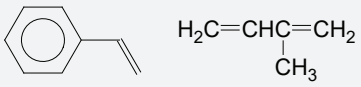
SIS styrene-isoprene-styrene block copolymer

PARAMETER	UNIT	VALUE	REFERENCES
GENERAL			
Common name	-	styrene-isoprene-styrene block copolymer	
CAS name	-	isoprene-styrene rubber, block, triblock	
Acronym	-	SIS	
CAS number	-	308067-96-1	
HISTORY			
Person to discover	-	Bailey, J T; Nyberg, D D	Bailey, J T; Nyberg, D D, US Patent 3,328,173, Shell, Mar. 1, 1966.
Date	-	1966	
Details	-	SIS block copolymers	
SYNTHESIS			
Monomer(s) structure	-		
Monomer(s) CAS number(s)	-	100-42-5; 78-79-5	
Monomer(s) molecular weight(s)	dalton, g/mol, amu	104.15; 68.12	
Monomer ratio	-	14-30 (styrene)/70-86 (isoprene)	
Number average molecular weight, M_n	dalton, g/mol, amu	142,000	
Mass average molecular weight, M_w	dalton, g/mol, amu	156,000-237,000	
Polydispersity, M_w/M_n	-	1.10-1.49	
COMMERCIAL POLYMERS			
Some manufacturers	-	Kraton Polymers; Polimeri Europa	
Trade names	-	Kraton; Europrene	
PHYSICAL PROPERTIES			
Density at 20°C	g cm^{-3}	0.92-0.94	
Bulk density at 20°C	g cm^{-3}	0.35	
Color	-	clear	
Decomposition temperature	°C	190	Hacaloglu, J; Fares, M M; Suzer, S, Eur. Polym. J., 35, 939-44, 1999.
MECHANICAL & RHEOLOGICAL PROPERTIES			
Tensile strength	MPa	12-23.2	
Tensile stress at yield	MPa	6-32	
Elongation	%	750-1,500	
Tensile yield strain	%	1,300	
Shore A hardness	-	24-87	
Melt index, 190°C/5 kg	g/10 min	2-41	
CHEMICAL RESISTANCE			
Alcohols	-	good	
Aromatic hydrocarbons	-	poor	

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FLAMMABILITY			
Volatile products of combustion	-	CO, CO_2, isoprene, styrene, benzene	Hacaloglu, J; Fares, M M; Suzer, S, Eur. Polym. J., 35, 939-44, 1999.
PROCESSING			
Typical processing methods	-	blow molding, coating, compression molding, extrusion, injection molding	
Preprocess drying: temperature/ time/residual moisture	°C/h/%	52/2-4/	
Processing temperature	°C	150-200	
Processing pressure	MPa	7-138 (injection); 0.35 (back)	
Applications	-	adhesives, coatings, cosmetics, membranes, pharmaceuticals, plastics modification, sealants	
BLENDS			
Suitable polymers	-	PE, PPy, ULDPE	