

Flame Retardants

FlamEL™

High Quality | Halogen-free
Non-Toxic | Environment-friendly

What is FlamEL™

FlamEL is phosphorus based products with intumescent flame retardants.
FlamEL is started from violet phosphorus with special technology.

The differences from other phosphorus based intumescent F.R. as below :

High contents of phosphorus

High hydrolysis resistance

High thermal stability and low volatility

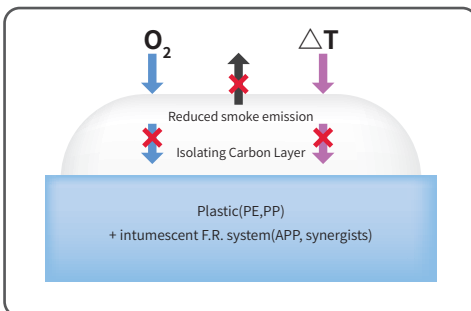
Non-toxic, environment-friendly

High performance with low dosing



FlamEL™ Mechanism

Violet phosphorus based
intumescent Flame Retardant

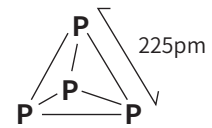


Mechanism of intumescent F.R.



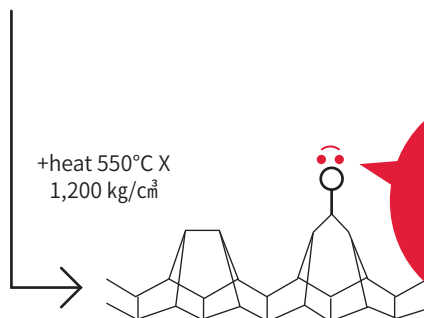
Red phosphorus

← +heat 300°C(572°F) in the absence of air or exposing to sunlight



White phosphorus

+heat 550°C X
1,200 kg/cm³



Violet phosphorus based FlamEL™

Special technology as capsulation on the oxygen radical to prevent of Hydrolysis, then polymerization by oligomeric ethyl ethylen.

Product Details

- Key Properties**
- Halogen-free
 - Environment-friendly
 - Non-toxic
 - High thermo-stability
 - Low volatility
 - Dosage : 2 ~ 10%

- Application**
- Steel painting
 - Adhesives
 - Polyurethane system (e.g. coating, potting compounds)
 - Wood
 - Artificial Leather

	FlamEL™ RFL 2.2	FlamEL™ RFL 2.2T	FlamEL™ RFL 3.2
Chem. Name	Triethyl phosphate polymer with oxirane and phosphorus oxide	Triethyl phosphate polymer with oxirane and phosphorus oxide	Triethyl phosphate polymer with oxirane and phosphorus oxide
CAS No.	184538-58-7	184538-58-7	184538-58-7
formulation	(C2H5)n(PO4)m	(C2H5)n(PO4)m	(C2H5)n(PO4)m
Appearance	Transparent liquid	Transparent liquid	Transparent liquid
Odor	Odorless	Odorless	Odorless
Moisture content	Less than 0.2%	Less than 0.2%	Less than 0.2%
Decomposition temperature	220°C	220°C	320°C
Viscosity (25°C)	6,000 ~ 7,000 cps	9,000 ~ 10,000 cps	25,000 ~ 35,000 cps
P-contents	19% min	21.5% min	21% min
PH value	4-5	6-7	6
Purity	100%	100%	100%
Shelf life	12 months	12 months	12 months

Application case

Coating Application

Target users

Textile for car industry

Guide Formulation

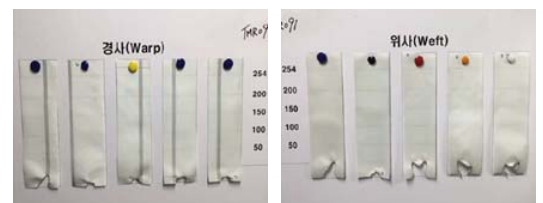
Impranil DLU : 95%
 FlamEL RFL 2.2 : 5%
 Additive (cross linker + thickener + UV stabilizer etc.) : depending on the situations

Flammability test result (FMVSS302)

Properties		PA66 470dtex OPW coating 35gsm					
		1	2	3	4	5	Ave.
Flammability (mm/min)	Warp	2	2	2	2	2	2
	Fill	3	3	3	2	3	3
note		Base resin : WB PUD 100wt% Flame retardant : FlamEL RFL 2.2 5.0wt%					

Standard value : max. 75mm/min

Test Pictures



Warp direction

Fill direction