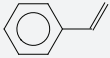


MABS poly(methyl methacrylate-co-butadiene-co-styrene)

| PARAMETER | UNIT | VALUE | REFERENCES |
|---|-----------------------------------|---|---|
| GENERAL | | | |
| Common name | - | poly(methyl methacrylate-co-acrylonitrile-co-butadiene-co-styrene), methyl methacrylate ABS | |
| CAS name | - | 2-propenoic acid, 2-methyl-, methyl ester, polymer with 1,3-butadiene, ethenylbenzene and 2-propenenitrile | |
| Acronym | - | MABS | |
| CAS number | - | 9010-94-0 | |
| HISTORY | | | |
| Person to discover | - | D'Alello, G F | D'Alello, G F, US Patent 2,414,803, General Electric, Jan. 28, 1947. |
| Date | - | 1947 | |
| Details | - | polymerization patented | |
| SYNTHESIS | | | |
| Monomer(s) structure | - | $\text{H}_2\text{C}=\text{CHC}\equiv\text{N}$ $\text{H}_2\text{C}=\text{CHCH}=\text{CH}_2$  $\text{H}_2\text{C}=\text{C}(\text{CH}_3)\text{COCH}_3$ | |
| Monomer(s) CAS number(s) | - | 107-13-1; 106-99-0; 100-42-5; 80-62-6 | |
| Monomer(s) molecular weight(s) | dalton, g/mol, amu | 53.06; 54.09; 104.15; 100.12 | |
| Core/shell ratio | | 60-70/40-30 (core - SBR (Bd/St=77/23), shell - St-MMA=50/50) | Dompas, D; Groeninckx, G; Isogawa, M; Hasegawa, T; Kadokura, M, Polymer, 35, 22, 4750-59, 1994. |
| Method of synthesis | - | core is synthesized by radical emulsion polymerization, followed by graft polymerization of shell | Dompas, D; Groeninckx, G; Isogawa, M; Hasegawa, T; Kadokura, M, Polymer, 35, 22, 4750-59, 1994. |
| Mass average molecular weight, M_w | dalton, g/mol, amu | 100,000 | |
| COMMERCIAL POLYMERS | | | |
| Some manufacturers | - | BASF, Schulman | |
| Trade names | - | Terlux, Polylux | |
| PHYSICAL PROPERTIES | | | |
| Density at 20°C | g cm ⁻³ | 1.04-1.09 | |
| Bulk density at 20°C | g cm ⁻³ | 0.6 | |
| Color | - | colorless | |
| Refractive index, 20°C | - | 1.54 | |
| Odor | - | faint, specific | |
| Softening point | °C | 100-150 | |
| Decomposition temperature | °C | 300 | |
| Thermal expansion coefficient, 23-80°C | 10 ⁻⁴ °C ⁻¹ | 0.8-1.1E-4 | |
| Thermal conductivity, melt | W m ⁻¹ K ⁻¹ | 0.17 | |
| Glass transition temperature | °C | 107 | |
| Maximum service temperature | °C | 75 | |
| Heat deflection temperature at 0.45 MPa | °C | 93-94 | |

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| PARAMETER | UNIT | VALUE | REFERENCES |
|--|-------------------------|---------------------------|------------|
| Heat deflection temperature at 1.8 MPa | °C | 87-90 | |
| Vicat temperature | °C | 87-93 | |
| Vicat temperature VST/B/50 | °C | 91 | |
| Dielectric constant at 100 Hz/1 MHz | - | 2.9/2.8 | |
| Relative permittivity at 100 Hz | - | 2.9-3.0 | |
| Relative permittivity at 1 MHz | - | 2.8 | |
| Dissipation factor at 100 Hz | E-4 | 160 | |
| Dissipation factor at 1 MHz | E-4 | 130-140 | |
| Volume resistivity | ohm-m | 1E13 | |
| Surface resistivity | ohm | 1E15 | |
| Electric strength K20/P50, d=0.60.8 mm | kV mm ⁻¹ | 34 | |
| Comparative tracking index | - | 600 | |
| MECHANICAL & RHEOLOGICAL PROPERTIES | | | |
| Tensile modulus | MPa | 1,900-2,000 | |
| Tensile stress at yield | MPa | 42-48 | |
| Tensile creep modulus, 1000 h, elongation 0.5 max | MPa | 1,250 | |
| Elongation | % | 12-20 | |
| Tensile yield strain | % | 4 | |
| Charpy impact strength, unnotched, 23°C | kJ m ⁻² | 110-120 | |
| Charpy impact strength, unnotched, -30°C | kJ m ⁻² | 70-80 | |
| Charpy impact strength, notched, 23°C | kJ m ⁻² | 5 | |
| Charpy impact strength, notched, -30°C | kJ m ⁻² | 2 | |
| Izod impact strength, notched, 23°C | J m ⁻¹ | 100 | |
| Ball indentation hardness at 358 N/30 S (ISO 2039-1) | MPa | 70 | |
| Shrinkage | % | 0.4-0.7 | |
| Melt viscosity, shear rate=1000 s ⁻¹ | Pa s | 220 | |
| Melt volume flow rate (ISO 1133, procedure B), 220°C/10 kg | cm ³ /10 min | 2-8 | |
| Water absorption, equilibrium in water at 23°C | % | 0.7 | |
| Moisture absorption, equilibrium 23°C/50% RH | % | 0.35 | |
| FLAMMABILITY | | | |
| Ignition temperature | °C | 405 | |
| Autoignition temperature | °C | >400 | |
| Volatile products of combustion | - | CO, CO ₂ , HCN | |

MABS poly(methyl methacrylate-co-butadiene-co-styrene)

| PARAMETER | UNIT | VALUE | REFERENCES |
|---|--------|---|---|
| UL 94 rating | - | HB | |
| WEATHER STABILITY | | | |
| Products of degradation | - | oxidation of C=C bonds to C=O and C-OH groups | |
| TOXICITY | | | |
| HMIS: Health, Flammability, Reactivity rating | - | 1/1/0 | |
| Carcinogenic effect | - | not listed by ACGIH, NIOSH, NTP | |
| PROCESSING | | | |
| Typical processing methods | - | injection molding | |
| Preprocess drying: temperature/time/residual moisture | °C/h/% | 70/2/ | |
| Processing temperature | °C | 230-260 (injection molding) | |
| Mold temperature | °C | 50-80 | |
| Applications | - | computers, consumer electronics, household devices, peripherals, sport equipment, telecommunication | Dompas, D; Groeninckx, G; Isogawa, M; Hasegawa, T; Kadokura, M, Polymer, 35, 22, 4750-59, 1994. |
| Outstanding properties | - | brilliant visual effect | |
| BLENDS | | | |
| Suitable polymers | - | PA6, PMMA, PVC | |