PBT
工程塑膠
POLYBUTYLENE TEREPHTHALATE

ENGLISH

長 CCP 春

長春人造樹脂廠股份有限公司
Chang Chun Plastics Co., Ltd.

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CCP PBT Engeering Plastics

I. Introduction

Chang Chun Plastics Co., Ltd. is one of the world-class manufactures of PBT compound. With more than 21 years of professional experience in PBT manufacturing, CCP has used R & D's in-house technology to develop PBT compound as a verstile high-quality product.

At present, halogen-free, low-warpage, high-impact, high-stiffness, UV stabilized, hydrolysis resistance, fine-gloss, and alloy grades of PBT have been successfully developed, and the execllent quality has won confidence from customers in different applications, including electronic and automobile industries. CCP has developed and adopted unique continuous PBT polymerization process in manufacturing.

Quality is good and stable with a strong R & D and quality assurance cast. We provide all kinds of technical services and aim to keep the spirit of creation, innovation and service to uplift quality and satisfy our customer's needs.

II. PBT characteristics

- Excellent electrical properties
- Excellent temperature resistance, high heat distortion temperature
- Excellent mechanic and chemical properties
- Excellent wear property
- Excellent dimensional stability
- Excellent moldability
- High resistance to fuels, oil, fats and many solvents
- Special grades for less-gas, low warpage, hydrolysis resistance, high impact strength or non-halogen flame retardant types.

III. PBT Applications

- Electrical & Electronic Applications:
  Connector, IC sockets, Terminal block, bobbins, push-button of telephone set, Micro-switch, TV parts, hair-dryer parts, micro-motor housing, glue guns etc.
- Automobile Applications:
  Wiper gear case, outer handle, distributor, coupler, ignition system parts, bumper, valve of exhaust gas treating system etc.
- Household Appliances:
  Iron skirt & handle, Lamp base, Toaster base, Dryer nozzle, parts of microwave.
- Others:
  Cooling fan, Keyboard, parts of watch and clock, OA equipment, loose buffer tube in optical cable system etc.

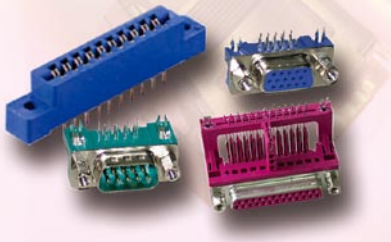
The reference table as follows:

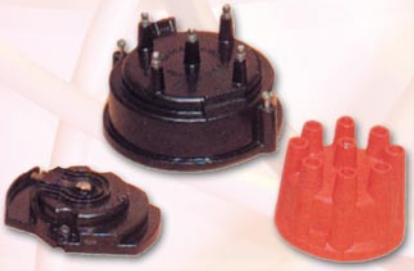
Application Examples and Respective

(◎: Most important　○: Important)

	Application Examples \ Properties	Stiffness	Heat resistance	Self-extinguishing	Electrical insulation	Arc resistance	Chemical resistance	Weathering resistance	Frictional characteristics	Dimensional stability
Electrical	Connector	◎	◎	◎	◎		◎		○	○
	Plug	○	◎	◎	◎	◎				○
	Socket	○	◎	◎	◎	◎				○
	Coil-bobbin	◎	◎	◎	◎					○
	Relay	○	◎	◎	◎	◎				○
	Switch	○	◎	◎	◎	◎			○	○
	IC carrier	○	◎	○	◎					○
	Fuse-case	○	◎	◎	◎	◎				○
	End cap	○	◎	○	◎				○	○
	Brush holder	○	◎	○	◎				○	○
	Commutator	○	◎	○	◎					◎
	Process Controllers	○	○		○				◎	◎
	Record Player Parts	○	○	○					○	◎
	Flyback Transformer	○	◎	◎	◎	◎			○	○
	Tuner	○	◎	◎	◎				○	○
	CRT Socket		◎	◎	◎	◎				○
	Cover	○								○
	Lever	○							○	○
	Fluorescent Lamp Base		○		○			○		○
Automobile	Ignition	○	◎		◎				○	○
	Turn-signal	○	◎	◎	◎		○		○	○
	Heater	○	◎		◎				○	○
	Taillight Socket	○	◎		◎					○
	Fuse-case	○	◎		◎					○
	Voltage-regulator Parts	○	◎		◎					○
	Case	○	◎		◎	◎				○
	Bobbin	◎	◎		◎	◎	◎			○

	Application Examples \ Properties	Stiffness	Heat resistance	Self-extinguishing	Electrical insulation	Arc resistance	Chemical resistance	Weathering resistance	Frictional characteristics	Dimensional stability
Automobile	Cap	○	◎		◎	◎				○
	Housing	○	◎		◎	◎			◎	○
	Rotor	○	◎				◎			○
	Carburetor	○	◎				◎			○
	Valves	○	◎				◎		◎	○
	Gears	○	◎				◎		◎	◎
	Exhaust Gas Treating Devices	◎	◎				◎		○	◎
	Gear Cases	◎	◎				◎	◎		
	Outer Door-handle		○						○	◎
	Connector		◎		◎		◎	◎		
	Bumper									
	Trim		◎				◎	◎		
Miscellaneous industries	Click Jewel Plate	○					○		○	◎
	Watch Jewel Plate	◎						◎		◎
	Camera Parts (Irisdiaphragm-ring)							○	○	○
	Binocular Body		◎				◎			○
	Key-top	○		◎						
	Fixing Cover of Copying Machine						◎			
	Insecticide Sprayer Housing						◎	◎		○
	Ski Peg							◎		○
	Fishing Spool	◎						◎		○
Building and piping materials	Gas Burner Parts		◎		◎			○		○
	Watermeter Housing	◎						○		○
	Pump(impeller and housing)	◎					◎	○		○
	Flow Controllers	◎								○
	Pressure Vessel	◎					○	○		
	Treatment equipment for liquid chemical waste	◎					◎	○		◎





Ⅳ. CCP PBT Grade Nomenclature

(1) CCP PBT-1000 Series(Resin)

	Specification
PBT-1100	Neat Resin
PBT-1200	Neat Resin with good flowability

(2) CCP PBT-2000 Series (FR-PBT)

	Specification
PBT-2000	PBT, V-0 @ 0.8mm
PBT-2100	PBT, V-0 @ 0.8mm

(3) CCP PBT-3000 Series (PBT+GF)

	Specification
PBT-30xx	xx stands for GF content, currently we have 15%, 20%, 30%, 50% glass-reinforced grades with good flow and impact properties

(4) CCP PBT-4000 Series (FR-PBT+GF)

	Specification
PBT-41xx	xx stands for GF content, currently we have 15%, 20%, 30%, 40% glass-reinforced grades with good flow and impact properties; UL94 V-0 @ 0.8mm (1/32 inch)
PBT-41xxF	Economic Grade of high inflammability, xx stands for GF content, currently we have 15%, 30% glass-reinforced grades with good flow and impact properties; UL94 V-0 @ 0.8mm (1/32 inch)
PBT-4630	FR PBT + GF 30%, UL94 V-0 @ 1.6mm (1/16 inch)
PBT-48xx	Economic Grade of high inflammability, xx stands for GF content, currently we have 15%, 20%, 30% glass-reinforced grades with good flow and impact properties; UL94 V-0 @ 3.0mm (1/8 inch)
PBT-48xxG	xx stands for GF content, currently we have 15%, 30% glass-reinforced grades; UL94 V-0 @ 1.6mm(1/16 inch)

(5) CCP PBT-5000 Series (Halogen Free FR-PBT+GF)

	Specification
PBT-51xx	Halogen free grade. xx stands for GF content, currently we have 15%, 30% glass-reinforced grades with good flow and impact properties; UL94 V-0 @ 0.8mm (1/32 inch), Black color
PBT-56xx	Halogen free and red phosphorous free grade. xx stands for GF content, currently we have 15%, 30% glass-reinforced grades ; UL94 V-0
PBT-56xxF	Halogen free and red phosphorous free grade. xx stands for GF content, currently we have 0%, 15%, 30% glass-reinforced grades with good flow and impact properties; UL94 V-0

(6) CCP PBT-6000,7000 Series (PBT Low Warp Grade)

	Specification
PBT-6730	FR-PBT + GF 30%, Low Warp ,V-0 @ 0.8mm

(7) CCP PBT-7000 Series (PBT+ABS Low Warp Grade)

	Specification
PBT-7320	Low Warp , GF 20%, V-0
PBT-7320H	Low Warp , GF 20%, HB

(8) CCP PBT-8000 Series (FR-PBT+Glass/Mineral)

	Specification
PBT-8830	FR PBT + Glass/Mineral 30%, V-0 @ 3.0mm

(9)CCP PET-9000 Series (FR-PET+GF)

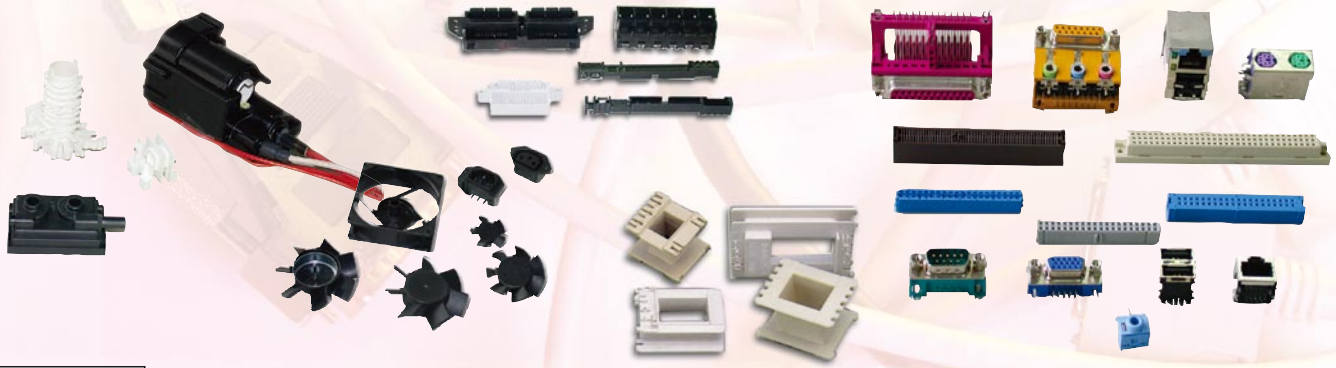
	Specification
PET-9115	FR PET + GF 15%, V-0 @ 0.8mm
PET-9130	FR PET + GF 30%, V-0 @ 0.8mm

V . SPECIFICATION

FOR REFERENCE ONLY

Property		Unit	ASTM	PBT1100	PBT1200	PBT2000	PBT2100	PBT3015	PBT3020
Mechanical	Tensile Strength	kg/cm^2	D638	500-600	500-600	500-700	500-700	800-1000	900-1200
	Tensile Elongation	%	D638	120-180	50-90	4-9	4-8	3-5	3-5
	Flexural Strength	kg/cm^2	D790	750-850	750-850	700-1000	600-1000	1300-1600	1500-2000
	Flexural Modulus	kg/cm^2	D790	≧20000	≧22000	≧20000	≧20000	≧40000	≧50000
	Izod Impact Strength (notched 1/4")	kg-cm/cm	D256	5.0-6.0	4.5-5.5	2.5-3.5	2-6	3-7	5-8
	Hardness	M-Scale	D785	85-90	85-90	88	88	93	94
Thermal	Melting Point	˚C	DSC	225	225	225	225	225	225
	Heat Deflection Temp. ($18.6kg/cm^2$)	˚C	D648	60	60	65	65	205	207
	Heat Deflection Temp. ($4.6kg/cm^2$)	˚C	D648	155	155	165	165	220	220
	Coefficient of Thermal Expansion	10^{-5} cm/cm˚C	D696	9	9	9	9	5	4
	Flammability	-	UL94	HB	HB	V-0 (0.8mm)	V-0 (0.8mm)	HB	HB
Electrical	Dielectric Constant	60Hz	D150	3.3	3.3	3.2	3.2	3.5	3.7
	Dissipation Factor	60Hz	D150	0.001	0.001	0.001	0.001	0.001	0.001
	Volume Resistivity	Ω-cm	D257	$>10^{15}$	$>10^{15}$	$>10^{15}$	$>10^{15}$	$>10^{15}$	$>10^{15}$
	Surface Resistivity	Ω	D257	$>10^{13}$	$>10^{13}$	$>10^{13}$	$>10^{13}$	$>10^{13}$	$>10^{13}$
	Dielectric Strength (2mm)	KV/mm	D149	>20	>20	>20	>20	>20	>20
	Arc Resistance	sec	D495	120	120	120	120	130	90
Physical	Specific Gravity	-	D792	1.30-1.32	1.30-1.32	1.38-1.46	1.35-1.45	1.37-1.43	1.41-1.47
	Water Absorption (24hr immersion)	%	D570	0.06	0.06	0.05	0.03	0.04	0.04
	Mould Shrinkage — in flow direction	%	D955	0.8-2.0	0.8-2.0	1.1-1.9	0.9-1.9	0.2-0.6	0.2-0.6
	Mould Shrinkage — in transverse direction	%	D955	1.2-2.2	1.2-2.2	1.3-2.1	1.2-2.1	0.8-1.6	0.8-1.6
	Glass Fiber Content	%	Ash	0	0	0	0	15	20
	TYPE	-	-	pure resin	pure resin	94 V-0	94 V-0	GF 15% reinforced	GF 20% reinforced

※ CCP PBT UL file No:E59481(s)



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Property		Unit	ASTM	PBT3030	PBT4115	PBT4120	PBT4130	PBT4115F	PBT4130F
Mechanical	Tensile Strength	kg/cm^2	D638	1100-1400	900-1100	900-1200	1000-1400	900-1100	1100-1400
	Tensile Elongation	%	D638	3-5	2.5-4.5	2.5-4.5	2.5-4.5	2.5-4.5	2.5-4.5
	Flexural Strength	kg/cm^2	D790	1700-2100	1200-1700	1200-1700	1500-2300	1300-1800	1600-2300
	Flexural Modulus	kg/cm^2	D790	≧70000	≧45000	≧50000	≧70000	≧45000	≧70000
	Izod Impact Strength (notched 1/4")	kg-cm/cm	D256	8-12	4-7	6-10	7-13	4-7	7-13
	Hardness	M-Scale	D785	94	93	93	94	93	94
Thermal	Melting Point	℃	DSC	225	225	225	225	225	225
	Heat Deflection Temp. ($18.6kg/cm^2$)	℃	D648	210	205	205	205	200	205
	Heat Deflection Temp. ($4.6kg/cm^2$)	℃	D648	220	220	220	220	220	220
	Coefficient of Thermal Expansion	10^{-5} cm/cm℃	D696	3	5.5	3.5	3	5.5	3
	Flammability	-	UL94	HB	V-0 (0.8mm)	V-0 (0.8mm)	V-0 (0.8mm)	V-0 (0.8mm)	V-0 (0.8mm)
Electrical	Dielectric Constant	60Hz	D150	3.7	3.3	3.5	3.5	5.5	3.5
	Dissipation Factor	60Hz	D150	0.001	0.001	0.001	0.001	0.001	0.001
	Volume Resistivity	Ω-cm	D257	$>10^{15}$	$>10^{15}$	$>10^{15}$	$>10^{15}$	$>10^{15}$	$>10^{15}$
	Surface Resistivity	Ω	D257	$>10^{13}$	$>10^{13}$	$>10^{13}$	$>10^{13}$	$>10^{13}$	$>10^{13}$
	Dielectric Strength (2mm)	KV/mm	D149	>20	>20	>20	>20	>20	>20
	Arc Resistance	sec	D495	100	90	90	100	90	90
Physical	Specific Gravity	-	D792	1.49-1.57	1.47-1.56	1.52-1.62	1.59-1.68	1.48-1.56	1.61-1.68
	Water Absorption (24hr immersion)	%	D570	0.04	0.03	0.03	0.03	0.03	0.03
	Mould Shrinkage in flow direction	%	D955	0.2-0.5	0.3-0.6	0.3-0.6	0.2-0.5	0.3-0.6	0.1-0.5
	Mould Shrinkage in transverse direction	%	D955	0.8-1.4	1.2-1.8	1.2-1.8	0.8-1.4	1.2-1.8	0.6-1.4
	Glass Fiber Content	%	Ash	30	15	20	30	15	30
	TYPE	-	-	GF 30% reinforced	GF 15% 94 V-0	GF 20% 94 V-0	GF 30% 94 V-0	GF15% 94V-0	GF30% 94V-0

※ CCP PBT UL file No:E59481(s)

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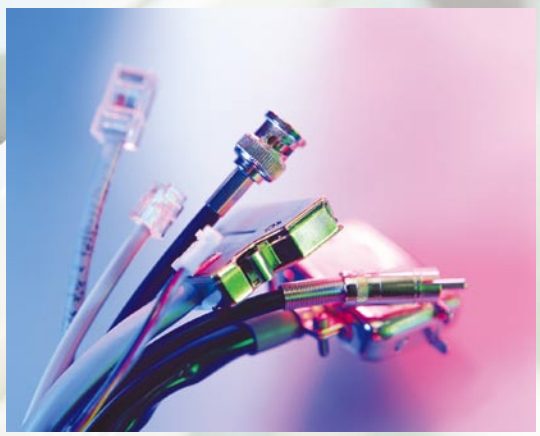
	Property		Unit	ASTM	PBT4140	PBT4630	PBT4815G	PBT4830G	PBT4815	PBT4820
Mechanical	Tensile Strength		kg/cm^2	D638	1000-1400	1000-1400	900-1100	1000-1400	800-1100	900-1200
	Tensile Elongation		%	D638	2.5-4.5	2.5-4.5	2.5-4.5	2.5-4.5	2.5-4.5	2.5-4.5
	Flexural Strength		kg/cm^2	D790	1700-2300	1500-2200	1200-1700	1500-2200	1200-1800	1400-1800
	Flexural Modulus		kg/cm^2	D790	≧70000	≧70000	≧45000	≧70000	≧40000	≧50000
	Izod Impact Strength (notched 1/4")		kg-cm/cm	D256	8-13	7-13	4-7	7-13	4-7	5-10
	Hardness		M-Scale	D785	94	94	93	94	93	93
Thermal	Melting Point		℃	DSC	225	225	225	225	225	225
	Heat Deflection Temp. ($18.6kg/cm^2$)		℃	D648	208	205	205	205	200	205
	Heat Deflection Temp. ($4.6kg/cm^2$)		℃	D648	220	220	220	220	220	220
	Coefficient of Thermal Expansion		10^{-5} cm/cm℃	D696	3	3	5.5	3	5.5	3.5
	Flammability		-	UL94	V-0 (0.8mm)	V-0 (1.6mm)	V-0 (1.6mm)	V-0 (1.6mm)	V-0 (3.0mm)	V-0 (3.0mm)
Electrical	Dielectric Constant		60Hz	D150	3	3.5	3.5	3.5	5.5	3.5
	Dissipation Factor		60Hz	D150	0.001	0.001	0.001	0.001	0.001	0.001
	Volume Resistivity		Ω-cm	D257	$>10^{15}$	$>10^{15}$	$>10^{15}$	$>10^{15}$	$>10^{15}$	$>10^{15}$
	Surface Resistivity		Ω	D257	$>10^{13}$	$>10^{13}$	$>10^{13}$	$>10^{13}$	$>10^{13}$	$>10^{13}$
	Dielectric Strength (2mm)		KV/mm	D149	>20	>20	>20	>20	>20	>20
	Arc Resistance		sec	D495	100	90	90	90	90	90
Physical	Specific Gravity		-	D792	1.72-1.78	1.57-1.62	1.46-1.50	1.56-1.60	1.45-1.56	1.48-1.56
	Water Absorption (24hr immersion)		%	D570	0.03	0.03	0.03	0.03	0.03	0.03
	Mould Shrinkage	in flow direction	%	D955	0.1-0.4	0.2-0.5	0.3-0.6	0.2-0.5	0.3-0.6	0.3-0.6
		in transverse direction	%	D955	0.6-1.2	0.8-1.4	1.2-1.8	0.8-1.4	1.2-1.8	1.2-1.8
	Glass Fiber Content		%	Ash	40	30	15	30	15	20
	TYPE		-	-	GF40% 94 V-0	GF30% 94 V-0	GF15% 94 V-0	GF 30% 94 V-0	GF15% 94 V-0	GF20% 94 V-0

※ CCP PBT UL file No:E59481(s)



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Property		Unit	ASTM	PBT4830	PBT5115	PBT5130	PBT5615	PBT5630	PBT5600F
Mechanical	Tensile Strength	kg/cm^2	D638	1000-1400	800-1000	950-1250	650-850	900-1200	300-500
	Tensile Elongation	%	D638	2.5-4.5	2.5-4.5	2.5-4.5	3-5	2.5-4.5	7-15
	Flexural Strength	kg/cm^2	D790	1500-2300	1300-1600	1500-1900	1100-1300	1500-1700	600-800
	Flexural Modulus	kg/cm^2	D790	≧70000	≧50000	≧70000	≧45000	≧75000	≧25000
	Izod Impact Strength (notched 1/4")	kg-cm/cm	D256	7-11	4-7	7-11	6-9	7-11	2-4
	Hardness	M-Scale	D785	94	85-90	85-90	80-90	80-90	80-90
Thermal	Melting Point	℃	DSC	225	225	225	225	225	225
	Heat Deflection Temp. ($18.6kg/cm^2$)	℃	D648	205	185	195	190	200	65
	Heat Deflection Temp. ($4.6kg/cm^2$)	℃	D648	220	205	210	200	210	165
	Coefficient of Thermal Expansion	10^{-5} cm/cm℃	D696	3	5	3	3	3	9
	Flammability	-	UL94	V-0 (3.0mm)	V-0 (0.8mm)	V-0 (0.8mm)	V-0	V-0	V-0
Electrical	Dielectric Constant	60Hz	D150	3.5	3	3	3.5	3.5	3.5
	Dissipation Factor	60Hz	D150	0.001	0.01	0.01	0.001	0.001	0.001
	Volume Resistivity	Ω-cm	D257	$>10^{15}$	$>10^{15}$	$>10^{15}$	$>10^{15}$	$>10^{15}$	$>10^{15}$
	Surface Resistivity	Ω	D257	$>10^{13}$	$>10^{13}$	$>10^{13}$	$>10^{13}$	$>10^{13}$	$>10^{13}$
	Dielectric Strength (2mm)	KV/mm	D149	>20	>19	>20	>20	>20	>20
	Arc Resistance	sec	D495	100	120	130	100	120	120
Physical	Specific Gravity	-	D792	1.55-1.65	1.40-1.46	1.50-1.56	1.38-1.42	1.48-1.52	1.29-1.33
	Water Absorption (24hr immersion)	%	D570	0.03	0.03	0.03	0.03	0.03	0.05
	Mould Shrinkage — in flow direction	%	D955	0.2-0.5	0.1-0.5	0.1-0.4	0.3-0.6	0.2-0.5	0.9-1.9
	Mould Shrinkage — in transverse direction	%	D955	0.8-1.4	0.8-1.3	0.8-1.4	0.6-1.2	0.8-1.4	1.2-2.1
	Glass Fiber Content	%	Ash	30	15	30	15	30	0
	TYPE	-	-	GF30% 94V-0	Halogen Free GF 15%, V-0	Halogen Free GF 30%, V-0	Halogen Free GF 15%, V-0	Halogen Free GF 30%, V-0	Halogen Free , V-0

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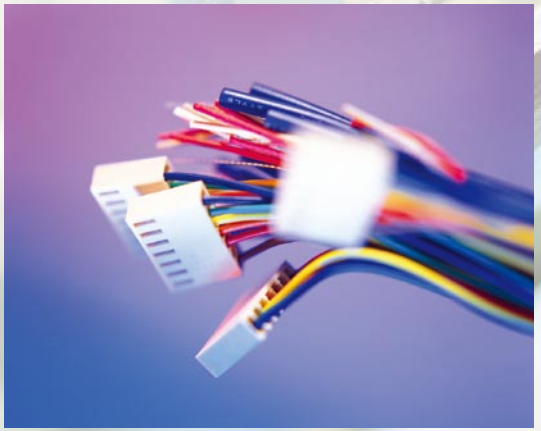

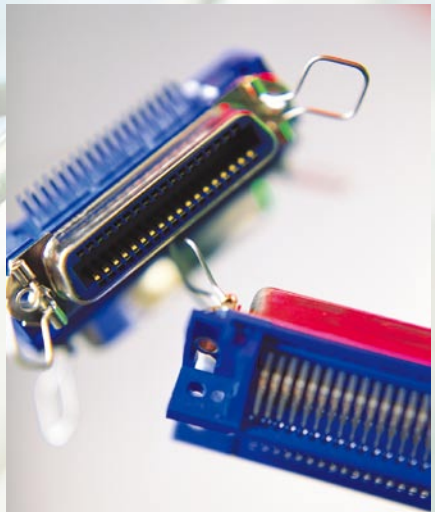

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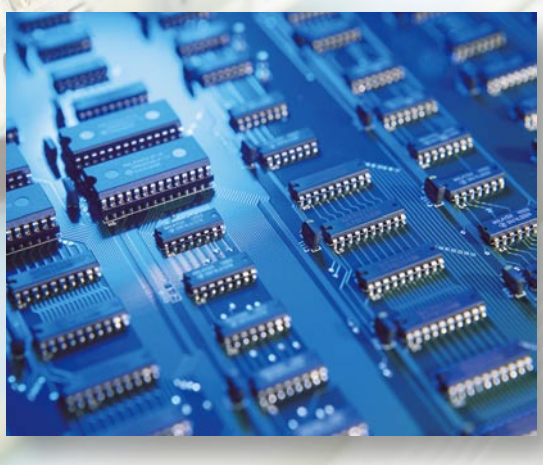
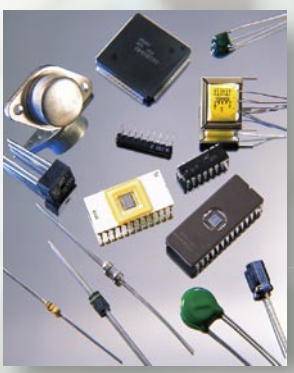
Property		Unit	ASTM	PBT5615F	PBT5620F	PBT5630F	PBT6730	PBT7320H	PBT7320
Mechanical	Tensile Strength	kg/cm^2	D638	700-1000	800-1100	900-1300	950-1200	700-900	700-900
	Tensile Elongation	%	D638	3-5	2.5-4.5	2.5-4.5	2.5-4.5	3-5	3-5
	Flexural Strength	kg/cm^2	D790	1000-1500	1400-1800	1500-2000	1450-1800	1100-1300	1000-1200
	Flexural Modulus	kg/cm^2	D790	≧45000	≧60000	≧75000	≧75000	≧25000	≧40000
	Izod Impact Strength (notched 1/4")	kg-cm/cm	D256	6-11	7-11	7-13	6-10	7-10	6-9
	Hardness	M-Scale	D785	85-95	85-95	85-95	85-90	90	90
Thermal	Melting Point	℃	DSC	225	225	225	225	225	225
	Heat Deflection Temp. ($18.6kg/cm^2$)	℃	D648	205	205	205	140	150	140
	Heat Deflection Temp. ($4.6kg/cm^2$)	℃	D648	220	220	220	200	200	190
	Coefficient of Thermal Expansion	10^{-5} cm/cm℃	D696	5.5	3.5	3	2.5	3	3
	Flammability	-	UL94	V-0	V-0	V-0	V-0 (0.8mm)	HB	V-0 (0.8mm)
Electrical	Dielectric Constant	60Hz	D150	3.5	3.5	3.5	3.5	4	4
	Dissipation Factor	60Hz	D150	0.001	0.001	0.001	0.001	0.001	0.001
	Volume Resistivity	Ω-cm	D257	$>10^{15}$	$>10^{15}$	$>10^{15}$	$>10^{15}$	$>10^{15}$	$>10^{15}$
	Surface Resistivity	Ω	D257	$>10^{13}$	$>10^{13}$	$>10^{13}$	$>10^{13}$	$>10^{13}$	$>10^{13}$
	Dielectric Strength (2mm)	KV/mm	D149	>20	>20	>20	>20	>20	>20
	Arc Resistance	sec	D495	100	100	100	90	90	90
Physical	Specific Gravity	-	D792	1.38-1.42	1.44-1.48	1.48-1.55	1.57-1.63	1.31-1.35	1.47-1.53
	Water Absorption (24hr immersion)	%	D570	0.03	0.03	0.03	0.03	0.06	0.06
	Mould Shrinkage — in flow direction	%	D955	0.3-0.6	0.3-0.6	0.2-0.5	0.1-0.3	0.1-0.5	0.1-0.5
	Mould Shrinkage — in transverse direction	%	D955	1.2-1.8	1.2-1.8	0.8-1.4	0.3-0.6	0.7-1.3	0.7-1.3
	Glass Fiber Content	%	Ash	15	20	30	30	20	20
	TYPE	-	-	Halogen Free GF 15%, V-0	Halogen Free GF 20%, V-0	Halogen Free GF 30%, V-0	Low warp grade GF 30%, V-0	Low warp grade GF 20%, HB	Low warp grade GF 30%, V-0

※ CCP PBT UL file No:E59481(s)

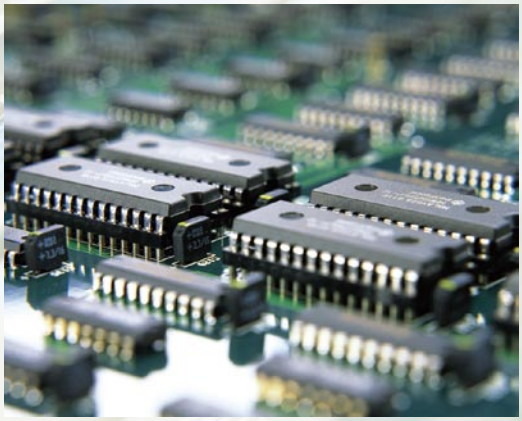




FOR REFERENCE ONLY

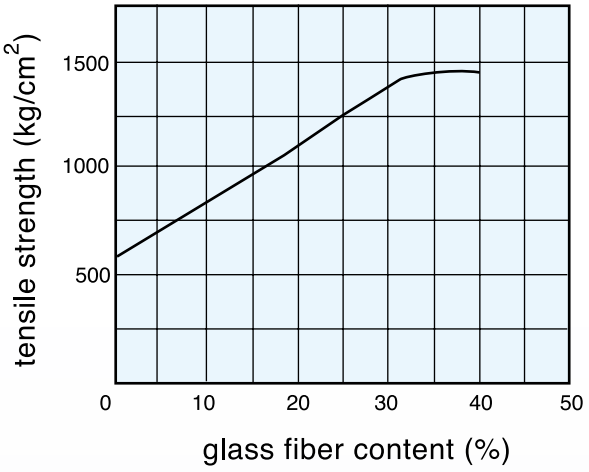
Property			Unit	ASTM	PBT8830	PET9115	PET9130
Mechanical	Tensile Strength		kg/cm^2	D638	900-1300	900-1200	1000-1500
	Tensile Elongation		%	D638	2.5-4.5	2.5-4.5	2.5-4.5
	Flexural Strength		kg/cm^2	D790	1400-2100	1300-1700	1800-2200
	Flexural Modulus		kg/cm^2	D790	≧65000	≧60000	≧100000
	Izod Impact Strength (notched 1/4")		kg-cm/cm	D256	6-11	4-7	9-13
	Hardness		M-Scale	D785	94	90-100	90-100
Thermal	Melting Point		℃	DSC	225	225	255
	Heat Deflection Temp. ($18.6kg/cm^2$)		℃	D648	200	210	230
	Heat Deflection Temp. ($4.6kg/cm^2$)		℃	D648	220	240	240
	Coefficient of Thermal Expansion		10^{-5} cm/cm℃	D696	3	2	2
	Flammability		-	UL94	V-0 (3.0mm)	V-0 (0.8mm)	V-0 (0.8mm)
Electrical	Dielectric Constant		60Hz	D150	3.5	3.5	3.5
	Dissipation Factor		60Hz	D150	0.001	0.001	0.001
	Volume Resistivity		Ω-cm	D257	$>10^{15}$	$>10^{15}$	$>10^{15}$
	Surface Resistivity		Ω	D257	$>10^{13}$	$>10^{13}$	$>10^{13}$
	Dielectric Strength (2mm)		KV/mm	D149	>20	>20	>20
	Arc Resistance		sec	D495	90	100	100
Physical	Specific Gravity		-	D792	1.57-1.65	1.58-1.62	1.68-1.75
	Water Absorption (24hr immersion)		%	D570	0.03	0.05	0.05
	Mould Shrinkage	in flow direction	%	D955	0.2-0.5	0.1-0.3	0.1-0.3
		in transverse direction	%	D955	0.8-1.4	0.4-1.1	0.5-1.0
	Glass Fiber Content		%	Ash	30	15	30
	TYPE		-	-	Economic grade Glass/ Mineral 30%, 94V-0	PET GF15% 94 V-0	PET GF30% 94 V-0

※ CCP PBT UL file No:E59481(s)

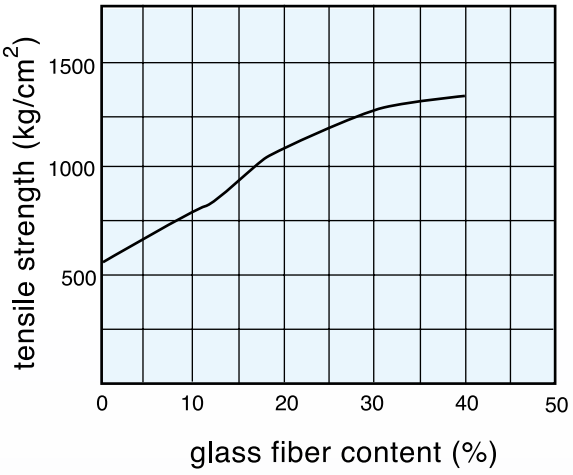


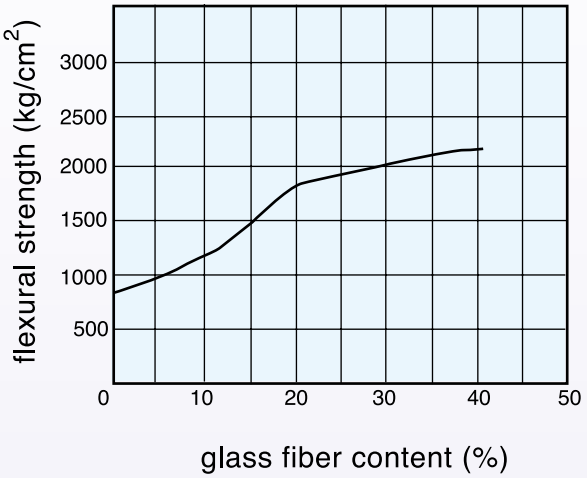
VI. THE RELATIONSHIP BETWEEN MECHANICAL PROPERTIES AND GLASS FIBER CONTENT

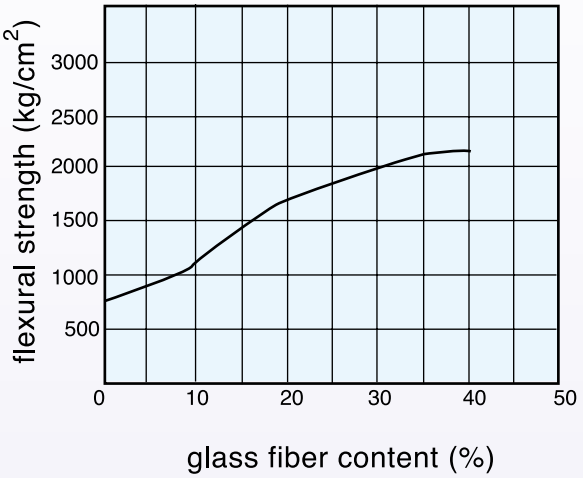
PBT 3000 series

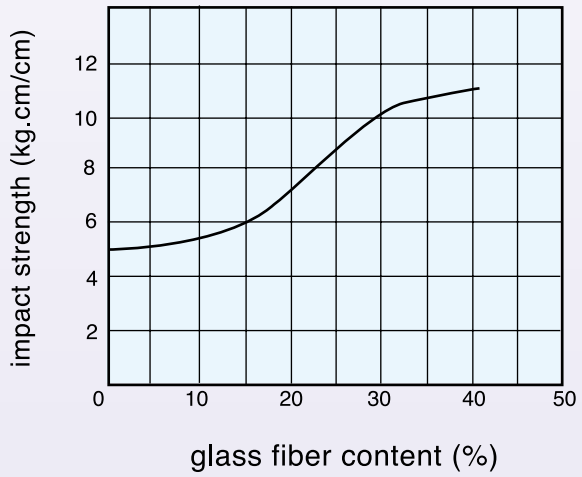


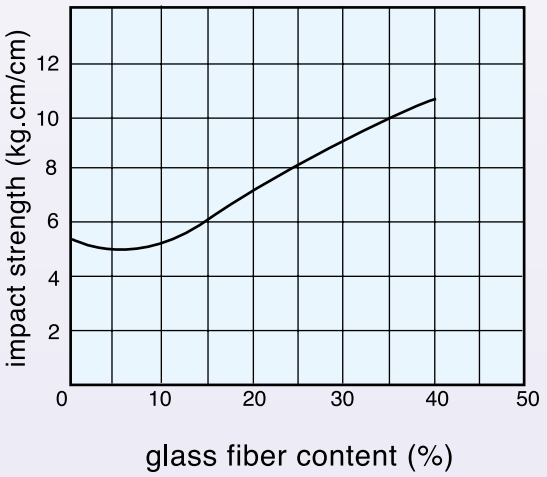
PBT 4000 series





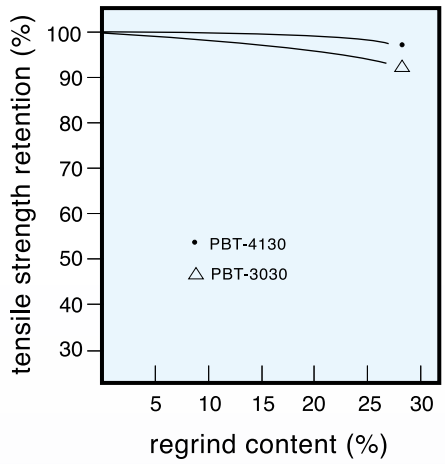


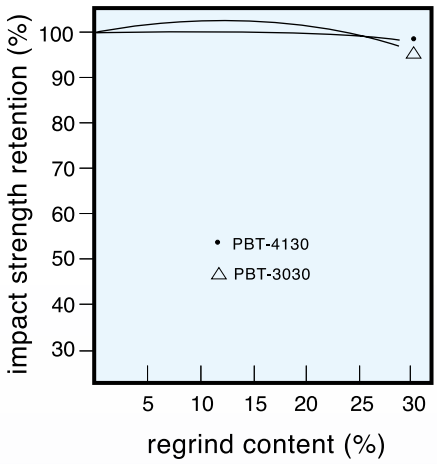




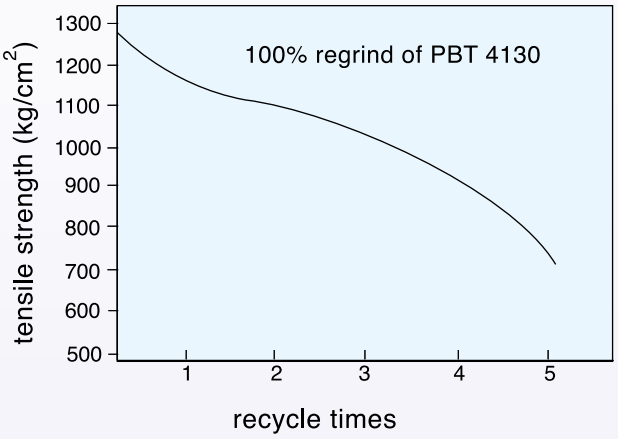
VII. THE RELATIONSHIP BETWEEN MECHANICAL PROPERTIES AND THE AMOUNT OF REGRIND

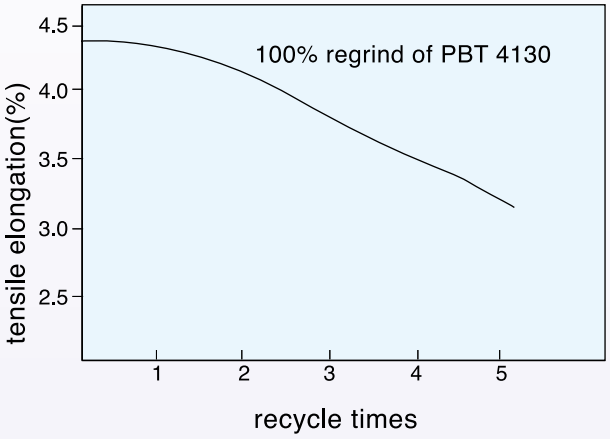
The molded CCP PBT can be reground, dried and remolded repeatedly. Up to 25% CCP PBT regrind can be blended with virgin CCP PBT with no significant loss of properties. It is important that CCP PBT regrind can only be used, otherwise the properties might be reduced.

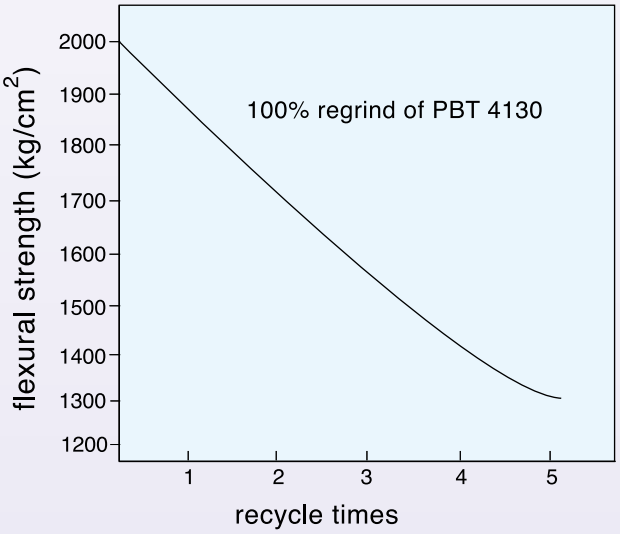


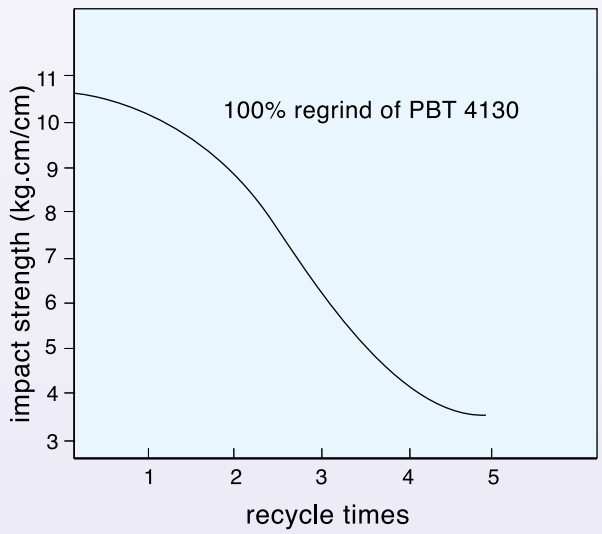


Mechanical properties v.s. recycle times of regrind PBT-4130.









Ⅷ. CHEMICAL RESISTANCE

CCP PBT is resistant to many common solvents, fats and oils. The chemical resistance depends on the concentration, temperature and duration of contact.

Chemicals	PBT	POM	PC	m-PPO	NYLON 6	NYLON66
30% Sulfuric acid	○	○	○	○	×	×
10% Nitric acid	○	○	○	○	×	×
10% Hydrochloric acid	○	○	○	○	×	×
Sodium hydroxide	×	○	×	○	○	○
Ammonium hydroxide	○	○	×	○	△	○
Methanol	○	○	△	○	×	△
Ethanol	○	○	○	○	△	△
Acetone	○	○	×	×	○	○
Chloroform	△	×	×	×	—	—
Carbon tetrachloride	○	○	×	×	○	○
Heptane	○	○	○	○	○	○
Toluene	○	○	×	×	○	○
Gasoline	○	○	○	×	○	○
Machine oil	○	○	○	—	○	○

○= excellent, no or slight weight change　△= fair　×= poor, unstable

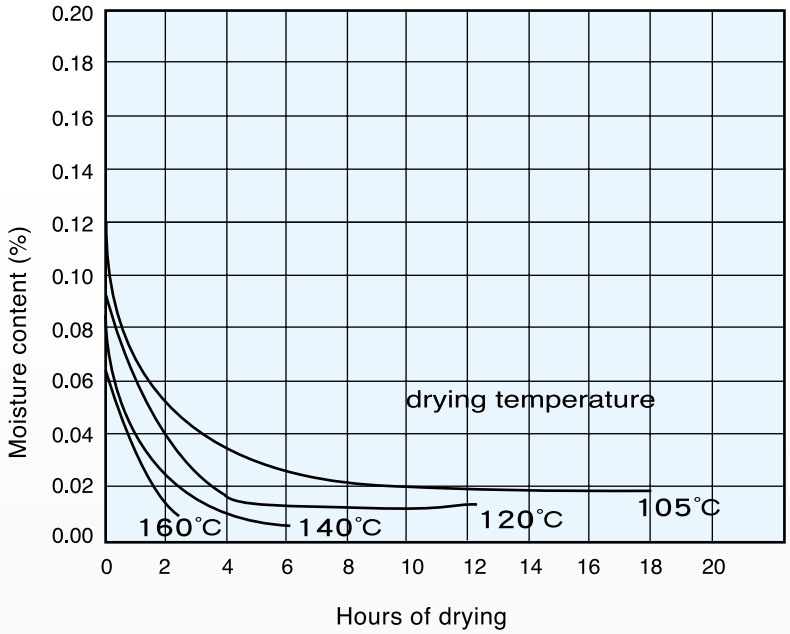
PBT immersion tests

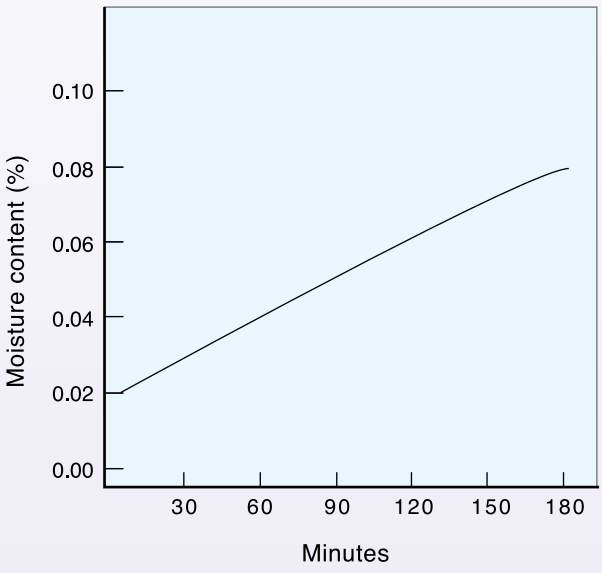
Chemical	Duration(days)	Temperature(˚C)	Weight change(%)	Strength change(%)
1% Sodium hydroxide	60 days	25˚C	+0.5%	−40%
10% Hydrochloric acid	60 days	25˚C	−0.1%	−4%
36% Sulfuric acid	60 days	25˚C	+0.3%	−1.7%
10% Sodium chloride	60 days	25˚C	+0.25%	−5%
Potable water	60 days	25˚C	−0.2%	−3%
5% Acetic acid	60 days	25˚C	+0.3%	0%
Acetone	60 days	25˚C	+0.8%	−12%
Styrene	60 days	25˚C	+0.3%	−5%
95% Ethanol	60 days	25˚C	+0.2%	−2%
Gasoline	60 days	25˚C	+0.1%	−1.0%
Machine oil	60 days	25˚C	0%	0%

IX. PRE-DRYING

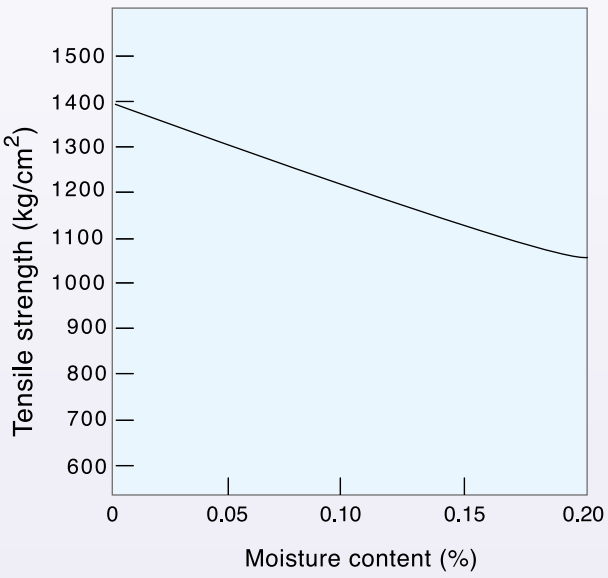
Thermoplastic, PBT for example, is susceptible to hydrolysis. To ensure the properties of molded parts, pre-drying is necessary before processing. The moisture content should be less than 0.02% Therefore CCP PBT must be dried as following drying conditions:

Temperature℃	105	120	140
Hours of drying	8	4-6	2-4





Reabsorption of moisture after drying



Tensile strength vs. moisture content

X. UL card

CHANG CHUN PLASTICS CO LTD E59481

7TH FL 301 SONGKIANG RD TAIPEI, TAIWAN

									H	D	
		Min.		H	H	R T I			V	4	C
		Thk	Flame	W	A	Elec	Mech		T	9	T
Material Dsg	Color	mm	Class	I	I		Imp	Str	R	5	I
Polybutylene Terephthalate (PBT), furnished as pellets.											
PBT-1100	ALL	0.75	HB	3	0	75	75	75	0	6	0
		1.5	HB	3	0	75	75	75			
		3	HB	2	0	75	75	75			
PBT-1200	ALL	0.75	HB	3	0	75	75	75	0	5	0
		1.5	HB	3	0	75	75	75			
		3	HB	2	0	75	75	75			
PBT-1200T	WT	0.82-0.9	HB	3	–	75	75	75	–	–	–
PBT-2000	ALL	0.35	V-0	5	0	75	75	75	2	7	4
		0.71	V-0	3	0	75	75	75			
		1.5	V-0	3	0	75	75	75			
		3	V-0	2	0	75	75	75			
PBT-2000T	WT	0.96-1.06	V-0	4	—	75	75	75	–	–	–
PBT-2100	ALL	0.75	V-0	3	0	75	75	75	3	7	2
		1.5	V-0	3	0	75	75	75			
		3	V-0	3	0	75	75	75			
PBT-2800	ALL	3.0-3.3	V-0	2	3	75	75	75	2	7	2
PBT-3015	ALL	0.80	HB	4	0	140	120	140	0	7	1
		1.5	HB	4	0	140	120	140			
		3	HB	0	0	140	120	140			
PBT-3020	ALL	0.72	HB	3	0	75	75	75	2	7	0
		1.5	HB	2	0	75	75	75			
		3	HB	0	0	75	75	75			
PBT-3030	ALL	0.71	HB	2	0	75	75	75	0	7	1
		1.5	HB	1	0	75	75	75			
		3	HB	1	0	75	75	75			
PBT-4108	ALL	0.89-0.98	V-0	2	4	75	75	75	3	7	3
PBT-4115(a)	ALL	0.75	V-0	4	0	120	120	140	1	6	3
		1.5	V-0	3	1	120	120	140			
		3	V-0	1	0	120	120	140			
PBT-4115F	ALL	0.82	V-0	4	1	75	75	75	2	6	3
		1.5	V-0	4	1	75	75	75			
		3	V-0	4	1	120	75	130			

PBT-4120	ALL	0.82	V-0	4	0	75	75	75	0	7	2
		1.5	V-0	—	—	75	75	75			
		3	V-0	1	0	75	75	75			
PBT-4130(a)	ALL	0.40	V-0	4	0	75	75	75	4	7	2
		0.74	V-0	4	0	120	120	140			
		1.5	V-0	3	0	120	120	140			
		3	V-0	2	0	120	120	140			
PBT-4130F	ALL	0.40	V-0	—	—	75	75	75	2	6	3
		0.80	V-0	4	1	75	75	75			
		1.5	V-0	4	1	75	75	75			
		3	V-0	2	1	120	—	125			
PBT-4140	ALL	0.83	V-0	4	2	75	75	75	2	7	3
		1.5	V-0	—	—	75	75	75			
		3	V-0	1	2	75	75	75			
PBT-4630	ALL	1.5-1.6	V-0	1	3	75	75	75	3	7	3
PBT-4815	ALL	3.0-3.2	V-0	1	3	75	75	75	2	7	3
PBT-4820	ALL	3.0-3.2	V-0	1	3	75	75	75	2	7	3
PBT-4830	ALL	3.0-3.2	V-0	0	1	75	75	75	2	7	3
PBT-48@G	ALL	1.6	V-0	3	0	75	75	75	3	7	3
		3.2	V-0	2	0	75	75	75			
PBT-5115	ALL	0.89-0.98	V-0	4	3	75	75	75	3	7	3
PBT-5130	ALL	0.89-0.98	V-0	1	3	75	75	75	3	6	3
PBT-56*	ALL	0.80	V-0	0	0	75	75	75	4	5	0
		3	V-0	0	0	75	75	75			
PBT-56($)F	ALL	0.80	V-0	4	0	75	75	75	4	6	0
		3	V-0	2	0	75	75	75			
PBT-5600F	ALL	0.80	V-0	4	0	75	75	75	4	6	0
		3	V-0	2	0	75	75	75			
PBT-5630F	ALL	0.80	V-0	1	0	75	75	75	4	5	0
		3	V-0	0	0	75	75	75			
PBT-67#	ALL	0.89-0.98	V-0	4	4	75	75	75	3	7	3
PBT-6730	ALL	0.89-0.98	V-0	0	4	75	75	75	3	7	3
PBT-73@	ALL	0.8-0.88	V-0	3	0	75	75	75	4	7	3
PBT-8830	BK	3.0-3.3	V-0	—	—	75	75	75	—	—	—
Polyethylene Terephthalate(PET), “LONGLITE”, furnished as pellets.											
PET-9115	ALL	0.80	V-0	0	0	75	75	75	3	7	3
		3	V-0	0	0	75	75	75			
PET-9130	ALL	0.80	V-0	0	0	75	75	75	3	7	3
		3	V-0	0	0	75	75	75			
PET-9145	ALL	0.90-0.98	V-0	0	3	75	75	75	4	7	3

#-Maybe 08~30 indicating the content of glass fiber from 8% to 30%
(a)-Ball pressure temperature of 210 C in accordance with IEC.695.10.2 and IEC 950.5.4.10
*-Maybe 15~35 indicating the content of glass fiber from 15% to 35%
@- Maybe 08~40 indicating the content of glass fiber from 8% to 40%

Marking: Company name or tradename “ LONGLITE” and material designation on container, wrapper or finished part.

XI. CERTIFICATIONS

THE BUREAU OF STANDARDS, METROLOGY AND INSPECTION (BSMI),
MINISTRY OF ECONOMIC AFFAIRS, TAIWAN, R.O.C.
QUALITY MANAGEMENT SYSTEM CERTIFICATE

ISO 9001
BSMI
REGISTERED

hereby certifies that the firm

CHANG CHUN PLASTICS CO., LTD. KAOHSIUNG FACTORY
(14, KUNG YEH 1 ROAD, JEN-WU INDUSTRIES DISTRICT, KAOHSIUNG, TAIWAN, R.O.C.)

has fulfilled the requirements of Quality Management System specified as

ISO 9001:2008/CNS 12681

and is granted registration by the Bureau.
The scope of registration is described below.

THE DESIGN AND PRODUCTION OF:
* PBT (POLYBUTYLENE TEREPHTHALATE)
* MELAMINE MOLDING COMPOUNDS
* OTHER SYNTHETIC RESINS (PAPER DRY STRENGTH RESINS)
* OTHER SYNTHETIC RESINS (PAPER WET STRENGTH RESINS)
(Continued)

Originally Registered: February 01, 1994
Date of Approval: April 14, 2009
Expiry Date: April 13, 2012
Certificate No: 7XEY007-11

Jay-San Chen, Ph. D.
Director General

TAF IAF

Scopes accredited by the TAF are marked with "*"

THE BUREAU OF STANDARDS, METROLOGY AND INSPECTION (BSMI),
MINISTRY OF ECONOMIC AFFAIRS, TAIWAN, R.O.C.
QUALITY MANAGEMENT SYSTEM
CERTIFICATE (APPENDIX)

CHANG CHUN PLASTICS CO., LTD. KAOHSIUNG FACTORY
(14, KUNG YEH 1 ROAD, JEN-WU INDUSTRIES DISTRICT, KAOHSIUNG, TAIWAN, R.O.C.)

Scope of Registration:
THE DESIGN AND PRODUCTION OF:
* UREA RESINS ADHESIVES, * MELAMINE RESINS ADHESIVES
* UREA MOLDING COMPOUNDS
* OTHER SYNTHETIC RESINS (POLYESTER PLASTICIZERS)
* OTHER SYNTHETIC RESINS (POWDER POLYESTER RESINS)
* OTHER SYNTHETIC RESINS (TEXTILE RESINS)
* OTHER SYNTHETIC RESINS (FURAN RESINS)
* OTHER SYNTHETIC RESINS (METHYLATED MELAMINE RESINS)
* OTHER SYNTHETIC RESINS (AMINO RESINS)
* OTHER SYNTHETIC RESINS (N-BUTYL FORMOLS)
* OTHER SYNTHETIC RESINS (HARDNERS FOR UREA RESINS ADHESIVES)
* OTHER SYNTHETIC RESINS (HARDNERS FOR FURAN RESINS)
* OTHER SYNTHETIC RESINS (MOLD CLEANERS)
* OTHER SYNTHETIC RESINS (OVERLAY RESINS)
* OTHER SYNTHETIC RESINS (STABILIZERS)
* OTHER SYNTHETIC RESINS (EPOXY REACTIVE DILUENTS)
* OTHER SYNTHETIC RESINS (EPOXY RESINS)
* OTHER SYNTHETIC RESINS (THERMOPLASTIC POLYESTER ELASTOMERS)
* OTHER SYNTHETIC RESINS (POLYESTER HOT MELT ADHESIVES)
THE PRODUCTION OF:
* FORMALDEHYDE
OFF-SITE(S) INCLUDED:
MARKETING DIVISION AND OVERSEAS MARKETING DIVISION (7TH FL., NO. 301, SONGKIANG ROAD, TAIPEI, TAIWAN, R.O.C.)
---end---

Originally Registered: February 01, 1994
Date of Approval: April 14, 2009
Valid Until: April 13, 2012
Certificate No: 7XEY007-11

Scopes accredited by the TAF are marked with "*"

THE BUREAU OF STANDARDS, METROLOGY AND INSPECTION (BSMI),
MINISTRY OF ECONOMIC AFFAIRS, TAIWAN, R.O.C.
ENVIRONMENTAL MANAGEMENT
SYSTEM CERTIFICATE

ISO 14001
BSMI
REGISTERED

hereby certifies that the firm

CHANG CHUN PLASTICS CO., LTD. KAOHSIUNG FACTORY
(12 & 14, KUNG YEH 1 ROAD, JEN-WU, KAOHSIUNG, TAIWAN, R.O.C.)

has fulfilled the requirements of Environmental Management System specified as

ISO 14001:2004 / CNS 14001

and is granted registration by the Bureau.
The scope of registration described below.

THE RELATED ACTIVITIES OF THE PRODUCTION OF:
* PBT (PLOYBUTYLENE TEREPHTHALATE)
* MELAMINE MOLDING COMPOUNDS, * FORMALDEHYDE
* UREA RESIN ADHESIVES, * UREA MOLDING COMPOUNDS
* OTHER SYNTHETIC RESINS
---end---

Originally: November 14, 1996
Date of Approval: July 01, 2008
Expiry Date: July 01, 2011
Certificate No: 7XEE002-04

Jay-San Chen, Ph. D.
Director General

TAF IAF

Scopes accredited by the TAF are marked with "*"

THE BUREAU OF STANDARDS, METROLOGY AND INSPECTION (BSMI),
MINISTRY OF ECONOMIC AFFAIRS, TAIWAN, R.O.C.
OCCUPATIONAL HEALTH AND SAFETY MANAGEMENT SYSTEM CERTIFICATE

OHSAS 18001 BSMI REGISTERED
TOSHMS BSMI REGISTERED

hereby certifies that the firm

CHANG CHUN PLASTICS CO., LTD. KAOHSIUNG FACTORY
(NO. 14, KUNG YEH 1 RD., JEN-WU INDUSTRIES DISTRICT, KAOHSIUNG HSIEN, TAIWAN, R.O.C.)

has fulfilled the requirements of Occupational Health and Safety Management System specified as

OHSAS 18001 : 2007 and TOSHMS : 2007

and is granted registration by the Bureau. The scope of registration is described below.

Page 2 : OHSAS 18001 (No. : 7XEH009-01)
Page 3 : TOSHMS (No. : CB01-98048-00)

Originally Registered : May 1, 2008
Date of Approval : April 22, 2009
Valid Until : April 30, 2011
Certificate No : 7XEH009-01

Jay-San Chen, Ph. D.
Director General

SGS

CHANG CHUN PLASTICS CO., LTD.

No.14, Kung Yeh 1 Road, Jen-Wu Industries District, Kaohsiung Hsien, Taiwan

Has been assessed and certified as meeting the requirements of

ISO/TS 16949:2002
Edition 2

Manufacture of polybutylene terephthalate for use in automobile parts.

EXCLUSIONS: 7.3 product design

3 Year certification is valid from 10 September 2009 until 09 September 2012 and remains valid subject to satisfactory surveillance audits
Version no. 2 Current version updated 10 September 2009
Re certification audit due before 09 August 2012
Certified since 12 September 2006

SGS SGS SGS

Certificate of Green Partner

STWN-PC003063

Presented To:

Chang Chun Plastics Co.,Ltd. (Kaohsiung Factory)

This is to certify that you have successfully established an environmental management system that has met the requirements of the Sony Green Partner Program

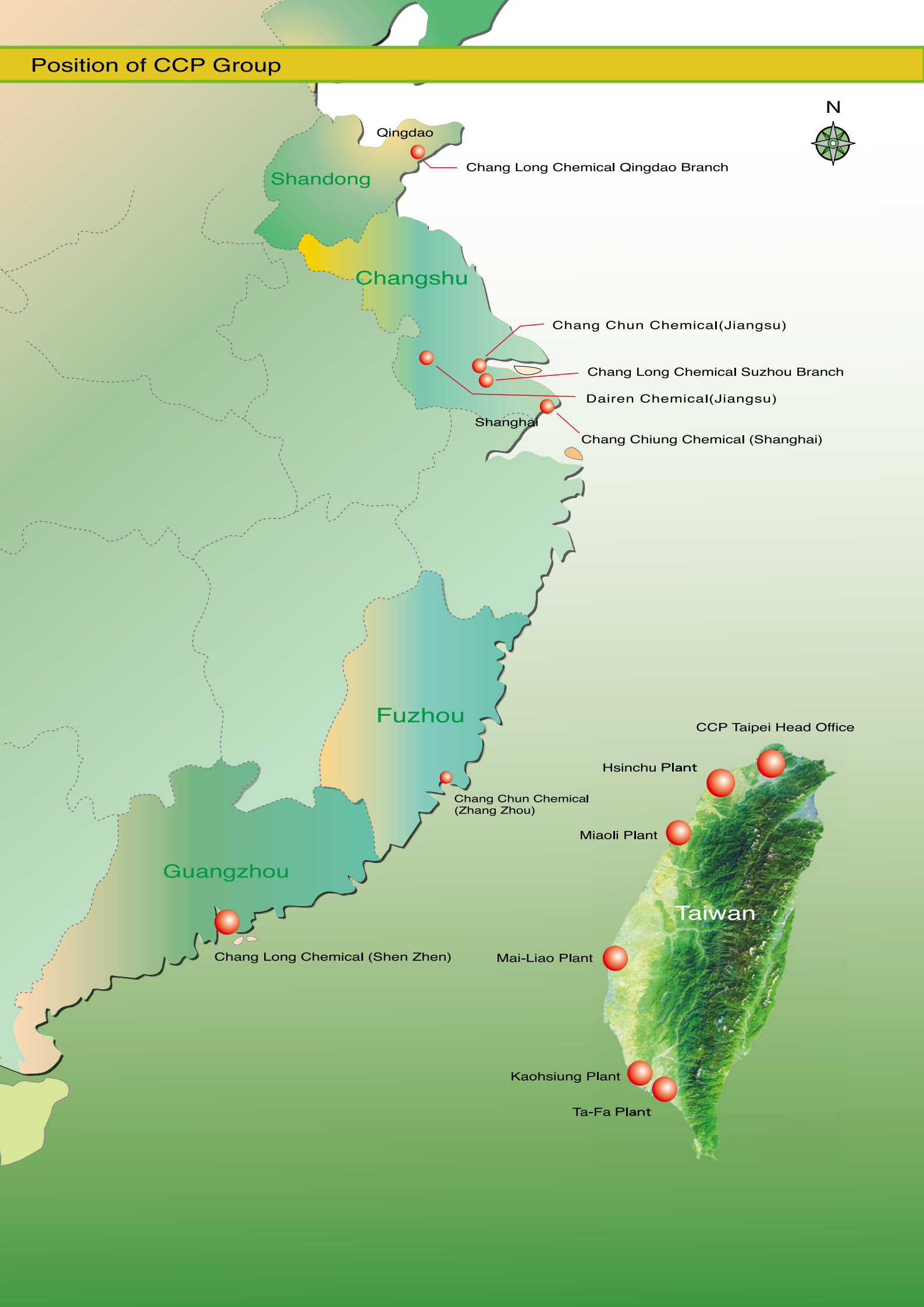
Term of Validity : 2010 / 3 / 1 ~ 2012 / 2 / 29
Issued on : 2010/2/10
Approved and Issued by : Procurement Group, Sony Corporation

Kazuaki Takanose
President, Procurement Group, Sony Corporation

Isamu Takahashi
Division President,
Sony Supply Chain Solutions Taiwan,
a div. company of Sony Taiwan LTD

SONY 92307

Position of CCP Group



長春總公司

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傳真：886-2-2501-8018
網址：www.ccp.com.tw

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301 SONGKIANG RD., 7TH FL., TAIPEI 104, TAIWAN
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FAX: 886-2-2501-8018
WEB SITE: www.ccp.com.tw

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