

Flame Retardancy and Physical Properties of Phosphates

Resin;	PC/ABS	100 phr
FR agent;	PX-200, CR-741, CR-733S, TPP	10 ~ 18 phr
FR assistant;	PTFE	0.4 phr
Kneading; 250 °C Twin screw extruder (D=37mm, LID=35)		
Molding; 250 °C Injection molding machine		

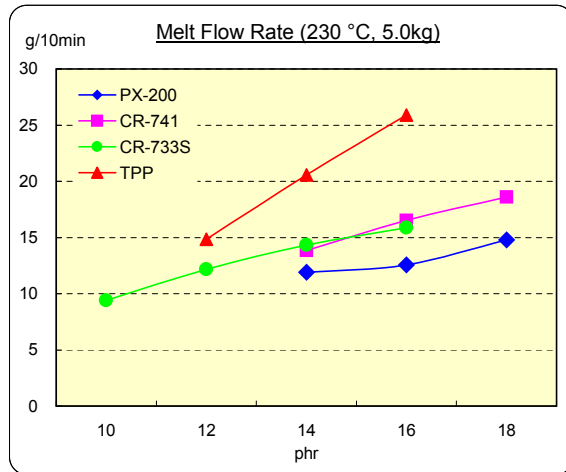
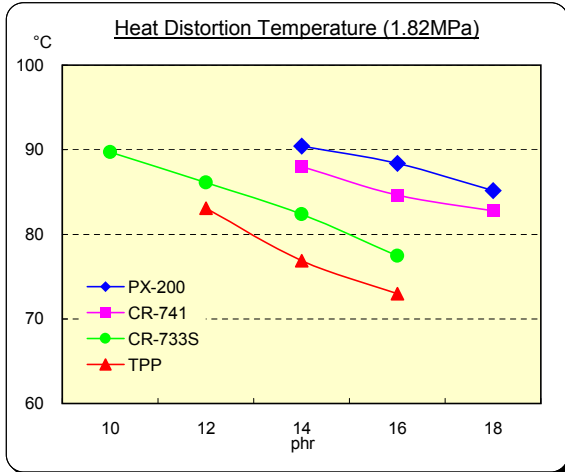
Melting Point	
PX-200	95 °C
CR-733S	liq.
CR-741	liq.
TPP	52 °C

UL-94 Vertical (1.6mm)					
FR(phr)	10	12	14	16	18
PX-200			V-1	V-0	V-0
CR-741			V-1	V-1	V-0
CR-733S	V-1	V-0	V-0	V-0	V-0
TPP		V-1	V-0	V-0	V-0

Oxygen Index					
FR(phr)	10	12	14	16	18
PX-200			26.8	27.6	27.4
CR-741			26.1	26.7	27.5
CR-733S	25.9	27.2	27.6	28.1	
TPP		25.6	26.8	27.2	

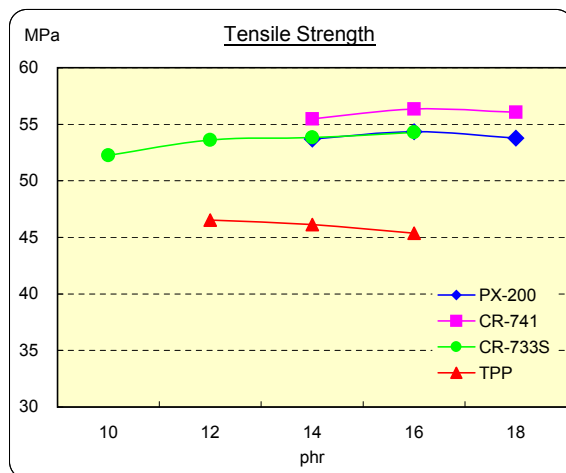
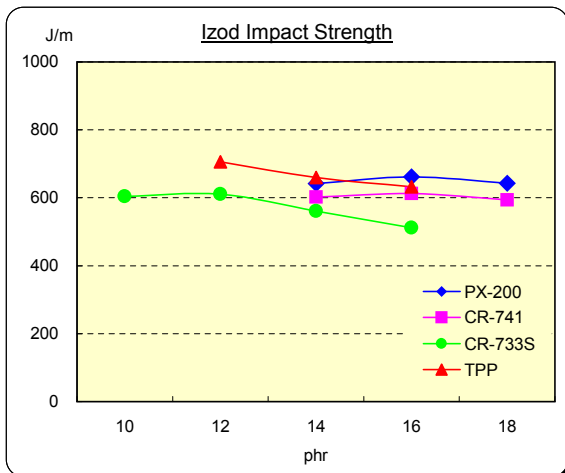
Heat Distortion Temperature					
FR(phr)	10	12	14	16	18
PX-200			90.4	88.4	85.2
CR-741			88.0	84.6	82.8
CR-733S	89.7	86.1	82.4	77.5	
TPP		83.1	76.9	73.0	

Melt Flow Rate					
FR(phr)	10	12	14	16	18
PX-200			11.9	12.6	14.8
CR-741			13.9	16.5	18.6
CR-733S	9.40	12.2	14.3	15.9	
TPP		14.8	20.6	25.9	



Izod Impact Strength (3.2mm)					
FR(phr)	10	12	14	16	18
PX-200			641	661	643
CR-741			602	612	594
CR-733S	604	611	560	511	
TPP		706	660	632	

Tensile Strength					
FR(phr)	10	12	14	16	18
PX-200			53.7	54.3	53.8
CR-741			55.5	56.3	56.1
CR-733S	52.2	53.6	53.8	54.3	
TPP		46.5	46.1	45.4	

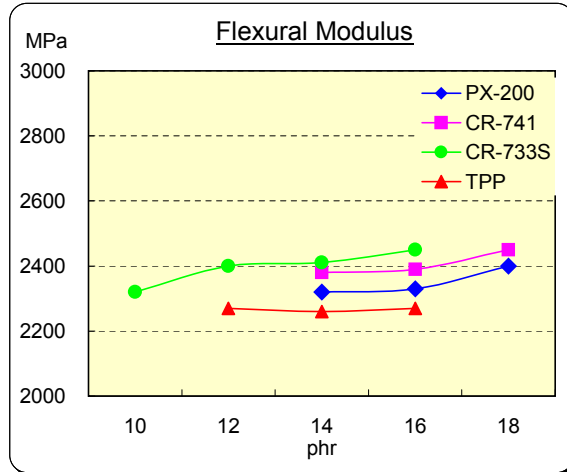
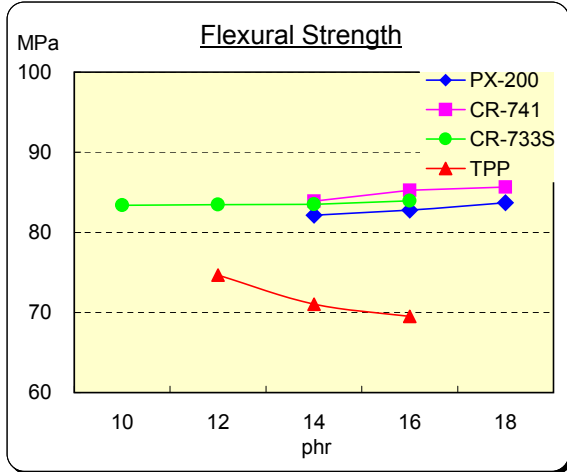


Flexural Strength

FR(phr)	10	12	14	16	18
PX-200			82.1	82.8	83.7
CR-741			83.9	85.3	85.7
CR-733S	83.4	83.4	83.5	83.9	
TPP		74.7	71.0	69.5	

Flexural Modulus

FR(phr)	10	12	14	16	18
PX-200			2320	2330	2400
CR-741			2380	2390	2450
CR-733S	2320	2400	2410	2450	
TPP		2270	2260	2270	



Hydrolysis Resistance of Phosphates (MIL-H19475)

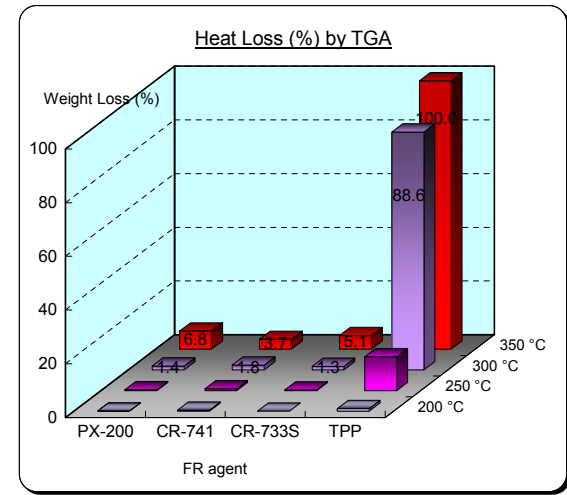
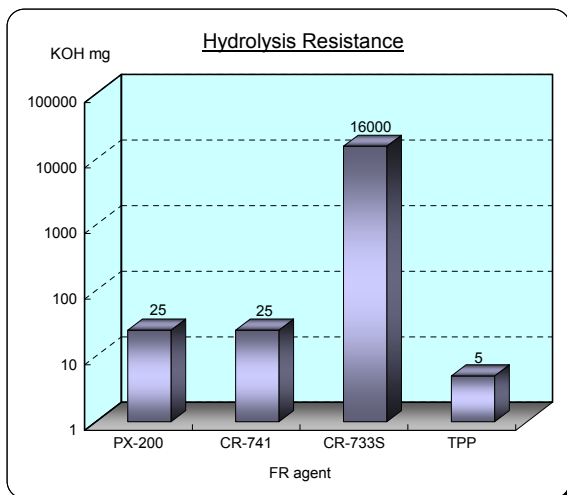
FR agent	KOH mg
PX-200	25
CR-741	25
CR-733S	16000
TPP	5

KOHmg ; Acid amount of water layer after hydrolysis
 Hydrolysis Condition ; sample 75g + distilled water 25g, 93 °C×48 hrs

Heat Loss (%) by TGA

FR agent	200 °C	250 °C	300 °C	350 °C
PX-200	0.1	0.3	1.4	6.8
CR-741	0.4	0.7	1.8	3.7
CR-733S	0.0	0.2	1.3	5.1
TPP	1.0	12.6	88.6	100.0

N2 ; 150 mL/min Heating Rate ; 10 °C/min
 Sample pan ; open



Flame Retardancy and Physical Properties of Phosphates

Resin:	ABS	100 phr
FR agent:	PX-200, CR-741, TPP	4 ~ 12 ohr
Kneading:	220 °C Twin screw extruder (D=37mm, LID=35)	
Molding:	220 °C Injection molding machine	

Melting Point
PX-200 95 °C
CR-741 liq.
TPP 52 °C

UL-94 Vertical (1.6mm)

FR(phr)	4	6	8	10	12
PX-200			Burn	V-2	
CR-741	Burn	Burn	Burn	V-2	V-2
TPP		Burn	V-2	V-2	V-2

Oxygen Index

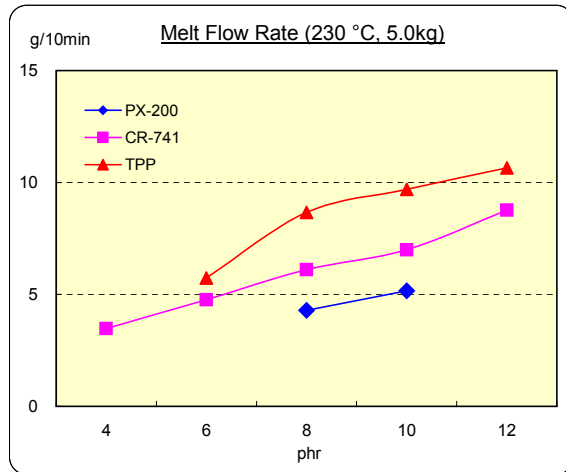
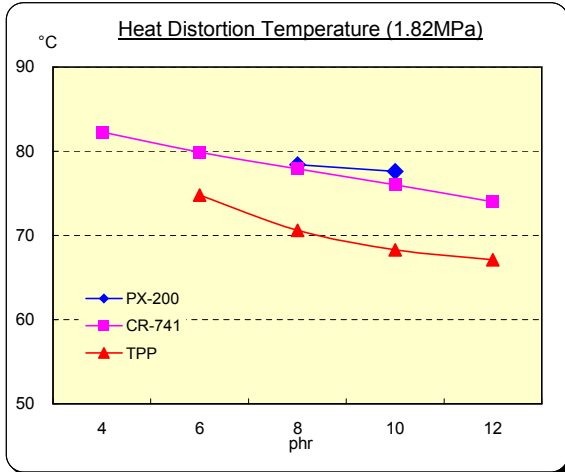
FR(phr)	4	6	8	10	12
PX-200			20.2	20.6	
CR-741	19.7	20.2	20.2	20.6	20.6
TPP		20.6	20.6	20.2	20.6

Heat Distortion Temperature

FR(phr)	4	6	8	10	12
PX-200			78.4	77.6	
CR-741	82.3	79.9	77.9	76.0	74.0
TPP		74.8	70.6	68.3	67.1

Melt Flow Rate

FR(phr)	4	6	8	10	12
PX-200			4.3	5.2	
CR-741	3.5	4.8	6.1	7.0	8.8
TPP		5.7	8.7	9.7	10.6

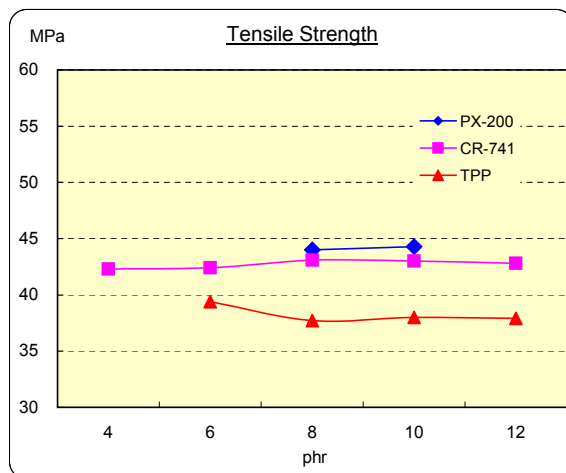
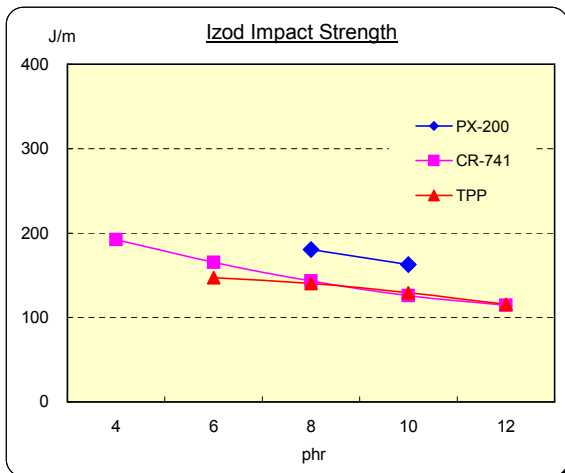


Izod Impact Strength (3.2mm)

FR(phr)	4	6	8	10	12
PX-200			180	163	
CR-741	192	165	144	126	115
TPP		147	140	129	116

Tensile Strength

FR(phr)	4	6	8	10	12
PX-200			44.0	44.3	
CR-741	42.3	42.4	43.1	43.0	42.8
TPP		39.4	37.7	38.0	37.9

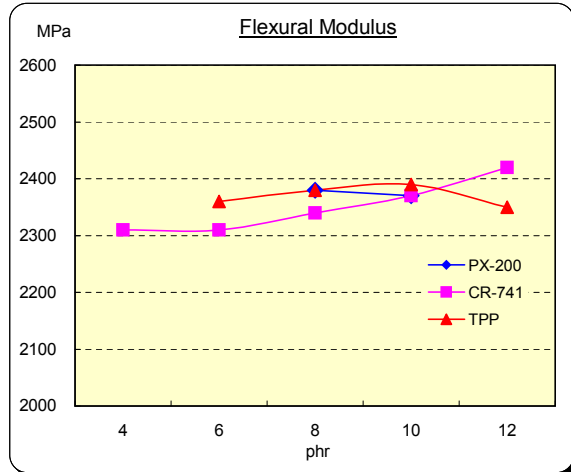
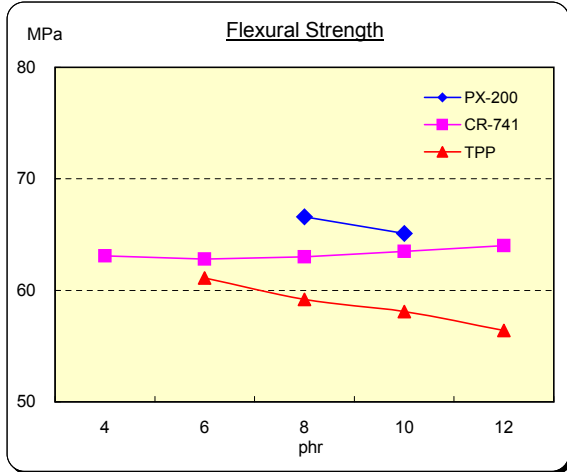


Flexural Strength

FR(phr)	4	6	8	10	12
PX-200			66.6	65.1	
CR-741	63.1	62.8	63.0	63.5	64.0
TPP		61.1	59.2	58.1	56.4

Flexural Modulus

FR(phr)	4	6	8	10	12
PX-200			2380	2370	
CR-741	2310	2310	2340	2370	2420
TPP		2360	2380	2390	2350



Hydrolysis Resistance of Phosphates (MIL-H19475)

FR agent	KOH mg
PX-200	25
CR-741	25
TPP	5

KOHmg ; Acid amount of water layer after hydrolysis
Hydrolysis Condition ; sample 75g + distilled water 25g, 93 °C×48 hrs

Heat Loss (%) by TGA

FR agent	200 °C	250 °C	300 °C	350 °C
PX-200	0.1	0.3	1.4	6.8
CR-741	0.4	0.7	1.8	3.7
TPP	1.0	12.6	88.6	100.0

N2 ; 150 mL/min Heating Rate ; 10 °C/min
Sample pan ; open

