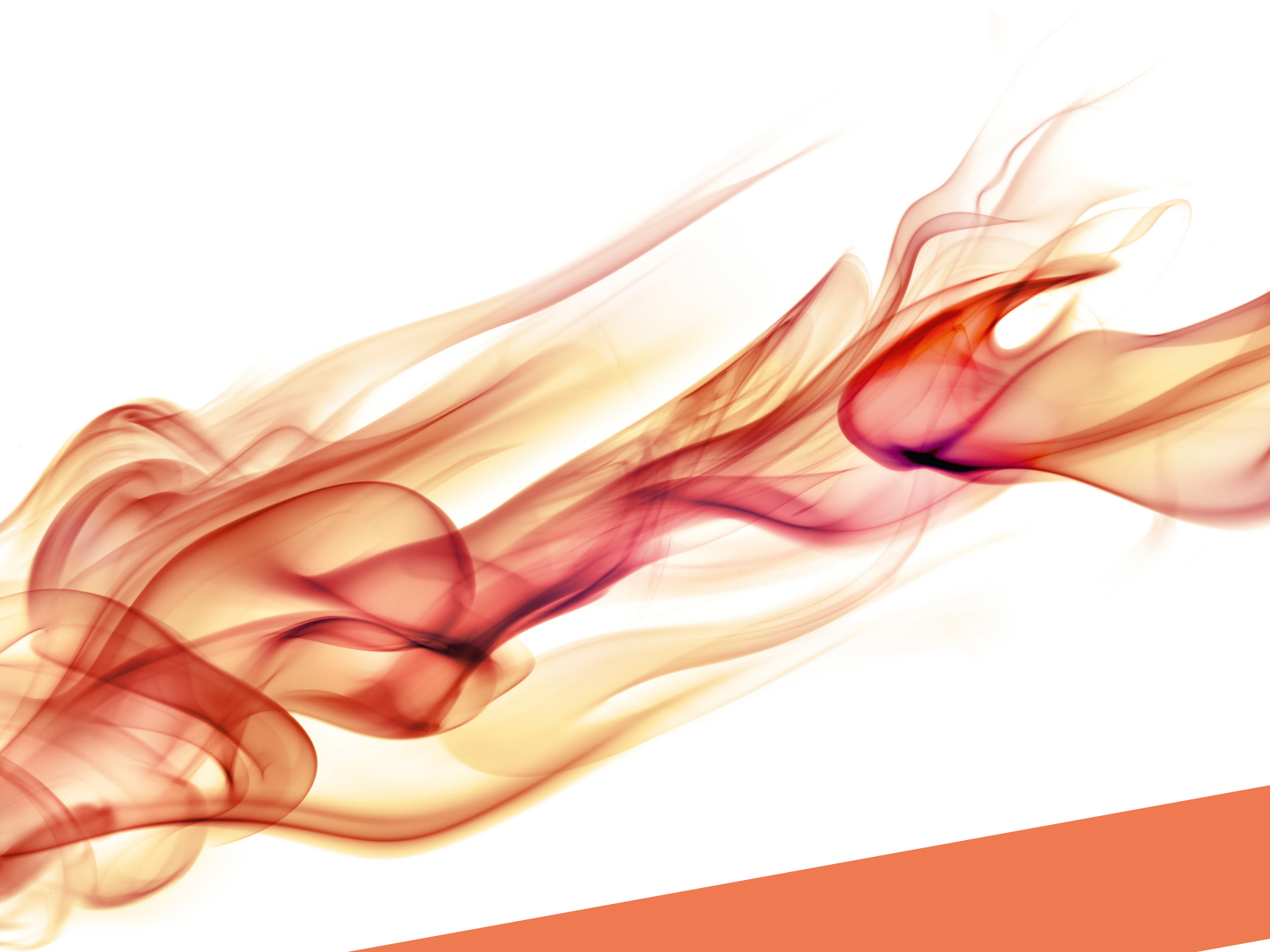


CUSTOMIZED
SOLUTIONS

Schill+Seilacher

struktol®



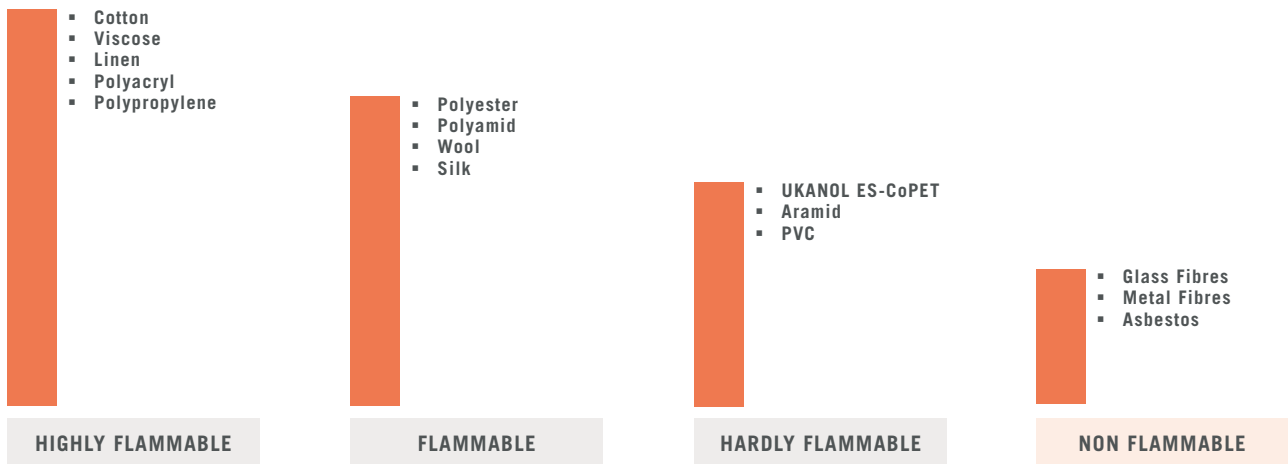
UKANOL ES

REACTIVE FLAME RETARDANT ADDITIVE FOR POLYESTER

ADDITIVE FOR PERMANENT FLAME RETARDANCY IN POLYESTER FIBRES

The trend towards the use of synthetic polymers in the textile industry is increasing continuously. It is therefore of major importance that the fire safety aspects of these materials should not be ignored. The inflammability of PET Fibres can be significantly reduced by the use of flame retardants, which increase the resistance to ignition or decrease the rate of spread of flame. However, additives should not affect the physical properties of the material and additional costs must remain low. Although halogenated flame retardant additives can meet these requirements, their use will raise questions about their effect on human health and the environment. Ukanol ES offers an alternative approach. Schill + Seilacher offers Ukanol ES as a halogen-free phosphorus based flame retardant additive, which provides PET Fibres with excellent, permanent flame retardant effects.

FLAME RETARDANCY OF TEXTILES



THE TWO PRINCIPLES OF ESTABLISHED FLAME RETARDANCY IN TEXTILES

Flame retardants may be physically blended with or chemically bonded to the host polymer. Therefore a distinction has been made between reactive and additive flame retardants:

1

REACTIVE FLAME RETARDANTS

are reactive components chemically built into a polymer chain.

2

ADDITIVE FLAME RETARDANTS

are mixed with polymer or coated on a fabric. Additive flame retardants can be removed easily after washing.

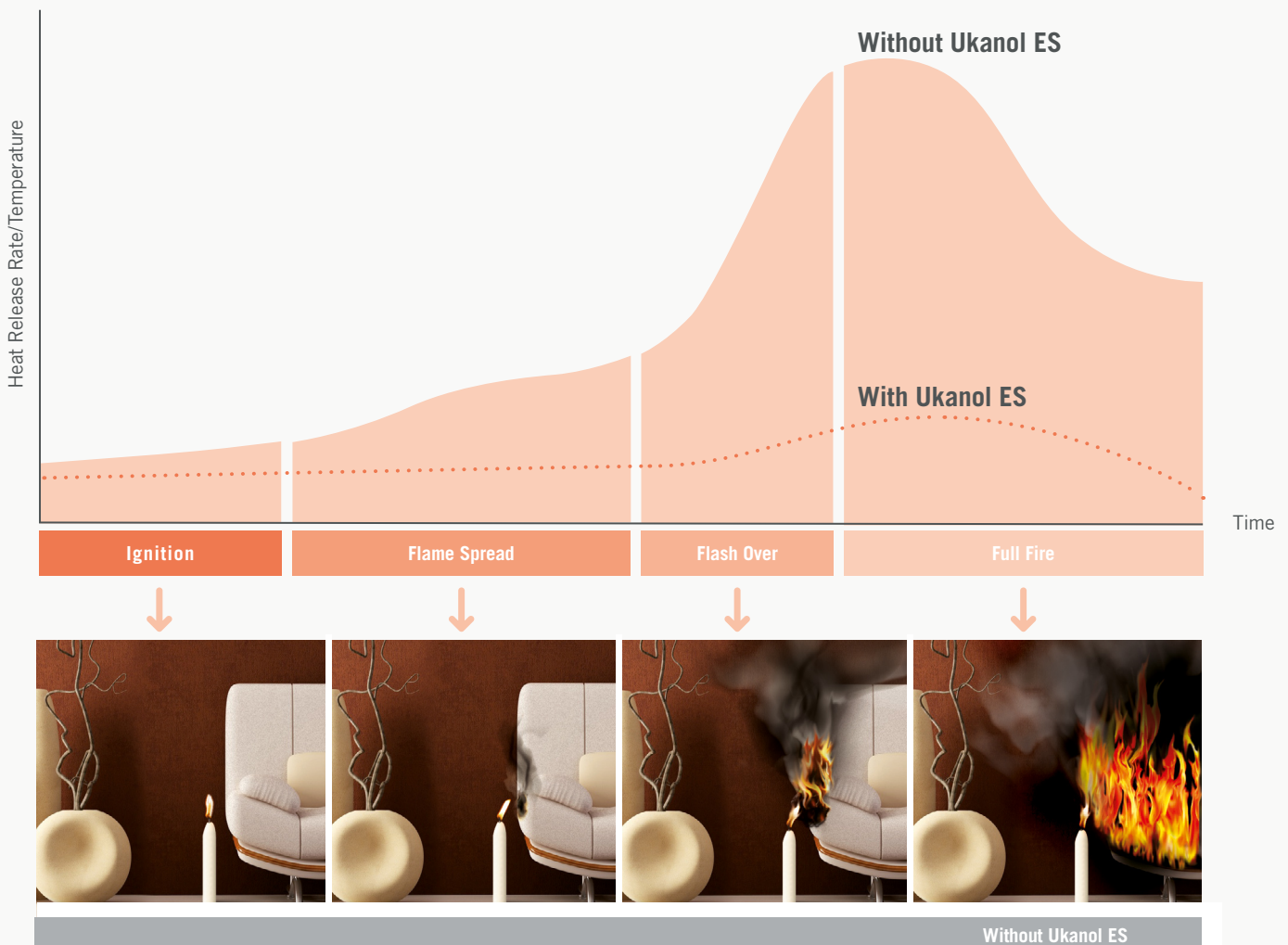
PROPERTIES AND PERFORMANCE

UKANOL ES

...is a halogen-free phosphorus based reactive flame retardant additive. It is incorporated into the polymer chain during the polycondensation process by chemical bonding.

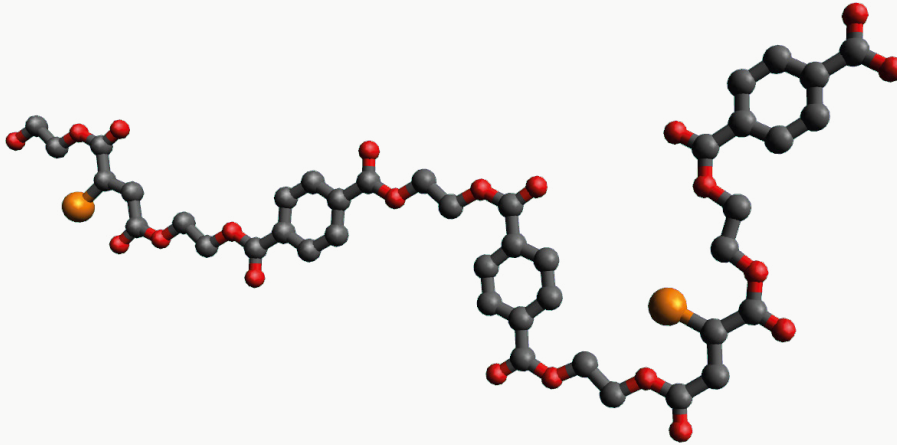
UKANOL ES

...is an efficient flame retardant system with more than one mode of action and including free radical scavenging. It does not simply rely on influencing the melting behaviour of PET. In this way it can either prevent fires from growing or significantly slow the rate of growth.



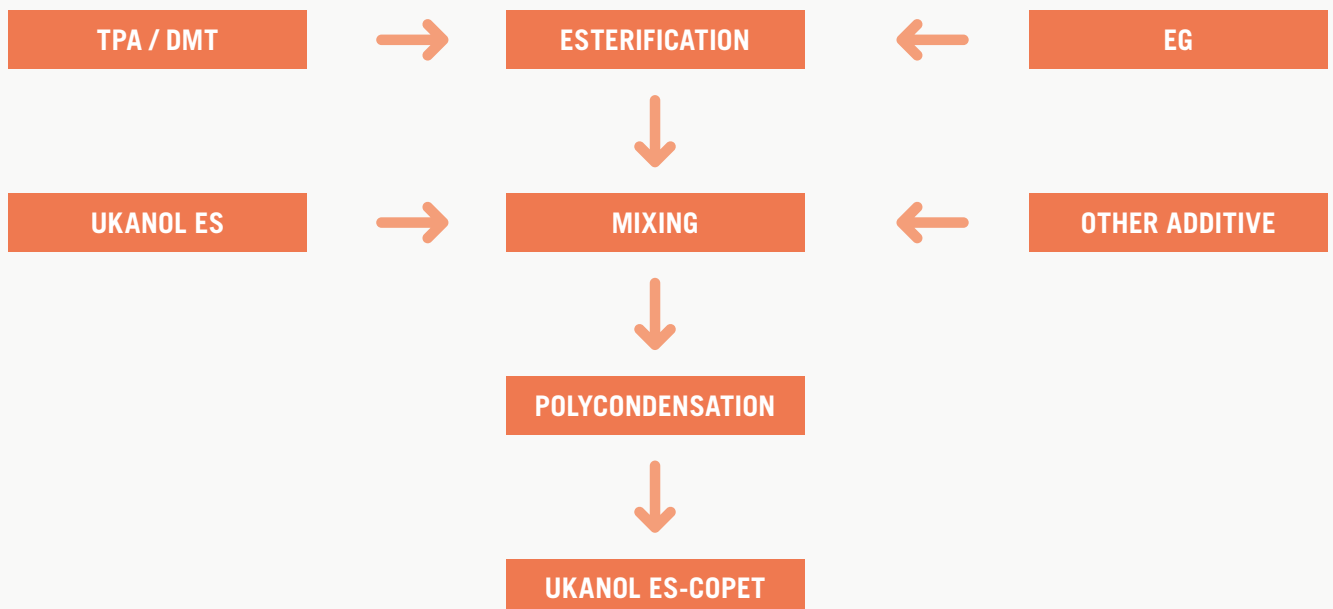
Without Ukanol ES

THE UNIQUE PROPERTIES OF UKANOL ES-COPET ARE DUE TO THE POSITION OF THE ACTIVE FLAME RETARDANT IN THE MACROMOLECULE

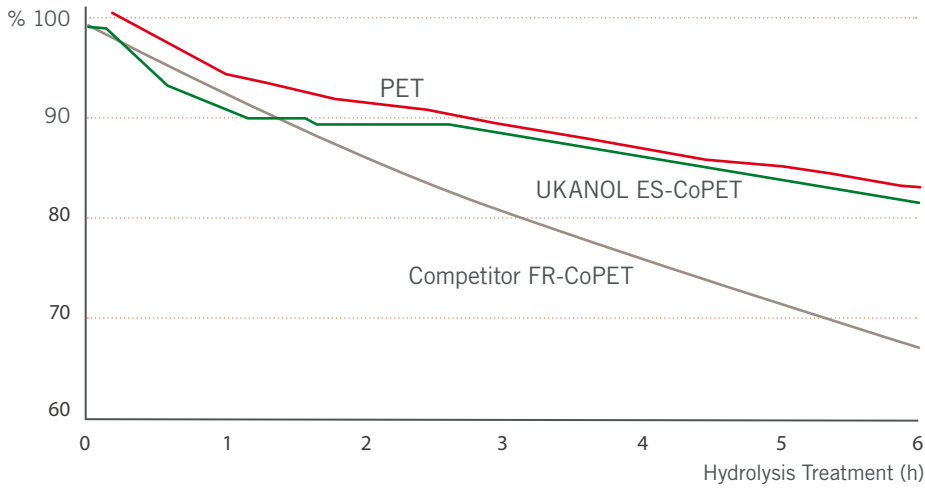


APPLICATION OF UKANOL ES

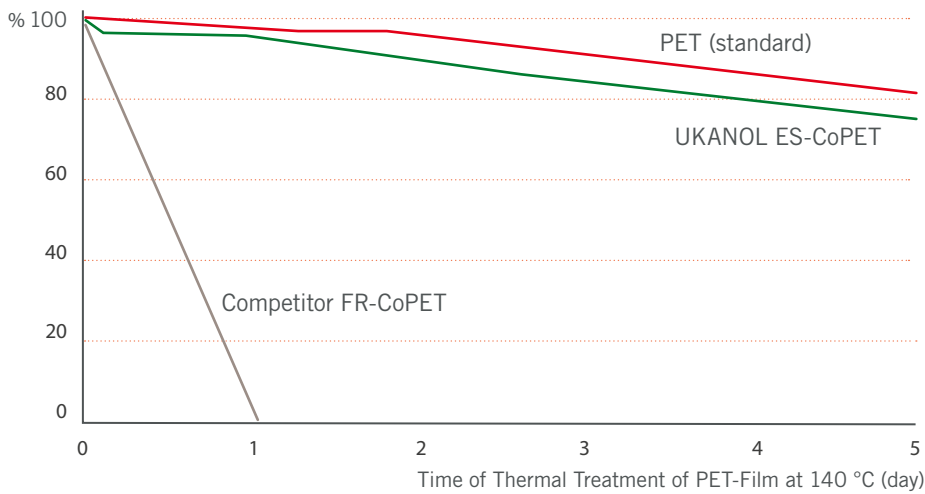
- **UKANOL ES** is applied after the esterification process.
- **UKANOL ES** is manufactured as a ready usable 65% solution in ethylene glycol.
- Due to the fact that no chemical interaction takes place, **UKANOL ES** may be combined with other additives (Sb₂O₃, TiO₂, GeO₂) and catalysts.
- **UKANOL ES-COPET** reaction parameters such as temperature and time in the polycondensation stage are similar to those of standard PET production.
- Approx. 12% **UKANOL ES** (based on the final polymer) is required for a phosphorous content of 6000 ppm, which is necessary to reach a flame retardant effect in PET.



HYDROLYTIC STABILITY OF UKANOL ES-COPET AND COMPETITOR FR-COPET



THERMAL RESISTANCE OF UKANOL ES-COPET AND COMPETITOR FR-COPET



The active part of the flame retardant molecule is attached to the PET polymer chain by side chain bonding. Bond breaking by thermal rearrangement or hydrolysis in the flame retardant does not affect the integrity of the PET polymer itself. The unique characteristics of Ukanol ES-CoPET provide a fibre with hydrolysis resistance and thermal stability to match standard Polyester fibre.

FIELDS OF APPLICATION OF UKANOL ES-COPET

- POY, FDY textile denier
- Staple fibre, short cut
- Industrial yarn, BCF, CF
- Nonwovens

FINAL ENDUSES IN

- Hospitals
- Schools
- Cinemas/Theaters
- Restaurants
- Hotels
- Railway, Aircraft, Ferries
- Military

KEY PROPERTIES OF UKANOL ES-COPET

FLAME RETARDANCY



Excellent

HYDROLYTIC STABILITY



VERY High

THERMAL RESISTANCE



Excellent*

TOXICITY AND ENVIRONMENTAL BEHAVIOR



Harmless

*Thermal stability allows solid state polycondensation (SSP)

LOCATIONS.

BÖBLINGEN

GERMANY

DIN EN ISO 9001:2015
DIN EN ISO 14001:2015
DIN EN ISO 50001:2011
RSPO Certification Mass Balance

SPIN FINISHES FOR
MAN-MADE FIBRES
CHEMICALS FOR
TECHNICAL TEXTILES
LEATHER CHEMICALS
PAPER CHEMICALS
COSMETIC, HI&I,
SPECIAL CHEMICALS

HAMBURG

GERMANY

DIN EN ISO 9001:2015
DIN EN ISO 14001:2015
DIN EN ISO 50001:2011

RUBBER ADDITIVES
ANTIFOAMS
REACTIVE POLYMERS
& FLAME RETARDANTS
LATEX ADDITIVES
SILICONES
RELEASE AGENTS

PIRNA

GERMANY

SILICONES
PU INDUSTRY
PAPER
TEXTILES
COSMETICS
FIBRES
LEATHER

STOW

USA

DIN EN ISO 9001:2008

RUBBER ADDITIVES
PLASTIC ADDITIVES
PVC ADDITIVES
ENGINEERED
THERMOPLASTIC ADDITIVES
WOOD PLASTIC
COMPOSITE ADDITIVES
LEATHER CHEMICALS

VILLA RICA

RUBBER ADDITIVES

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