

# FIBRE UKANOL ES

REACTIVE FLAME RETARDANT  
ADDITIVE FOR POLYESTER

**Schill+Seilacher**  
**struktol®**

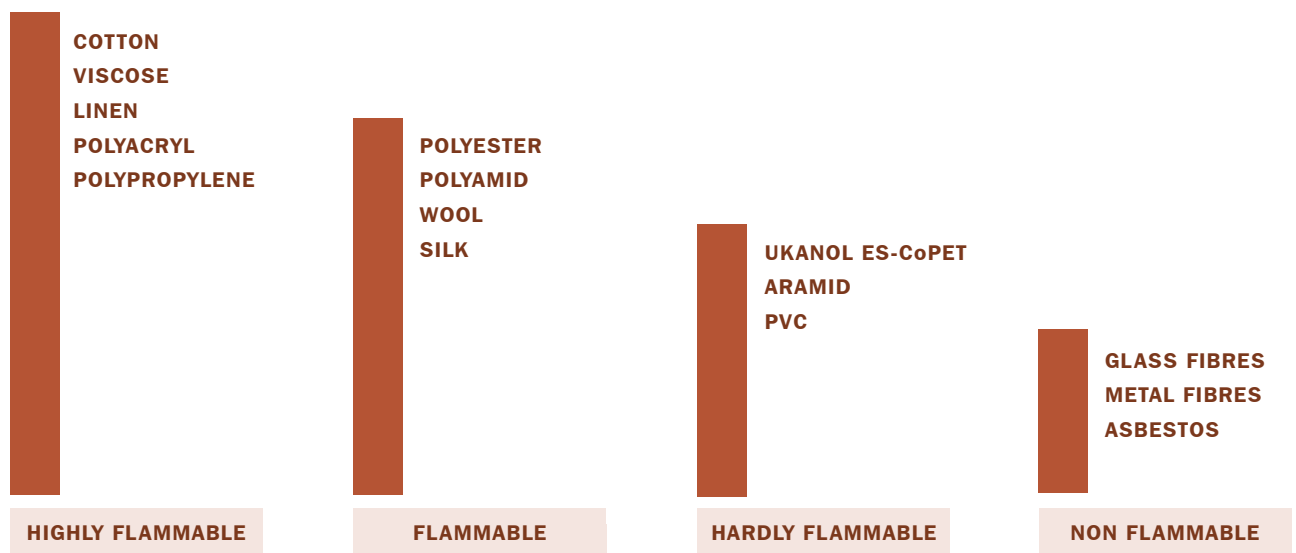
## ADDITIVE FOR PERMANENT FLAME RETARDANCY IN POLYESTER FIBRES

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 offer **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

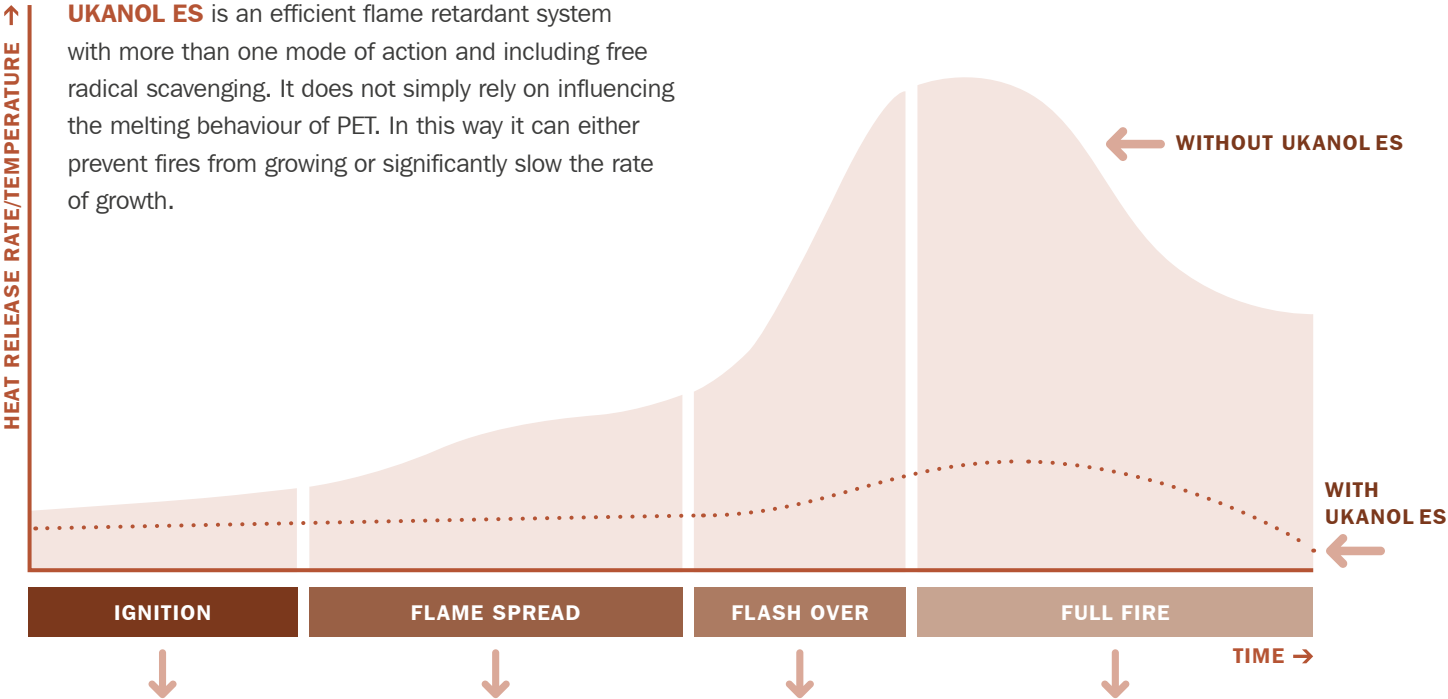
Flame retardants may be physically blended with or chemically bonded to the host polymer. Therefore a distinction has been made between reactive and additive flame retardants:

- **Reactive flame retardants**  
are reactive components chemically built into a polymer chain.
- **Additive flame retardants**  
are mixed with polymer or coated on a fabric. Additive flame retardants can be removed easily after washing.

PROPERTIES AND PERFORMANCE

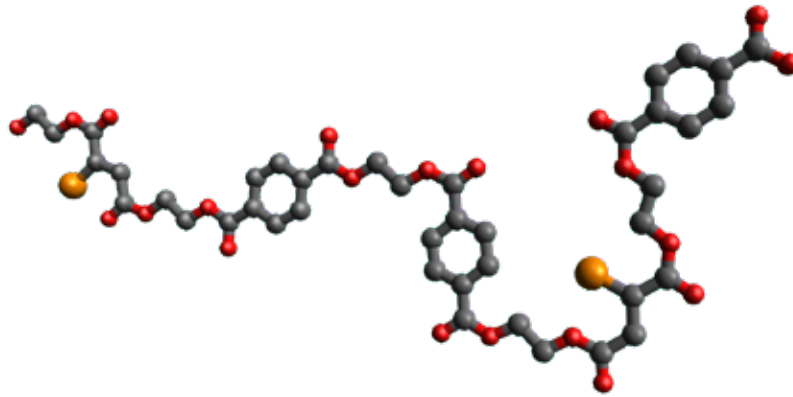
**UKANOL ES** is a halogen-free phosphorus based reactive flame retardant additive. It is incorporated into the polymer chain during the polycondensation process by chemical bonding.

PROPERTIES AND PERFORMANCE



WITHOUT UKANOL ES

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

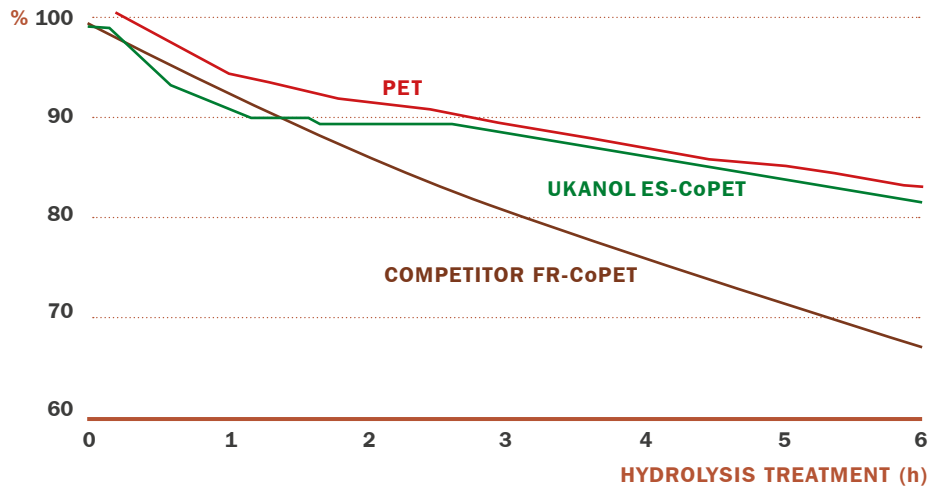


### APPLICATION OF UKANOL ES

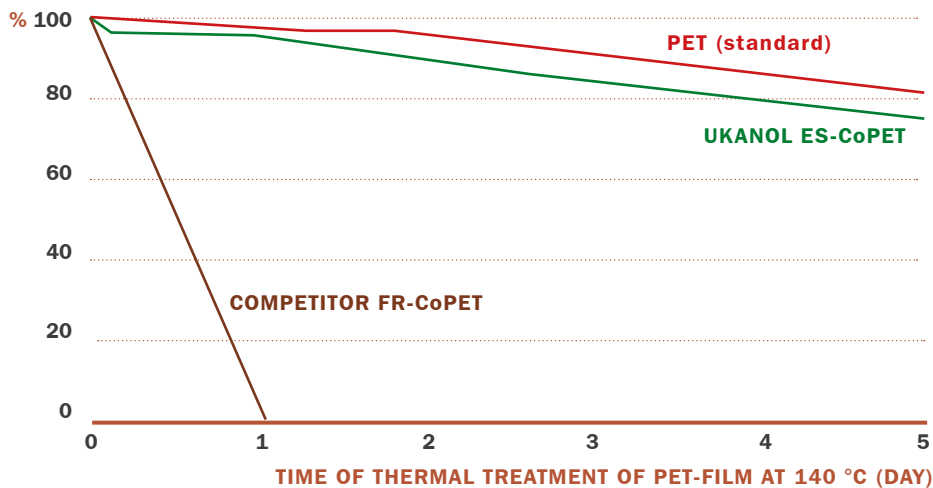
- **UKANOL ES** is applied after the esterification process.
- **UKANOL ES** is manufactured as a ready usable 65 % solution in ethylene glycol.
- Due to the fact that no chemical interaction takes place, **UKANOL ES** may be combined with other additives (Sb2O3, TiO2, GeO2) and catalysts.
- **UKANOL 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.

# UKANOL ES

## 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
- TRAINS, AIRPLAINES, 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).

# SCHILL+SEILACHER AT A GLANCE

## → **BOEBLINGEN** **SPECIALITY CHEMICALS FOR:**

DIN EN ISO 9001:2015  
DIN EN ISO 14001:2015  
DIN EN ISO 50001:2011  
RSPO CERTIFICATION MASS BALANCE

**FIBRES**  
**TEXTILES**  
**LEATHER**  
**PAPER**  
**COSMETICS**  
**FINE CHEMICALS**



## → **HAMBURG** **SPECIALITY CHEMICALS FOR:**

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

**RUBBER ADDITIVES**  
**ANTIFOAMS**  
**EPOXY PREPOLYMERS**  
**AND FLAME RETARDANTS**  
**LATEX ADDITIVES**  
**SILICONES**  
**RELEASE AGENTS**



## → **PIRNA** **SPECIALITY CHEMICALS FOR:**

DIN EN ISO 9001:2015  
(ONLY FOR BOEBLINGEN PRODUCTS)

**SILICONES**  
**PU INDUSTRY**  
**PAPER**  
**TEXTILES**  
**COSMETICS**  
**FIBRES**  
**LEATHER**



## → **HUDSON / OHIO / USA** **PRODUCER OF:**

DIN EN ISO 9001:2015  
DIN EN ISO 13485:2003

**NANOFIBRE MATRICES**



## → **STOW / OHIO / USA** **VILLA RICA / GEORGIA / USA** **SPECIALITY CHEMICALS FOR:**

DIN EN ISO 9001:2008

**PLASTICS**  
**WOOD COMPOSITES**  
**RUBBER**  
**LEATHER**





**Any Questions?**

Our service team will be pleased to answer any questions and to assist you with advice and information at all times. We can also advise you of the contact data of our local offices and agencies. Data sheets and samples of our products are available upon request.

For more information please contact:

**Schill+Seilacher GmbH**

Schoenaicher Strasse 205

71032 Boeblingen (Germany)

Phone: +49 7031 282-297

Fax: +49 7031 282-9277

E-Mail: [ctv@schillseilacher.de](mailto:ctv@schillseilacher.de)

Visit also our site:

**[www.schillseilacher.de](http://www.schillseilacher.de)**