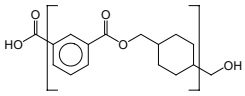
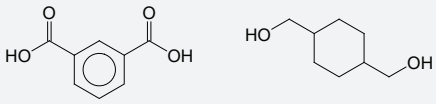
PCT poly(cyclohexylene terephthalate)

PARAMETER	UNIT	VALUE	REFERENCES
GENERAL			
Common name	-	poly(cyclohexylene terephthalate)	
CAS name	-	poly(oxycarbonyl-1,4-phenylenecarbonyloxymethylene-1,4-cyclohexanediylmethylene); 1,3-benzenedicarboxylic acid, polymer with 1,4-benzenedicarboxylic acid and 1,4-cyclohexanedimethanol	
Acronym	-	PCT	
CAS number	-	24936-69-4; 26124-27-6	
Formula			
SYNTHESIS			
Monomer(s) structure	-		
Monomer(s) CAS number(s)	-	121-91-5; 105-08-8	
Monomer(s) molecular weight(s)	dalton, g/mol, amu	166.13; 144.24	
COMMERCIAL POLYMERS			
Some manufacturers	-	Ticona	
Trade names	-	Thermx	
PHYSICAL PROPERTIES			
Density at 20°C	g cm^{-3}	1; 1.38-1.55 (20-40% glass fiber)	
Bulk density at 20°C	g cm^{-3}	0.6-0.9 (20-40% glass fiber)	
Refractive index, 20°C	-	1.597-1.605	
Odor		slight, specific	
Melting temperature, DSC	°C	>200; 285 (20-40% glass fiber)	
Decomposition temperature	°C	350	
Thermal expansion coefficient, 23-80°C	10^{-4} $°C^{-1}$	0.3-0.8	
Thermal conductivity, melt	W m^{-1} K^{-1}	0.2	
Glass transition temperature	°C	87-105	
Specific heat capacity	J K^{-1} kg^{-1}	1,470	
Heat deflection temperature at 1.8 MPa	°C	253-262 (20-40% glass fiber)	
Volume resistivity	ohm-m	1E13	
Surface resistivity	ohm	1E15	
Electric strength K20/P50, d=0.60.8 mm	kV mm^{-1}	41	
MECHANICAL & RHEOLOGICAL PROPERTIES			
Tensile strength	MPa	45; 100-130 (20-40% glass fiber)	
Tensile modulus	MPa	6,400-13,000 (20-40% glass fiber)	

PCT poly(cyclohexylene terephthalate)

PARAMETER	UNIT	VALUE	REFERENCES
Tensile creep modulus, 1 h/1,000 h, elongation 0.5 max	MPa	6,000/4,600 (20-40% glass fiber)	
Elongation	%	1.3-2.3 (20-40% glass fiber)	
Flexural strength	MPa	155-178 (20-40% glass fiber)	
Flexural modulus	MPa	5,800-12,800 (20-40% glass fiber)	
Charpy impact strength, unnotched, 23°C	kJ m^{-2}	35-55 (20-40% glass fiber)	
Charpy impact strength, unnotched, -30°C	kJ m^{-2}	30 (20-40% glass fiber)	
Charpy impact strength, notched, 23°C	kJ m^{-2}	7-8 (20-40% glass fiber)	
Charpy impact strength, notched, -30°C	kJ m^{-2}	7 (20-40% glass fiber)	
Izod impact strength, notched, 23°C	J m^{-1}	6 (20-40% glass fiber)	
Shrinkage	%	0.3-0.8 (20-40% glass fiber)	
Melt volume flow rate (ISO 1133, procedure B), 300°C/2.16 kg	cm^3/10 min	30 (20-40% glass fiber)	
Water absorption, equilibrium in water at 23°C	%	1.1	
Moisture absorption, equilibrium 23°C/50% RH	%	0.1	
CHEMICAL RESISTANCE			
Acid dilute/concentrated	-	good	
Alcohols	-	good	
Alkalis	-	poor	
Aliphatic hydrocarbons	-	good	
Aromatic hydrocarbons	-	fair	
Esters	-	good	
Greases & oils	-	good	
Ketones	-	good	
FLAMMABILITY			
Limiting oxygen index	% O_2	33 (flame resistant grade)	
Volatile products of combustion	-	CO,CO_2	
UL 94 rating	-	HB; V-0 (flame resistant grade)	
TOXICITY			
NFPA: Health, Flammability, Reactivity rating	-	1/1/0; 0/1/0 (HMIS)	
Carcinogenic effect	-	not listed by ACGIH, NIOSH, NTP	
TLV, ACGIH	mg m^{-3}	3 (respirable), 10 (total)	
OSHA	mg m^{-3}	5 (respirable), 15 (total)	

PCT poly(cyclohexylene terephthalate)

PARAMETER	UNIT	VALUE	REFERENCES
PROCESSING			
Typical processing methods	-	injection molding	
Preprocess drying: temperature/ time/residual moisture	°C/h/%	95/4-6/	
Applications	-	automotive ignition system, circuit board connectors, automotive connectors (headers), lamp sockets and relays	
Outstanding properties	-	hydrolysis resistance, high temperature resistance	
BLENDS			
Suitable polymers	-	LCP, PA, PBT, PET	