CAPh cellulose acetate phthalate

PARAMETER	UNIT	VALUE	REFERENCES
GENERAL			
Common name	-	cellulose acetate phthalate, cellacefate	
Acronym	-	CAPh	
CAS number	-	9004-38-0	
RTECS number	-	FJ5692000	
SYNTHESIS			
Monomer(s) structure	-	phthalic anhydride; partial acetate ester of cellulose	
Monomer(s) CAS number(s)	-	85-44-9; 9004-35-7	
Monomer(s) molecular weight(s)	dalton, g/mol, amu	148.1; range	
Acetyl content	%	21.5-26	
Phthalyl content	%	30-36	
Method of synthesis	-	partially substituted cellulose acetate is reacted with phthalic anhydride in the presence of an organic solvent and a basic catalyst	
Catalyst	-	base	
Number average molecular weight, M_n	dalton, g/mol, amu	4,400-19,200	
Mass average molecular weight, M_w	dalton, g/mol, amu	2,500-65,900	
STRUCTURE			
Crystallinity	%	0, amorphous	
COMMERCIAL POLYMERS			
Some manufacturers	-	Eastman; FMC BioPolymer	
Trade names	-	Cellulose Acetate Phthalate; Aquacoat	
PHYSICAL PROPERTIES			
Bulk density at 20°C	g cm^{-3}	0.26	
Color	-	white to off-white	
Odor		odorless	
Melting temperature, DSC	°C	192	
pH solubility		above 6.2	
Glass transition temperature	°C	145.59, 175 (Eastman)	Bhat, K D; Jois, H S S, Procedia Mater. Sci., 5, 995-1004, 2014.
MECHANICAL & RHEOLOGICAL PROPERTIES			
Intrinsic viscosity, 25°C	dl g^{-1}	0.2-0.6	
Water absorption, equilibrium in water at 23°C	%	2.2-5	
CHEMICAL RESISTANCE			
Alcohols	-	poor	
Esters	-	poor	
Ketones	-	poor	
Good solvent	-	acetone:water=97:3, acetone:ethyl alcohol:50:50	

CAPh cellulose acetate phthalate

PARAMETER	UNIT	VALUE	REFERENCES
FLAMMABILITY			
Autoignition temperature	°C	416	
Residue on ignition	%	0.06	
Volatile products of combustion	-	CO, CO_2	
BIODEGRADATION			
Typical biodegradants	-	cellulase, esterase	
TOXICITY			
HMIS: Health, Flammability, Reactivity rating	-	1/1/0	
Carcinogenic effect	-	not listed by ACGIH, NIOSH, NTP	
Teratogenic effect	-	none	
Oral rat, LD_{50}	mg kg^{-1}	>5,000	
Skin rabbit, LD_{50}	mg kg^{-1}	>2,000	
NOAEL	ppm	>50,000	
PROCESSING			
Preprocess drying: temperature/time/residual moisture	°C/h/%	mixing, spraying	
Additives used in final products	-	Plasticizers: diethyl phthalate, triethyl citrate, triacetin, dibutyl tartrate, glycerol, propylene glycol, tripropionin, triacetin citrate, acetylated monoglycerides	
Applications	-	delayed release, enteric coatings, pharmaceutical excipient, sustained release, tableting	
Outstanding properties	-	withstands prolonged contact with gastric fluids but dissolves readily in the mildly acidic to neutral environment of the small intestine	
BLENDS			
Suitable polymers	-	EC, PES, PVP	