove heat and the fuel sources from the fire tetrahedron.

Mar 1 is specially designed to apply on **class A** fires including wood, paper, coal, rubber, **class B** fires including hydrocarbons, petroleum's – crude oil, gasoline, petrol..., **class C** fires include natural mains gas, liquid petroleum gases – butane and propane..., medical or industrial gases, **class F** fires include high temperature cooking oils used in large industrial catering kitchens, restaurants.

Class F conventional extinguishers agent are not effective for cooking oil fires, as they do not cool sufficiently or may even cause flash back and putting the operator at risk. Mar 1 water additive firefighting agent contain specially formulated chemicals, which, when applied to the burning liquid, cools and emulsifies the oil, extinguish the flame, sealing the surface and prevent re-ignition!

Mar 1 works best in stable fire fighting systems (sprinklers), but can also be used as extremely efficient content for traditional fire extinguishers located in buildings (3 kg, 6 kg, and 9 kg) with Flamark state of the art portable fire extinguisher nozzle!

Mar 1 extinguish fires quickly, eliminates smoke and remains on the extinguished surfaces as a coating which prevents re-ignition.

Mar 1 can be mixed with other fire fighting agents or foam concentrates.



### Technical data:

Classes of fire:	A, B, C, F
Operating temp:	-15°C to 65°C
Storage temp:	-15°C to 65°C
Packaging:	20 l canisters, 1.000 l containers
Appearance:	Clear light yellow liquid
Freezing point:	- 15°C, without quality loss
pH:	5,6 ( concentrate)
Specific gravity:	1.2 at 20°C
Sediments:	None
Warranty:	5 years

### Heavy and industrial fires



## Mar 2

Mar 2 is water additive fire-fighting agent and eco-retardant, specially designed for structural, forest, wild land and other class A fires.

When added to water in proper quantities, Mar 2 water additive suppresses, cools, mitigates fire and vapours, and provides insulating properties for fuels exposed to radiant heat or direct flame impingement.

Mar 2 water additive reduce water's surface tension and increase its penetrating and spreading abilities, provide enhanced cooling, emulsification, and foaming characteristics. This creates faster penetration and better fire control when attacking combustible class A fires. Mar 2 cools 21 times faster than water, and works to remove heat and the fuel sources from the fire tetrahedron.

Even if Mar 2 is fire fighting agent specially developed for forest fires, it works also as additive to water in 6% mixed rate, for use with existing equipment of fire fighting departments: fire extinguishers, suck-bags, water-cannons, water-guns, fire fighting planes, helicopters and trucks, remote fire fighting vehicles and other equipment under low and high pressure.

Mar 2 extinguish fires quickly, eliminates smoke and remains on the extinguished surfaces as a coating which prevents re-ignition.

Mar 2 can be mixed with other fire fighting agents or foam concentrates.



### Technical data:

Classes of fire:	A
Operating temp:	-15°C to 65°C
Storage temp:	-15°C to 65°C
Packaging:	20 l canisters, 1.000 l containers
Appearance:	Clear light red liquid
Freezing point:	- 15°C, without quality loss
pH:	8,2 (concentrate)
Specific gravity:	1.2 at 20°C
Sediments:	None
Warranty:	5 years

### Structural, forest and wild land fires

