

Flame Retardants

Non-Halogen Phosphoric Acid Esters

Products	Formula mol.weight	Specifications								Typical Properties					Containers	Description and Uses
		Appearance	Color APHA	Specific Gravity 20/20°C	Acid value KOH mg/g	Heating Loss % 125°C 3hrs	Refractive Index n_D^{25}	Water Content %	Viscosity mPa·s/25°C	P%	Boiling Point °C	Flash Point °C	Freezing Point °C			
TMP Trimethyl phosphate	$O=P(OCH_3)_3$ 140	Colorless clear liquid	30max.	1.215±0.005	0.2max.	—	1.395±0.002	0.2max.	(P%) 21.0min.	2.0	22.1	180 ~ 195	—	<-70	220kg Drum	Flame retardant for thermosetting resins such as rigid polyurethane foam and unsaturated polyester.
TEP Triethyl phosphate	$O=P(OC_2H_5)_3$ 182	Colorless clear liquid	20max.	1.071±0.003	0.05max.	—	1.403±0.002	—	—	1.6	17.0	216	111	-56	210kg Drum	Flame retardant for thermosetting resins such as rigid polyurethane foam and unsaturated polyester.
TPP Triphenyl phosphate	$O=P(OC_6H_5)_3$ 326	White flake	—	—	0.03max.	—	(chloride) not cause turbidness	(Melting point °C) 48.5min.	—	—	9.5	399	225	—	25kg Paper bag *500kg	Flame retardant for PVC, cellulotics, synthetic, rubber, phenolics and PPO.
TCP Tricresyl phosphate	$O=P(OC_6H_4CH_3)_3$ 368	Colorless to light yellowish clear liquid	50max.	1.170±0.010	0.05max.	0.10max.	1.557±0.003	(Color after heated) APHA 60max.	(Volume resistivity) 30°C/cm 5x10 ⁹ min.	58	8.4	420	240	-35	220kg Drum	Plasticizer for PVC wall paper and film for agricultural use. Oil additive.
TXP Trixylenyl phosphate	$O=P[(OC_6H_3(CH_3)_2)_3]$ 410	Colorless to yellowish clear liquid	200max.	1.145±0.025	0.1max.	0.15max.	1.552±0.003	—	—	172	7.6	—	253	-15	220kg Drum	Low volatile and heat stable plasticizer for PVC. Fire-resistant hydraulic fluid.
CDP Cresyl diphenyl phosphate	$O=P\begin{matrix} (OC_6H_5)_2 \\ O \\ OC_6H_4CH_3 \end{matrix}$ 340	Colorless to light yellowish clear liquid	50max.	1.210±0.005	0.05max.	0.15max.	—	—	—	36	9.1	—	240	-30	220kg Drum	Flame retardant plasticizer for PVC, synthetic rubber and phenolics.

*Flexible container bag

Non-Halogen Phosphoric Acid Polyesters

Products	Formula	Specifications							Typical Properties					Containers	Description and Uses
		Appearance	Color APHA	Specific Gravity 20/20°C	Acid value KOH mg/g	Water Content %	Viscosity mPa·s/25°C	P%	Viscosity mPa·s/25°C	P%	Flash Point °C	Freezing Point °C			
CR-733S Aromatic polyphosphate	$O=P\begin{matrix} (OC_6H_5)_2 \\ O \\ C_6H_4 \\ O \\ O=P(OC_6H_5)_2 \end{matrix}$ Principal ingredient	Colorless to light yellowish clear liquid	80max.	1.306±0.010	0.5max.	0.15max.	500 ~800	10.5min.	600	10.9	302	-13	220kg Drum	Flame retardant for PVC, cellulotics, synthetic rubber, phenolics, epoxy resin, PPO and polyester fiber.	
CR-741 Aromatic polyphosphate	$(C_6H_5O)_2P(O)OC_6H_4C(CH_3)_2C_6H_4OP(O)(OC_6H_5)_2$ Principal ingredient	Colorless to yellowish clear liquid	—	1.260±0.010	0.2max.	0.10max.	—	—	2300 (40°C)	8.9	334	4~5	220kg Drum	Excellent hydrolytic and heat resistant capabilities. Used as a flame retardant for every type of engineering plastic and synthetic fiber.	
PX-200 Aromatic polyphosphate	$[OC_6H_3(CH_3)_2]_2P(O)OC_6H_4OP(O)[OC_6H_3(CH_3)_2]_2$	White powder to granule	—	—	1.0max.	(Melting point °C) 92min.	—	8.7min.	—	9.0	308	—	25kg Paper bag	Excellent heat resistance and hydrolytic capabilities. Used as a flame retardant for all types of engineering plastics.	

Flame Retardants

Halogen Containing Phosphoric Acid Ester

Products	Formula mol.weight	Specifications							Typical Properties					Containers	Description and Uses
		Appearance	Color APHA	Specific Gravity 20/20°C	Acid value KOH mg/g	Water Content %	Heating Loss % 125°C 3hrs	Refractive Index n _D ²⁵	Viscosity mPa·s/25°C	P%	Halogen %	Flash Point °C	Freezing Point °C		
TMCPP Tris(chloropropyl) phosphate	$\text{O}=\text{P}\left(\text{OCH}\begin{array}{l} \text{CH}_3 \\ \text{CH}_2\text{Cl} \end{array}\right)$ 328	Colorless to light yellowish clear liquid	50max.	1.293±0.005	0.10max.	0.10max.	0.30max.	1.463±0.003	68	9.3	Cl 31.4	210	-40	250kg Drum	Less scorch and high hydrolytic stability compared with CLP. Flame retardant for PVC, polyurethane foam, polyester and epoxy resins.

Halogen Containing Phosphoric Acid Polyesters

Products	Formula	Specifications							Typical Properties					Containers	Description and Uses
		Appearance	Color APHA	Specific Gravity 20/20°C	Acid value KOH mg/g	Water Content %	Viscosity mPa·s/25°C	Viscosity mPa·s/25°C	P%	Halogen %	Flash Point °C	Freezing Point °C			
CR-504L Chlorine containing aliphatic polyphosphate	—	Colorless to light yellowish clear liquid	150max.	1.330±0.010	0.30max.	0.10max.	800 ~ 1100	—	10.9	Cl 23.0	236	-10	250kg Drum	Exhibits low volatility and is used on all varieties of urethane resin such as flexible urethane foam, elastomers, and paint.	
CR-530 Chlorine containing aliphatic polyphosphate-phosphonate	—	Colorless to light yellowish liquid	—	1.405±0.015	0.5max.	0.15max.	400 ~ 800	—	13.0	Cl 29.0	213	-25	250kg Drum	Low volatility and high hydrolytic stability. Additive-type flame retardant for polyurethane foam and others.	
DAIGUARD-550	—	Colorless to light yellowish clear liquid	150max.	1.362±0.005	0.10max.	0.10max.	950 ~ 1350	1100	10.3	Cl 28.3	233	<-15	250kg Drum	Suitable for many type of flexible polyurethane foams required flammability standards. This product offers resistance to scorch and migration on aging.	