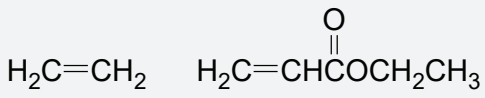
# EEAC poly(ethylene-co-ethyl acrylate)

| PARAMETER | UNIT | VALUE | REFERENCES |
|---|---|---|---|
| **GENERAL** | | | |
| **Common name** | - | poly(ethylene-co-ethyl acrylate) | |
| **IUPAC name** | - | ethene; ethyl prop-2-enoate | |
| **Acronym** | - | EEAC | |
| **CAS number** | - | 9010-86-0 | |
| | | | |
| **HISTORY** | | | |
| **Person to discover** | - | White, W G | White, W G, US Patent 2,953,551, Union Carbide, Sept. 20, 1960. |
| **Date** | - | 1960 | |
| **Details** | - | process of production | |
| | | | |
| **SYNTHESIS** | | | |
| **Monomer(s) structure** | - |  | |
| **Monomer(s) CAS number(s)** | - | 74-85-1; 140-88-5 | |
| **Monomer(s) molecular weight(s)** | dalton, g/mol, amu | 28.05; 100.11 | |
| **Ethyl acrylate content** | wt% | 10-25 | |
| | | | |
| **STRUCTURE** | | | |
| **Crystallinity** | % | 22.8 | Han, S H; Yeom, Y S; Ko, J G; Kang, H C; Yoon, HG, Compos. Sci. Technol., 117, 351-6, 2015. |
| **Rapid crystallization temperature** | °C | 78-82 | |
| | | | |
| **COMMERCIAL POLYMERS** | | | |
| **Some manufacturers** | - | Arkema; Dow; DuPont; Japan Polychem Corp. | |
| **Trade names** | - | Lotader; Amplify; Elvaloy AC; Rexpearl | |
| | | | |
| **PHYSICAL PROPERTIES** | | | |
| **Density at 20°C** | g $cm^{-3}$ | 0.92-0.94 | |
| **Color** | - | white | |
| **Odor** | - | characteristic acrylate | |
| **Melting temperature, DSC** | °C | 92-112 | Koulouri, E G; Gravalos, K G; Kallitsis, J K, Polymer, 37, 12, 2555-63, 1996. |
| **Softening point** | °C | 116 | |
| **Glass transition temperature** | °C | -33 | |
| **Heat deflection temperature at 0.45 MPa** | °C | 31-33 | |
| **Vicat temperature VST/A/50** | °C | 40-82 | |
| | | | |
| **MECHANICAL & RHEOLOGICAL PROPERTIES** | | | |
| **Tensile strength** | MPa | 6.0-24.0 | |
| **Tensile stress at yield** | MPa | 2.6-3.8 | |
| **Elongation** | % | 600-980 | |

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| **Tensile yield strain** | % | 8-11 | |
| **Flexural modulus** | MPa | 24-77 | |
| **Shore A hardness** | - | 70-87 | |
| **Shore D hardness** | - | 19-37 | |
| **Brittleness temperature (ASTM D746)** | °C | -64 to -76 | |
| **Intrinsic viscosity, 25°C** | dl $g^{-1}$ | 0.78 | |
| **Melt index, 190°C/2.16 kg** | g/10 min | 1-21 | |
| | | | |
| **FLAMMABILITY** | | | |
| **Ignition temperature** | °C | 430 | |
| **Volatile products of combustion** | - | CO, $H_2O$, $CO_2$, organic acids, aldehydes, alcohols | |
| | | | |
| **TOXICITY** | | | |
| **Carcinogenic effect** | - | not listed by ACGIH, NIOSH, NTP | |
| **OSHA** | mg $m^{-3}$ | 15 (total dust); 5 (respirable) | |
| | | | |
| **PROCESSING** | | | |
| **Typical processing methods** | - | extrusion (blown film, cast film, coextrusion) | |
| **Processing temperature** | °C | 160-310; 310 (max) | |
| **Additives used in final products** | - | MWCNT | Han, S H; Yeom, Y S; Ko, J G; Kang, H C; Yoon, HG, Compos. Sci. Technol., 117, 351-6, 2015. |
| **Applications** | - | packaging, performance booster for other resins, profile, tubing, wire & cable | |
| **Outstanding properties** | - | easy processing, compatible with LDPE, thermal stability | |
| | | | |
| **BLENDS** | | | |
| **Suitable polymers** | - | LDPE, PA6, PBT, PET, PVOH | Han, S H; Yeom, Y S; Ko, J G; Kang, H C; Yoon, HG, Compos. Sci. Technol., 117, 351-6, 2015. |
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