

Flame-retardant synergist technology

Versatile by nature
Higher performance
More applications

Committed to consistently improving the sustainability of its products and processes, SONGWON is leveraging its expertise in additives to offer a flame-retardant synergist portfolio that will fuel the growth of halogen-free solutions. With their synergistic effects, SONGFLAME* flame retardants are designed to provide high performance and competitive advantages in a broad range of applications.

* Trademark registration pending

It's all about **the chemistry™**



A powerful building block for halogen-free materials

New SONGFLAME products are effective in both the solid and the gas phase of fire. They act synergistically with most available phosphorus flame retardants and will thus assist customers in the development of halogen-free applications.

Since they are effective at loadings as low as 0.5-2.0%, they allow cost-in-use to be reduced, productivity to be increased, and physical and mechanical properties of the final goods to be improved.

Thanks to their fine particle size, SONGFLAME flame retardants are easy to disperse, which makes them suitable for most plastics production methods.

SONGFLAME flame-retardant synergists in a nutshell

- Lower cost-in-use of flame-retardant materials
- High efficiency at loadings as low as 0.5-2.0%, enabling reduction of total amount of flame retardant and therefore improved productivity and physical/mechanical properties of the end products
- Enhanced performance of existing phosphorus flame retardants in small flame tests
- Excellent dispersibility thanks to fine particle size

The first generation of SONGFLAME synergists enables the design of halogen-free formulations for a broad variety of materials, ranging from foams to various polymers such as polyolefins, acrylonitrile butadiene styrene (ABS) and thermoplastic polyurethane (TPU).

Beside thermoplastics, SONGFLAME technology is also recommended for thermosets, wood, coatings and adhesive applications.





Product range selection guide

	PO	Foams	ABS	TPU	Thermosets	Coatings	Wood
SONGFLAME 201		■			■	■	■
SONGFLAME 203	■		■	■	■		
SONGFLAME 205		■			■	■	■

SONGWON runs standard flame tests such as UL 94, the reference for the electrical & electronics market, and LOI (Limit Oxygen Index, ASTM D7348) in its application laboratory in Ulsan, South Korea.

It also exploits its core capabilities in plastics testing currently used for its antioxidant and light stabilizer products, including artificial weathering. In-house testing enables SONGWON to support customers in the formulation of plastic systems that meet their needs.

Working together with its R&D partners, SONGWON will continue to focus consistently on improving both the performance and the environmental compatibility of flame retardants to enable customers to reduce the risk and the hazards of fire in a more sustainable manner. Second-generation products in development will further push the boundaries of existing flame retardants and help the industry address the challenge of designing safe and cost-in-use-efficient material solutions.

Responding to the halogen-free market trend and helping customers comply with legislation

As new materials are developed and used in more and more different applications, fire risks are identified and new flame retardants needed.

These have to be tailored to specific polymers and comply with the relevant regulatory requirements, which encompass both performance and environmental, health and safety (EHS) standards.

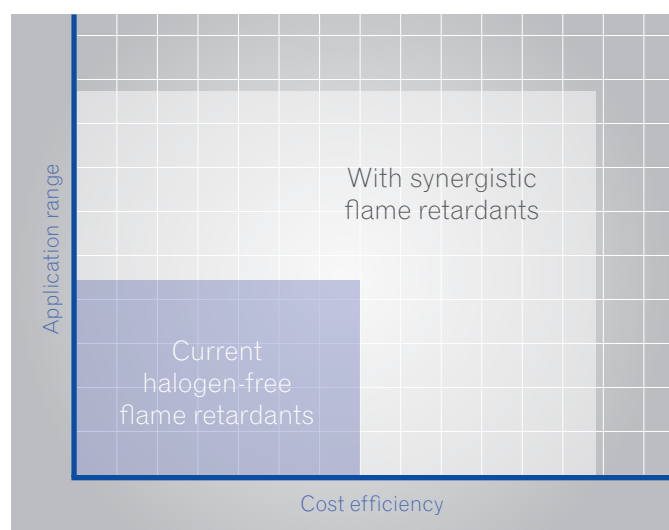
Concerns about the environmental impact and safety profile of specific halogenated flame retardants have triggered legislative as well as market-driven initiatives that are pushing for the use of halogen-free materials in a continuously growing number of applications.

These concerns have led OEMs and manufacturers in numerous industries to take active measures toward switching to more sustainable products wherever possible.

In the electrical and electronics industry, the transportation industry, and the building and construction industry amongst others, there is a strong drive toward halogen-free products.

They are now being specified on an increasing scale – for example in airports, subways and public buildings such as schools and hospitals.

Cost-efficiency improvement with synergistic flame retardants



SONGWON's SONGFLAME product range offers material formulators the opportunity to:

- unleash additional flame-retardant potential for requirements that cannot be fulfilled today with existing phosphorus flame retardants.
- reduce total flame-retardant loading by exploiting synergistic effects: this translates into an overall improved economic equation for halogen-free materials.

SONGFLAME technology complements our range and can be used in conjunction with our polymer stabilizers, thermoplastic polyurethanes and coatings solutions, for example.

Flame retardants – protecting people, property and the environment

Plastics are being used on an increasing scale in numerous applications – as components in buildings, vehicles, and electrical and electronic devices.

They can pose a high fire risk if the material has not been provided with a suitable flame-retardant package.

In confined environments, plastics are a challenge in terms of both flammability and the potential release of toxic smoke and gases.

In addition, the ongoing miniaturization trend in electronics is raising the bar of performance requirements as a result of the higher packing density of the components.

Flame retardants are an integral component of the passive fire-protection concept designed for the safety of modern buildings and structures. They play a crucial role in helping to prevent buildings, vehicles and equipment from catching fire and in delaying its spread. Modern fire safety standards necessitate their use in an ever-increasing number of applications.



Flame retardants provide the extra time crucial for escape by

- helping to prevent ignition
- delaying flame spread and flashover
- preventing the collapse of structures (intumescent coatings)

giving the fire brigade more time to arrive at the scene and fight the blaze



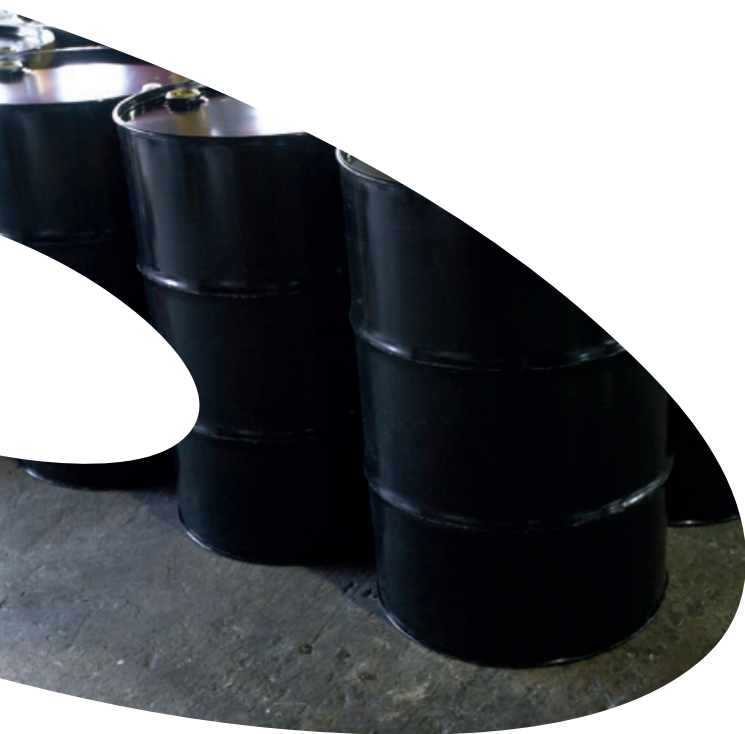
Standard Packaging

- **Synergist, Solids:** 7,5 kg Carton box

Standard pallet size is CP1.

Key to Abbreviations of Physical Forms

- | | | | |
|------------------------|-------------------------------|---------------------------------|-----------------------------|
| • PW: Powder | • DW: Dispersion | • BD: Beads | • GR: Granule |
| • SB: Semi Bead | • MB: Micro Beads | • DF: Dust Free Flow | • FG: Fine Grind |
| • SL: Solid | • FC: Fusion Crystal | • CP: Crystalline Powder | • VL: Viscous Liquid |
| • FF: Free Flow | • LQ: Liquid or Molten | • PS: Pastilles | |



Transport and Storage

As a general guideline, we recommend storing the products mentioned in this brochure in their original sealed containers in a cold and dry place. For more detailed information on a specific product, please refer to the corresponding **Technical Data Sheet**.

By law, a number of chemical products must be labeled in respect of transport, storage and handling. Thus corresponding care is a prerequisite for their appropriate handling. Furthermore, local legal regulations may apply.

Detailed information is given in the respective **Safety Data Sheets**.

About SONGWON Industrial Group

SONGWON, which was founded in 1965 and is headquartered in Ulsan, South Korea, is a leader in the development, production and supply of specialty chemicals.

The second largest manufacturer of polymer stabilizers worldwide, SONGWON operates group companies all over the world, offering the combined benefits of a global framework and readily accessible local organizations.

Dedicated experts work closely together with customers to develop tailor-made solutions that meet individual requirements.

For further information, please go to:
www.songwon.com





For further information, please go to:

www.songwon.com

specialtychemicals@songwon.com

SONGWON provides customers with warranties and representations as to the chemical or technical specifications, compositions and/or the suitability for use for any particular purpose exclusively in individual written agreements.

The facts and figures contained herein have been carefully compiled to the best of SONGWON's knowledge but are essentially intended for informational purposes only.

SONGWON Industrial Group does not accept any liability whatsoever for any information, reference or advice provided in this document or any similar SONGWON publication.

Version 1, August 2019 (Flame-retardant synergist technology)