



Elastomers and its Properties

Natural Rubber (NR, IR)

- Cis – 1, 4 – Poly-isoprene
- Produced from Latex of Hevea Brasiliensis Tree
- Tg : -70°C
- Strain induced crystallized, High Green Strength

Properties

- High Tensile strength with high rebound elasticity
- Very good tear strength
- Very low heat buildup and hysteresis
- Poor heat resistance, weather and ozone resistance
- Dynamic fatigue resistance excellent
- Poor oil and fuel resistance

Uses

- Versatile application
- Tire, Suspension elements i.e. engine manufacturers and vibration isolators, Belts, Molded rubber components, etc.
- Bumper, Technical goods, Hoses, Grommets
- Adhesives, Surgical Gloves, Sanitary rubber goods

Polybutadiene Rubber

- Cis – 1, 4 – Butadiene
- Solution Polymerization
- Tg : 100°C

Properties

- Tensile strength less than NR & SBR
- High abrasion resistance
- Very good low temp. flexibility
- Improved reversion resistance, heat buildup and groove crack resistance with NR & SBR

Uses

- Tire, Technical rubber goods, Impact modifier for plastics

Styrene Butadiene Rubber (SBR)

- Prepared by solution and emulsion polymerization
- Butadiene to Styrene ratio : 76:24 / by weight
- Tg : -50°C

Properties

- Poor Tensile of gum vulcanizate, High tensile with reinforcing filler.
- Dynamic fatigue resistance and heat ageing properties surpass NR
- Not resistance to weather and ozone degradation
- Poor resistance to fuel, oil and gasoline

Uses

- Tires, Belt ,Molded rubber goods, Shoe sole, Cable insulation and jacketing, Hose, Roll covering, Pharmaceutical, Surgical and Sanitary products, Food Packaging etc.

Acrylonitrile Butadiene Rubber (NBR)

- Prepared by copolymerization technique
- Acrylonitrile 18 to 51% by weight
- Blend with PVC
- Tg : - 10 to - 40°C

Properties

- Excellent mechanical properties with reinforcing fillers
- Elastic properties comparable with NR & SBR
- Abrasion resistance surpass NR & SBR
- Heat ageing properties better than NR & SBR
- Very good fuel and oil resistance

Properties of HNBR

- Because of fully saturated polymer chain, exhibit excellent hot air and hot oil resistance
- High resistance of oxidative and O₃ degradation
- Higher resistance to S, N, HS containing oil
- Good tensile and low temperature properties
- Good chemical resistance

Uses

- Static seal, 'O' ring, Packing for crank shaft and valve. Bellows for coupling, Fuel and Oil hose, Hydraulic and Pneumatic hose, Roll covering , Conveyor belt, Friction covering, lining work,Boots, Shoe Soling and heals, Printing Blanket ,Food industry

Chloroprene Rubber (CR)

- Prepared by bulk polymerization process
- 2, chloro-butadiene
- Tg : -50°C
- Different grade (S-modified, mercaptan – modified)
- Strain crystalline rubber (high green strength)

Properties

- Good gum strength
- Very good tear resistance
- Good heat and ageing resistance comparable with NBR
- Very good flame resistance
- Excellent O₃ and weathering resistance

- Moderate oil, fuel, grease resistance

Uses

- Technical Rubber Goods, Molding, Extrusion, Seal, Hoses, Profile, Rolls, Belts, V-belts, Bearing, lining, Rubberized Fabric, Shoe Soling, Many application in Construction Industry.

Butyl Rubber (IIR) / Bromobutyl (BIIR)/Chlorobutyl (CIIR)

- Isoprene-Isobutylene Copolymer, 97-99% Isobutylene
- Prepared by cationic copolymerization
- Tg : - 70°C

Properties

- Good tensile strength
- Good heat and ageing resistance comparable with secured EDPM, better than NBR
- Very good low temperature flexibility
- Very good O₃ and weather resistance
- Not good oil and fuel resistance
- Low gas permeability

Uses

Cable insulation and jacketing, Inner tube of tire, Inner liner of tubeless tire, Curing Bladders, Pharmaceutical stoppers, Belts, Hoses, Seal, Injection molded component, Adhesive, Sealant and mastic.

Ethylene Propylene Rubber (EPM)/Ethylene Propylene Diene Monomer (EPDM)

- Prepared by solution and suspension co- and ter-polymerization process.
- Tg : - 60°C
- Grades: EP ratio, diene content, Mooney viscosity.

Properties

- No gum strength
- Good mechanical properties depend on reinforcing fillers
- Good dynamic fatigue resistance
- Heat and ageing resistance up to 150°C
- Very good ozone and weathering resistance
- Good electrical resistance
- Poor oil and fuel resistance
- Good radiation resistance

Uses

- White sidewall of tire, radiator hoses, window and door seating, molding, weather-strip, profile, seal, door fender, washing machine house.

Ethylene –Vinyl acetate Copolymer (EVA)

- Prepared by co-polymerization emulsion process
- Tg : -25°C
- Polar nature

Properties

- Good mechanical properties
- Low compression set at high temperature
- Good heat and ageing resistance
- Resistance to Aliphatic oil
- Poor electric resistance
- Blended with NR or SBR, to improve ozone resistance of NR & SBR
- Moderate flame resistance

Uses

- Heat resistant seal, Cable cover tube, Hot melt adhesives, Plastic modifier, Blend with other rubbers.

Chlorinated Polyethylene (CM)

- Produced by solution/suspension/Emulsion chlorination process
- Tg : 40°C
- Copolymer of Ethylene and Chloro - ethylene unit

Properties

- Good mechanical properties
- Low compression set
- Low brittleness temperature
- Very good dynamic fatigue resistance
- Excellent ageing, weathering and O₃ resistance
- Good oil resistance, chemicals and flame resistance

Uses

Wire and Cable, Power steering hoses and other applications.

Chloro-sulphonated Polyethylene (CSM)

- Chloro-ethane, Ethylene and chlorosulphonyl ethylene for polymer
- Grade contain 25 to 45% chlorine

Properties

- Excellent weathering & O₃ resistance
- Good mechanical property
- Good flame resistance

Uses

- Hoses, Cables, Molded goods, Coating, Membranes and other application same as CR & CM

Acrylic Rubber (ACM)

- Produced by emulsion polymerization process
- Copolymers of acrylic ester (Ethyl Acrylate, Butyl Acrylate, Ethyl -ethoxy and Ethyl Acrylate) with monomers (2 Chloroethyl Vinyl ether, Vinyl chloro acetate, chloromethyl acrylate, allyl glycidyl ether)
- Tg : -21°C to - 49°C

- Polar in nature

Properties

- Good mechanical properties
- Very good ageing, heat and ozone resistance (up to 175°C)
- Resistance to swelling in mineral and vegetable oil
- Adequate low temp. flexibility

Uses

- Automotives and Engineering products, Seals for crank shafts, Transmission valves, 'O' rings and Oil Hoses.

Ethylene /Acrylate Copolymer (AEM), VAMAC

- Copolymerization of ethylene, methacrylate and a monomer with carboxylic group
- Polar Rubber

Properties

- Good mechanical properties
- Heat resistance up 175°C
- Good weathering and O₃ resistance
- Good oil resistance
- Low damping
- Poor resistance to acids

Uses

Static seal, Hoses, Cable and Wire, Gasket, 'O' ring

Epichlorohydrine Rubber (CO, ECO, ETER)

- Produced by ring opening polymerization epichlorohydrine/Ethylene oxide/glycidyl ether
- Polar rubber
- T_g : -40°C

Properties

- Good mechanical properties
- Very good ozone and weather resistance
- Heat resistance up to 150°C
- Good fuel resistance better than NBR
- Very good damping properties
- Good resistance to permeation to gases and liquids

Uses

- In Automotive Industry; Various seal, Diaphragms, Membrane, Hoses, etc.

Fluroelastomer (FKM /FPM)

- Produced by emulsion polymerization
- Co-or ter polymer, Hexafluro propylene (HFP), Tetrafluro ethylene (TFE), 1 – Hydropentafluro propylene (HFPE), Perfluro methyl vinyl ether (FMVE).

- Tg : -40°C

Properties

- Outstanding heat and ageing resistance up to 250°C
- Very good O₃ and weather resistance
- Very good solvents, chemicals, fuel and oil resistance
- Very low gas permeability

Uses

- Seals, Hose lining, Component in aircraft and rocket, Gasket, Fuel Hose, Tank lines.

Silicone Rubber (Q)

- Grade : VMQ, VMQ, PMQ, PVMQ
- Methyl, Vinyl, Phenyl
- Tg : - 120°C

Properties

- Excellent Heat resistance
- Not resistance to aliphatic, aromatic and chlorinated hydrocarbon, motor fuel
- Excellent electric resistance
- Very good low temp. flexibility
- Very good bio compatible
- Good resistance to O₃, UV radiation and weathering

Uses

- For high heat resistance and extreme low temperature
- Automotive, Mechanical equipment, lightning, Cable, Textile industries, Pharmaceutical, Medical and Food industry, Adhesive and Sealant
- Hoses, Seal, Gasket

Flurosilicone Rubber (FMQ, FVMQ)

- Better resistance to oils, motor, fuels and methanol containing fuel than silicone rubber

Polysulphide Rubber (TM)

- Produced by polycondensation
- Trade name : Thiokol
- Ethylene / Polysulphide unit

Properties

- Resistance to ketones, ester and most solvents
- Good O₃ and weather resistance
- Lower level of mechanical properties

Uses

- Fuel hose liner, Gasket, Putties, Seals, Molded products, etc.

Polyurethane Rubber (PUR, AU, EU, TPO)

- Poly condensation of polyester or poly ether with isocyanate
- Millable, castable and thermoplastic
- Tg : - 35°C

Properties

- Good mechanical properties
- Weathering and O₃ resistance excellent
- Ageing resistance upto 100°C
- Very good abrasion resistance
- Moderate swelling resistance

Uses

- Seal, Shock absorbing or damping members for power transmission element, for flexible joints for suspension and for support with high abrasion resistance.

Thermoplastic Elastomer

- Blend of Rubber with thermoplastic (EPDM/PP, NBR/PP)
- Soft block co-polymer (SBS)
- Hard block co-polymer (engineering thermoplastic) (TPU, Copolester, Polyetheramides)

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