

# Prevent fire naturally

Eco-efficient flame retardants

**DEFLAMO**

# Save lives without endangering health and nature



Eliminating bio-accumulative, toxic, potentially carcinogenic and definitely non-renewable flame retardants is a burning question.

It is also the very reason why Deflamo was founded in 2004.

We develop and commercialize sustainable flame retardants that not only meet strict fire standards but are as user-friendly as they are environmentally-friendly throughout the lifecycle. And we offer services that considerably shorten time to market.

The awarded and patented Apyrum system can be integrated into the production processes of a wide range of materials. This allows you to reduce or even completely replace toxic substances while improving overall fire performance.

In other words, Apyrum makes your product better, safer and more attractive to discerning customers.

## APYRUM MEANS GREAT BENEFITS

- › Sustainable product
- › Improved fire performance
- › Reduction or total substitution of ATO (antimony trioxide) loading
- › Reduced heat release rate
- › Less smoke
- › Safe to handle
- › Environmental profile
- › Cost efficient

Get started by visiting  
[deflamo.com](http://deflamo.com)

---

**The Apyrum system can be integrated into the production processes of a wide range of materials.**

---



With Apyrum a sustainable  
future is closer

# The all-natural flame retardant



## BROAD RANGE OF POTENTIAL APPLICATIONS

Apyrum can be used with some of the most common polymers, and is especially suitable for plastics such as PVC. It can also be combined with other flame retardants as an excellent synergist and smoke suppressant for the final formulation.

## MEETS FIRE STANDARDS

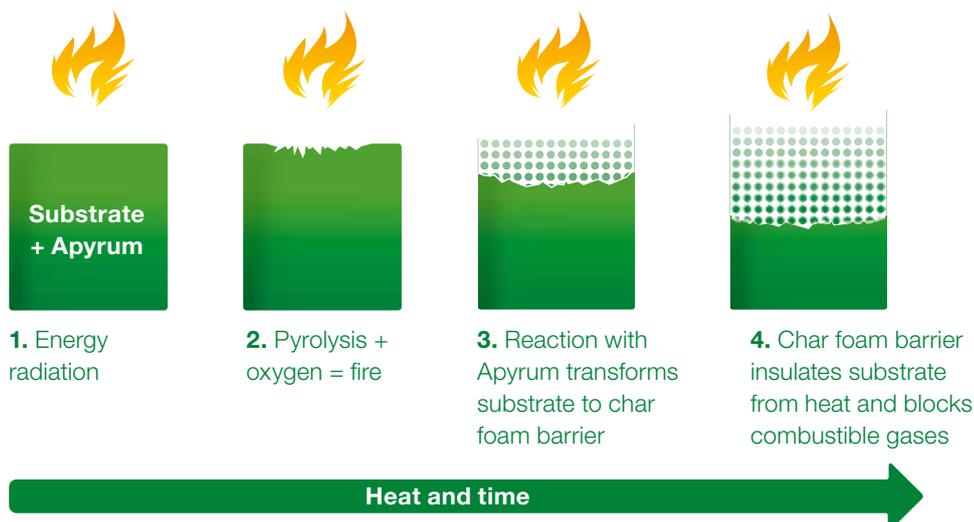
Apyrum is based on a technology that changes the processes that occur when a material is exposed to high temperatures. By interacting with the treated material, both during application and heat exposure, it achieves an optimal balance between fire and the material's physical, chemical and mechanical properties.

## INTUMESCENT CHAR-BUILDING

Simply put, Apyrum reduces released heat, slows down ignition time and decreases the emissions of toxic and flammable gases. It reacts by forming a protective foamy barrier of char that holds the flammable gases in and physically blocks the growth of flames by preventing oxygen entering. This smothers the flame and counteracts the dripping of material in solid state.

**Apyrum is based on a technology that changes the processes that occur when a material is exposed to high temperatures.**

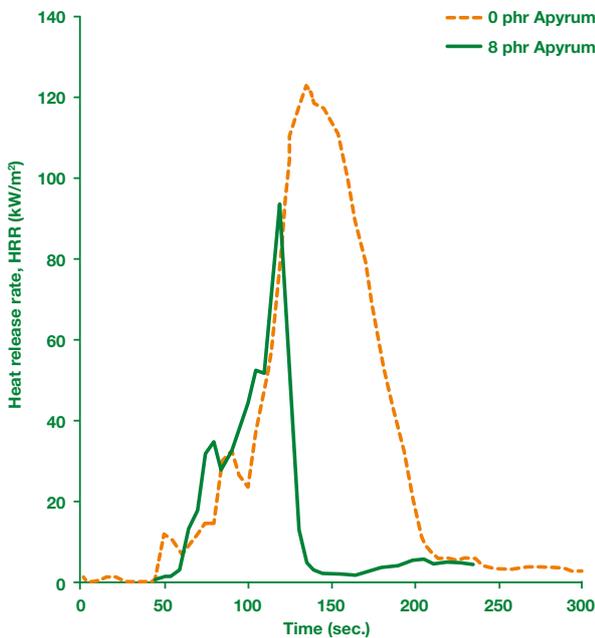
## Apyrum functionality



- > Extinguishes fire
- > Delays time-to-ignition
- > Delays fire spread
- > Reduces heat release
- > Reduces smoke
- > Stops dripping
- > Apyrum does not create toxins

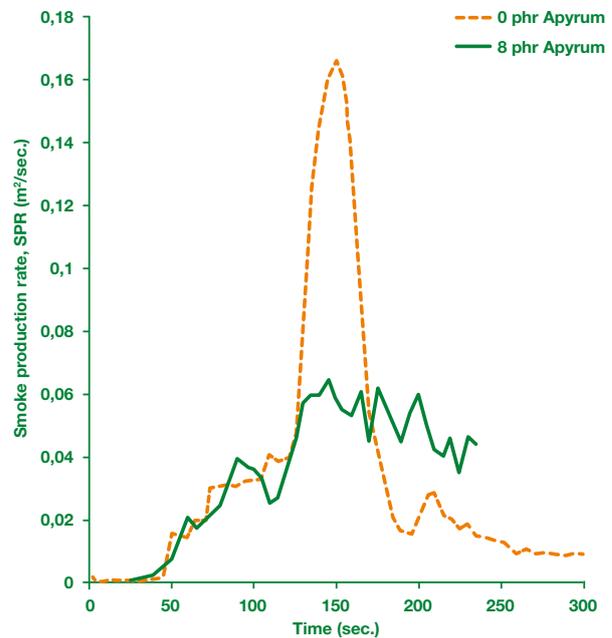
Apyrum consists primarily of carboxylates that form natural salts. In fact, all substances are additives that are approved and commonly used in the food industry.

## Decrease the effect of fire



### Effectively reducing heat

Example of result from cone calorimetry; heat release rate as function of time. The specific recipe is a plasticized PVC (plasticizer: 40phr of triaryl phosphate ester) with and without Apyrum.



### Effectively reducing smoke

Example of result from cone calorimetry; smoke production rate as function of time. The specific recipe is a plasticized PVC (plasticizer: 40phr of triaryl phosphate ester) with and without Apyrum.

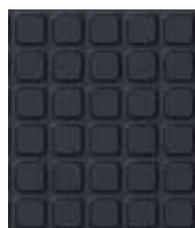
# Applications

Apyrum can be used for most applications where flame retardants traditionally are necessary, such as construction, transportation and electric/electronics. We are constantly researching new fields and applications, so please contact us to discuss how we can solve your specific needs.



## ENHANCE PVC FLAME RETARDANT PERFORMANCE

Apyrum is a very cost-effective solution for PVC. Adding a slight amount of Apyrum into a flexible PVC matrix containing ATH (aluminium hydroxide) improves flame retardant performance without affecting the end product's physical properties.



## SUBSTITUTE ATO (ANTIMONY TRIOXIDE)

Thanks to a stable price and the inert nature throughout time Apyrum is perfect for reducing ATO loading. A high level of flame retardant performance can be obtained for many PVC formulations.

In the test below you can follow the results of Apyrum tests with several plasticizers showing how it decreases the amount of ATO. By means of Deflamo's Cone Calorimeter, improvements on time-to-ignition and heat release were clearly observed, confirming Apyrum's contribution to end product flame retardant properties.

## APPLICATION EXAMPLES

- > Flooring, wall covering, roofing
- > Synthetic leather
- > Upholstery
- > Thin films
- > Cable
- > Textile
- > Paper and cellulose

Sample	Plasticizer		Antimony trioxide	Apyrum	Time-to-ignition	Heat release rate
Name	Type	Per hundred resin	Per hundred resin	Per hundred resin	Seconds	Kw/m <sup>2</sup>
P-1	Phtalate	40	10	0	50	191
P-2	Phtalate	40	5	8	57	101
PF-1	Phtalate free	40	10	0	47	118
PF-2	Phtalate free	40	3	8	59	97
PE-1	Phosphate ester	40	0	0	130	120
PE-2	Phosphate ester	40	0	8	119	51

# Uniquely equipped to help

With us you get a long-term partner in improving your product's flame retardant properties and sustainability profile – and support from test to production to make the transition easy.



As we offer a first-class fire testing laboratory, a full study of your material can be performed enabling designed formulations. We can also produce samples thanks to our two-roll mill and other equipment.

## SHORTEN TIME TO MARKET

In-depth understanding of how a material reacts when exposed to a heat source is crucial in order to provide qualified solutions. However, tests cost money and take time. We strive to help you speed up time to market for a greener production.

## AT YOUR DISPOSAL: OUR CONE CALORIMETER

Of all the equipment available in the field of fire testing, the Cone Calorimeter is the most significant on a bench scale and a preferred instrument of institutes around the world.

During testing, both the amount of energy released and how quickly that energy is released, can be established and many important variables can be measured, such as:

- › Time-to-ignition
- › Calorific value of the product
- › Heat release rate
- › Total heat release
- › Smoke production

The results are a valuable contribution to fire behaviour understanding, and through specialised software we can predict likely product performance in the most important fire testing, such as the SBI-test (Single Burning Item Test) and many others.



Applying Apyrum



Two-roll mill



Cone Calorimeter

## DESIGNED FORMULATIONS

Based on the fire tests, we evaluate your materials and offer tailor-made Apyrum formulations that enhance your product's flame retardant properties.

# Let's work together for a safer world

Deflamo AB is a Swedish specialty chemical company that develops and commercializes high-performance, sustainable and patented flame retardants under the Apyrum brand.

The head office, testing facilities, laboratory and warehouse are placed in Malmö and the production site in Karlshamn. Deflamo AB (publ) is listed on Nasdaq First North; Avanza Bank is the Certified Advisor.

**[deflamo.com](https://www.deflamo.com)**

## **Deflamo AB**

Höjdrodergatan 32

SE-212 39 Malmö, Sweden

Registered office: Malmö

Phone: + 46 (0) 40 619 95 00

Reg.no.: 556648-6204

[info@deflamo.com](mailto:info@deflamo.com)

**DEFLAMO**