RANGDANEH
SIRJAN Co.®

Masterbatch,
Compound & Additive,
Bio Plastic Compound,
Extruded Polymer,
Plastic Granules

Manufacturer
Nano & Hygienic (Food Contact)

Powder Predisperse Solid
Pigments (Carbon Black & Colors)

PE100+
Natural, Black & Colors Compound

Steel Pipe Coating (TOP-COAT)
Adhesive

PE100, PE80 Welding Rod

Agro PET Wire

Established to help you Work
Smarter ,not Harder

FOREWORD

Rangdaneh Sirjan Co. (P.J.S.) is one of the most important producers in the field of Masterbatch, Compound, Additive, Bio plastic Compound, Extruded Polymer, Plastic Granules, Powder Predisperse Solid, Pigments (Carbon Black & Colors), PE80+, PE100+ (Natural, Black & Colors Compound), Steel Pipe Coating (TOP COAT), Adhesive, PE100 and PE80 Welding Rod and etc., with an excellent experience in such production in Iran. Our products are useful for textile and plastic industries. The raw material used by Rangdaneh is supported by same formulas of well-known producers including Clariant, CIBA and BASF.

We follow all the international standards by which our different departments (R&D, Engineering, Labaratory) pursue the strategy of doing their best for achieving the high quality production.

As our factory is located in special economic zone of Kerman province, we have excellent possibilities to import and export our final product with very competitive price.

The technical data in our site is based on our present status of knowledge and it intends to provide general notes on our products and their applications. It should not be therefore considered as a guarantee of the specific properties or their suitability for any other particular application.

Message from the Group CEO

RANGDANEH SIRJAN believes in long-term management vision in which it pursues the international goal of a healthier ecosystem besides better protection from a climate change. This calls for us to create a robust operating platform capable of delivering consistent growth under safe and environmentally friendly conditions. From the national point of view, by focusing on sixth five years' development plan, environmental issue is considered in production process. Our focus is on achieving all the above, by shifting gradually towards bio-based production. This is to embrace the circular economy – where goods and materials are used multiple times for a variety of purposes as a first step towards a sustainable future. For instance, we are conducting a joint research project with Amir Kabir University on bio-based materials. In addition, we entered into a business partnership to provide more opportunities for people in the asset building phase to invest.

Being innovative plays a critical role in keeping products with best quality and services for our clients. We are also trying to be up to date while conducting ongoing research into the latest technologies. I am personally committed to pursuing these initiatives to help us further leverage both environmental and technical innovation in our business.

Placing clients at the heart of everything is an undeniable part of our DNA and remains unchanged. Our dedication to contribute to the capital markets is also unwavering.

We go for delivering a better tomorrow as a trusted partner to our clients, embodying the values of entrepreneurial leadership, teamwork and integrity.

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Masterbatch

Color Masterbatch

Rangdaneh offers a wide range of coloured Masterbatches for all thermoplastic polymers and for all transformation technologies, in compliance with the main international standards for contact with foodstuffs and international standards (PANTONE, RAL, etc) such as:

- Tailor-made very highly concentrated mono pigments based Masterbatches for PP, PET, PA
- Fiber & Filament extrusion (PP, PET, PA)
- Coloured Masterbatches for all polyolefin and styrene polymers
- Masterbatches for engineering polymers transformation
- Combibatches
- Nano Compound polymers and additives
- Color PE100 Pipe Compounds
- BOPP, BOPET, Thin Film
- PET Bottle, PP,PE Caps
- S, SS, SMS, SMMS Cloths

White Masterbatch

Rangdaneh's Masterbatch range is extremely wide and includes formulations able to confer both uniform colour and high covering power to the finished articles:

- Formulations for general use, also in bluish version
- Cast film Masterbatches (for uses such as diapers, stretch, adhesive film for hay bales
- Masterbatches for coating (packaging, extrusion, lamination)
- Masterbatches for thermoforming, both for polyolefin and styrene resins
- Special Masterbatches based on TiO_2 resistant to UV radiation, also in combination with HALS
- Masterbatches based on a special TiO_2 that renders the finished article transparent and with high UV
- Absorbency, thus particularly suitable for packaging and agricultural use
- High dispersion Masterbatches for specific formulations for PP, PET extrusion, also in non-abrasive version but with excellent outdoor resistance

Black Masterbatch

Rangdaneh offers a complete range of black Masterbatches for all main thermoplastic polymers, with a wide range of carbon blacks of varying particle size, all meeting the most important international standards:

- Non-toxic Masterbatches for the extrusion of films for water pipes
- Special formulations for stretch film production, combined with anti-UV stabilizers and/or antioxidants. A typical application is for packaging hay
- Masterbatches for cast film (extrusion and co-extrusion, sheet extrusion, coating extrusion)
- Specific Masterbatches for PET and PP fibers
- Black PE100 pipe compounds
- Geomembranes
- Three layers Film

U.V. Stabilizer
Antistatic
Optical Brightener
Antibacterial
Antioxidant
Flame Retardant
Anti-Blocking Agents
Foaming Agent
Slip Agent
Wetting Agent & Dispersing Agents
Nucleating Agent
Cleaning Agent
Hydrophilic
Hydrophobic
Anti Fog Agent
Anti Scratch
IV Enhancer

Additives

U.V. Stabilizer

UV stabilizer additives can inhibit or absorb the harmful UV radiation that causes degradation of the polymer. There are two primary types of stabilizers used today: UV absorbers and Hindered Amine Light Stabilizers (HALS). UV absorbers work by absorbing the UV rays and dissipating them into thermal energy. UV absorber chemistries include benzophenones, benzotriazoles and hydroxyphenyl triazines. HALS work by scavenging free radical intermediates generated by the UV rays to neutralize the degradation. In both cases, the damaging effect of the UV light is focused away from the base polymer and colorants due to interaction with the UV additive presented in the base polymer. It is important to know the specifics of the end-use environment, polymer base and processing conditions to design the most effective UV stabilization package to meet the performance expectations. The use of UV stabilizers will retard the harmful effects of UV radiation on polymer properties. This provides several benefits:

- Reduced field failures and returns
- Increase shelf life for end products
- Ability to store parts outside for longer periods
- Protection against premature color fading

Antistatic

Antistatic offers a solution to problems related to the built-up of electric charges on plastic material. Once added to the polymer during the extrusion process, our antistatic additives migrate to the surface giving the required effect. Dust attraction upon storage of plastic materials is a well-known phenomenon. In many industrial applications antistatic properties are needed to prevent electric discharge during filling or loading of plastic packaging, which can initiate fires or dust explosions. During processing they prevent fouling, packaging film defects caused by sparks and improve release of injection or blow molded articles. Dosing liquid or paste-form antistatic additives can be a challenge. That’s why we offer high performance concentrates. They reduce cleaning time of dosing systems and minimize waste while giving all the advantage of the antistatic additives. Fast antistatic action, long lasting antistatic properties, solid or liquid products, or cost efficient, easy to dose high concentrate solutions. Building up static charges on the plastic surface hampers the processing procedures and can be an issue for hygiene and aesthetics. Antistatic agents can be external and internal. With external antistatic agents, the plastic is coated by spraying or via immersion while internal antistatic agents are incorporated into the polymer matrix and then migrate to the surface. Some conductive fillers can also be used as antistatic agents.

Optical Brightener

This additive will cause more brightness and glossiness of the product and prevent its color fading. The application is in PE films, PP sheet and film, Disposable dishes, Injection and blowing products.

Antibacterial

Range of antimicrobial additives can be added to any material during the production process including plastics and polymers, coatings and paints, textiles, metals and and etc.

Antioxidant

ANTIOX 1

Masterbatch recommended for use during machinery shut-down to prevent the degradation of the polymer. Its use enables an easier machinery start-up, particularly in the film sector.

ANTIOX 2

Combination of antioxidants recommended for the processing of LDPE and HDPE when long processing cycles are being employed at high temperatures. Also recommended for the processing of recycled or substandard material.

ANTIOX 3

Synergetic combination of antioxidants in a polypropylene carrier, which has a permanent effect on products exposed to high temperatures during use.

Especially recommended for mineral filler based compounds.

ANTIOX 4

Special bend with high phosphate concentration. This masterbatch is recommended for application of technical articles using polyolefin resins (LDPE, LLDPE, HDPE and PP) with high processing temperatures.

ANTIOX 5

Antioxidant dispersion with high molecular weight (20 %) specific for PA 6 and PA 6,6.

ANTIOX 6

Masterbatch with high antioxidant concentration specific for PA 6 and PA 6,6, suggested for technical molding where the end product mechanical features have to be respected.

Flame retardant

Some polymers are inherently flame retardant. Other polymers-including nylons, polyesters, polypropylenes and many other useful and cost-effective materials-are not. They must be modified to achieve the proper level of fire resistance through the use of flame retardant additives. Mechanisms for flame retardance in plastics are as follows:

Vapor Phase Inhibition:

During combustion, flame retardant additives react with the burning polymer in the vapor phase disrupting, at a molecular level, the production of free radicals and shuts down the combustion process. This mechanism is commonly used with halogenated flame retardant systems.

Solid Phase Char-Formation:

Char-forming flame retardant additives react to form a carbonaceous layer on the material's surface. This layer insulates the polymer, slowing pyrolysis, and creates a barrier that hinders the release of additional gases to fuel combustion. This method is commonly deployed by non-halogen systems using phosphorous and nitrogen chemistries.

Quench & Cool:

Hydrated minerals make up a class of halogen-free flame retardant systems commonly used for extruded applications like wire and cable. These systems use an endothermic reaction in the presence of fire to release water molecules that cool the polymer and dilute the combustion process.

Anti-Blocking Agents

anti-blocking agent prevents layers of polymer films from sticking together-known as "blocking" in the industry. Anti-blocking agents also enhance surface structure of films resulting in improve scratch-resistance.

Anti-blocking agents are non-toxic, synthetic amorphous silica gels with purity exceeding 99 %. Such synthetic silica gels provide several advantages in polymer films and manufacturing processes including:

- High efficiency-only low concentrations are needed to attain desired effects
- Excellent dispersibility and high film clarity
- Food contact
- Consistent and reproducible product qualit

Combining silica with organic additives such as fatty acid amides can offer additional performance benefits to product line. In addition, porosity, average particle size, number of organic additives, and other physical characteristics can be adapted to suit specific requirements.

Foaming Agent

Foaming Agent masterbatches provide several benefits to injection molded plastic articles:

- Reductions of plastic part weight by up to 20 % for density critical applications such as fuel floats and energy saving transportation equipment
- Elimination of sink marks on injection molded parts - sink marks are shallow depressions on a part surface and are the result excessive shrinkage in thicker areas of the part - they can be minimized by adding a small amount of foaming agent which creates just enough internal pressure within the molded part to offset excessive shrinkage and reduce sink marks

Slip Agent

Today’s slip masterbatch additives for LDPE, LLDPE, and other polyolefin films offer a wider range of performance capabilities than in the past. These products range from the traditional amide slips- the predominant grades now in use-to newer specialty, non-migratory grades that can meet such needs as the ability to work well at higher temperature, improve reliability, and hold coefficient of friction (COF) steady before and after laminating. Processors should be aware of newer alternatives that overcome slips’ previous limitations.

Slip agents overcome the resins’ natural tackiness so they can move smoothly through converting and packaging equipment. LDPE and LLDPE films are commonly categorized as low-, medium-, or high-slip, depending on their COF. The COF level generally corresponds to how much slip they contain.

Slip masterbatches are available in formulations that allow for various diffusion rates, end-use temperatures, base resins, and ink types. Traditional slips are based on unsaturated fatty acid amides, most commonly oleamide and erucamide. These primary amides migrate rapidly through polyolefin films after extrusion and appear on the surface of the film to lower the COF.

Other slips based on secondary amides have almost twice the molecular weight of primary amides and thus migrate more slowly in polyolefins. Traditional primary and secondary amides are offered commercially in LDPE, LLDPE, and mLLDPE carriers.

The newer slip masterbatches include non-migratory slips with very large molecules and specialized formulations adapted for lamination. Specialty grades may be comprised of blends of primary slips or primary and secondary amide slips, as well as a variety of carrier resins such as PP, EMA, and EVA.

Wetting Agent & Dispersing Agents

Wetting Agent and dispersing agents are for preventing the formation of agglomerates. These chemical compounds get adsorbed on the surface of the pigments as a spacer. With these dispersing and wetting agents, the formed agglomerates get separated easily into single particles and then permanently stabilize in a uniform distribution.

Available Range:

- Wetting agents
- dispersing agents

Features:

- Comprehensive wetting of pigments and fillers in the liquid phase
- Provides the best possible distribution of solid particles within the coating
- Permanent stabilization of the suspension
- Compatibility with almost all types of coatings
- Prevents the uneven dying

The Wetting & Dispersing Agents are the anionic.These are best for pearl pigments as well.

Nucleating Agents

Nucleating agents are widely used to modify the properties of various polymers. The rate of crystallization and the size of the crystals have a strong impact on the mechanical and optical properties after conversion of the plastic, especially (but not exclusive) in polypropylene.

The addition of nucleating agents to the semi-crystalline polymers provides a surface on which the crystal growth can start. As a consequence, fast crystal formation will result in many small crystal domains. Cycle times in injection molding are reduced. Mechanical properties like flexural modulus, strength, heat distortion temperature and hardness will increase. The clarity and transmittance will improve. Nucleating agents used for optimizing the optical properties are called clarifying agents.

Cleaning Agent

Plastics processing periodically requires complete removal of thermo-oxidized deposits from extruders and injection molding machines. clean masterbatches permit fast, economical cleaning of machinery to facilitate color or resin changes with minimal downtime and loss of virgin material.

Hydrophilic

It is designed as a kind of modified Masterbatch compounding Super Absorbent Resin and polypropylene resin and some other hydrophilic materials. It has excellent hydrophilic property. Safe and non-toxic, and has nice property of dispersibility as well. The nonwoven fabric made from this hydrophilic Masterbatch can be instead of hydrophilic after treatment, and the hydrophilic property is permanent. Hydrophilic melt additive Masterbatch is an effective wetting agent for melt blown non-woven polypropylene and polyethylene fiber.

- Increases melt blown non-woven polypropylene fiber wettability at 5 %
- Makes fiber instantly wettable off line at 6 %

As our hydrophilic in polypropylene fiber increases, the absorptive capacity of a non-woven polypropylene fiber can be increased > 4 times that of a non-woven fiber without additive.

Hydrophobic

hydrophobic is formed from an acrylonitrile-butadiene-styrene copolymer plastic feed stock and a silicone additive.

The hydrophobic plastics material is used to produce a casing material, and also an electrical device.

The hydrophobic plastics material is ideally suited for protecting sensitive electronic components from moisture via a casing.

Anti Fog Agent

Antifog additives are used to prevent fogging in plastic films, especially in food packaging and agricultural (greenhouse film) applications. Rangdaneh sirjan co. offers a complete range of anti-fogs for use in PE (LDPE, LLDPE), EVA, PP, and PVC. These additives are also used in color masterbatches and plastic compounds as pigment dispersing agents.

“Fogging“ in plastic films refers to condensation of water vapor on the surface in the form of small discrete droplets, which results from differences in surface tension between the water droplet and the polymer surface. Fogging may occur as a result of either a drop in temperature on the inside surface of the film below the dew-point of the enclosed air/water vapor mixture (“cold fogging”), or by cooling of the air near the film to a temperature at which it can no longer retain all the water vapor; excess water condenses upon the film (“hot fogging”).

Fogging of plastic films is associated with a number of problems. In food packaging, fogging reduces the visibility of the product, provides a less attractive appearance of the package, and the presence of droplets can even result in deterioration of product quality. In agricultural films, fogging reduces light transmission, leading to slower growth and lower crop yields. Plants can also be damaged from burning due to lens effects of drops on sunlight. Water dripping from the inside film surface can also be problematic in greenhouse operations.

Combining silica with organic additives such as fatty acid amides can offer additional performance benefits to product line. In addition, porosity, average particle size, number of organic additives, and other physical characteristics can be adapted to suit specific requirements.

Anti Scratch

Anti-scratch additives have been designed to help to reduce the appearance, width and whiteness of scratches in polymer systems. Their superior oxidative stability reduces visible blooming at the surface to ensure that injection moulded parts retain their original high-quality finish. The range of 5 high stability products are designed to work from within the polymer to enhance the surface finish of plastic parts. The product range can withstand challenging processing conditions and give long-term in-use performance in the finished parts from low addition levels (typical usage levels are 0.5 % by weight.)

IV enhancer

These additives are useful in a variety of PET recovery and extrusion applications.

Designed to restore the molecular weight of PET, our IV enhancers allow the use of lower cost feedstock for fiber spinning. These additives have proven success in PET staple and filament applications.

One way of making conjugate bicomponent fiber is using polymers of differing IV. A smart, cost-effective way of accomplishing this IV differential is by utilizing IV enhancer on the polymer on one side of the bicomponent fiber. The different IV makes each side shrink differently, thus providing a permanent curl, typical of conjugate fiber.

PE100+, PE80+ (Color & Black Compound)

Polypropylene PE100+ high pressure gas and water pipes

Black High Density Polyethylene for High Pressure Gas and Water Pipe

Top quality PE100+ pressure pipes for gas and water transportation at higher pressures .

Rangdaneh Sirjan PE100+ is a black, high density polyethylene with 1-Butene as co monomer. It is black, outstanding HSCR, high impact strength, outstanding hydrostatic strength for PE100 class. A highly stress crack resistant (HSCR) PE100+ for pipes facing the toughest conditions. As confidence in the use of PE100+ pipes grew amongst engineers, PE100+ pipes began to be used in ever more challenging environments. They are now installed using trenchless technology techniques and in trenches lacking any imported pipe bed or surround material. These tough conditions increase the risk of the pipe being scratched or scored during installation and being subjected to point loads from rocks and other hard materials during operation. Both situations can result in high stresses that cause a crack in the pipe wall. Over a long period of time, the crack can gradually grow through the wall, gradually reducing its effective thickness until it fails.

This mechanism is referred to as Slow Crack Growth (SCG).

Polypropylene PE80+ TOP COAT

Black High Density Polyethylene for Steel Pipe Coating (Top Coat)

Rangdaneh Sirjan PE80+ is a black, high density polyethylene produced with the advanced technology, providing the material with especially good melt strength and extrudability. Also its mechanical and heat deformation properties resistance are very good. It contains very well dispersed, fine particle sized carbon black in order to ensure excellent weathering resistance. This product fulfils the requirements in DIN 30670S when used in combination with the grafted adhesives. it is also recommended for Top-coat in steel pipe coating and its suitable for severe laying conditions even at elevated ambient temperatures. With this material, high running speeds and relatively thin layers are obtained without problems. Rangdaneh Sirjan PE80+ can be used up to °85c service temperature of the pipeline when combined with the grafted adhesives.

Polypropylene ADHESIVE GRANULE (TOP COAT)

Rangdaneh Sirjan's Adhesive Granule (Top Coat) is a maleic-anhydride grafted polyethylene polymer to be extruded on conventional PE extruders with flat die or crosshead and it has excellent adhesion to epoxy powder and the PE80+ Top Coat.

Adhesive Granule (Top Coat) applied together with the PE80+Top Coat and a compatible powder epoxy fulfils the requirements of DIN 306705 when applied under sound processing conditions.

Adhesive Granule (Top Coat) can be used up to 85°c service temperature of the pipeline, when combined with PE80+Top Coating.

Adhesive Granule (Top Coat) is primarily designed to be used as the tie layer between epoxy layer and the top coat polyethylene in -3layer coated steel pipes.

Welding Rod PE100,PE80,MDPE,PP,PC

Specialized Compounds for Car industries

More than half of all the plastic materials used in automobiles. Polypropylene compounds can be used for a variety of parts, including bumper facias, instrumental panels and door trims. The general constitution of PP compounds for automotive applications. The impact strength of the - impact PP, which is composed of homo PP and ethylene propylene copolymer (EP copolymer), is improved by adding an ethylene-based elastomer such as ethylene-butene or ethylene-octene copolymer, to which inorganic filler such as talcum is added for enhanced rigidity. With respect to resin-based automotive parts, lower weight is demanded for the sake of reduced environmental burden and better design and higher moldability are also required. In response to that demand, various phases of PP compounds for automotive applications have been improved.The improvements made thus far include greater rigidity, impact strength, fluidity and crystallization. Such enhancements of PP compounds have been achieved by compounding PP with additives such as elastomers and/or various inorganic fillers, as well as through higher stereoregularity, fluidity and rubberization which have been achieved with the aforementioned improvements in catalysts and the manufacturing process. The growth of PP compounds for automotive applications has thus far been supported by the improved performance of PP resins which serve as the base of PP compounds and advancements in compound technology. With respect to the former, catalysts and the polymerization process have been continually, energetically improved in order to control the primary and higher order structures of polymers. Regarding the latter, improvements in the performance and dispersibility of elastomers, as well as the control of particle size, dispersion and interface of inorganic fillers, have been attempted up to the present time. With respect to resin-based automotive parts, lower weight is demanded for the sake of reduced environmental burden and better design and higher moldability are also required. Also with the use of the filler materials the strength of the material made of polypropylene fibre has been improved. The property of polypropylene compound of fire resistant as the ignition temperature of the PP is very high. And the flexural strength is excellent, hence it is best replacement for metals and plastic for the car parts.

Compound

XLPE Compound

The polyethylene cross-linked is a method called the Catenary Continuous Vulcanisation (CCV) process by Peroxide. This process improves the properties of the cables and makes it suitable for power transmission. These compounds can be used at high temperature above 110° c where the normal Polyethylene compounds are thermally unstable. Type of XLPE, PEX Compounds:

- Moisture curable Silane Grafted XLPE (LV.MV upto 33 KV)
- Peroxide XLPE (upto 33 KV)
- High Temperature Resistant pipes
- High temprature (PEX Pipes)
- Characteristics of XLPE Cables,Pipes
- Higher current carrying capacity with high permissable continuous conductor temperature
- Higher temperature to withstand emergency overload
- Extremely low dielectric losses
- Higher short circuit ratings
- Light in weight
- Trouble-free in maintenance and simple in terminating and jointing

HFFR Compound

HFFR cables are used in all locations where a high degree of protection against fire and fire damage has to be provided, including:

- Public buildings
- Telecommunication centers
- Industrial structures such as power plants
- Public transportation.

HFFR formulations are used in thermoplastic and cross-linked wire and cable applications, with the majority of compounds used in sheathing applications. Ethylene vinyl acetate is an essential polymer in HFFR compounds, with higher VA levels improving filler loading, flame retardancy and flexibility.

SSP (Solid State Polymerization Powder) for PET granule bottle and industrial filament yarn grade (HMLS, HTLS, HTSLS, FDY) and Pipe, Cable & Engineer Polymer under high MPA Pressures (PET, PA, PE100, PP Bi modals)

Bio Plastic

Bioplastics advantages (saving fossil resources and carbon neutrality) makes them an appropriate substitute for fossil fuel resources. According to European bioplastics, “the global market for bioplastics is predicted to grow by roughly 25 percent over the next five years”. This is while Asia, as a major production hub, has over 50 percent of the regional capacity. Following the ultimate goal of sustainable future, RANGDANEH SIRJAN believes in improving biomass production. It pursues the international goal of a healthier ecosystem besides better protection from a climate change. From the national point of view, by focusing on sixth five years’ development plan, environmental issue is considered in production process. To achieve all the above, the production of starch based bioplastics has been fully studied and run as a priority. This is to embrace the circular economy-where goods and materials are used multiple times for a variety of purposes as a first step towards a sustainable future.

According to european bioplastics, bioplastics are a large family of different materials. there are variety of materilas and applications for bioplastics. a bioplastic can be biobased, biodegradable or it can have both features as well.

Bioplastics are biobased, biodegradable, or both.

Biobased

The term biobased means that the material or product is (partly) derived from biomass (plants). Biomass used for bioplastics stems from e.g. corn, sugarcane, or cellulose.

Biodegradable

Biodegradation is a chemical process during which microorganisms that are available in the environment convert materials into natural substances such as water, carbon dioxide, and compost (artificial additives are not needed). The process of biodegradation depends on the surrounding environmental conditions (e.g. location or temperature), on the material and on the application.

Biobased does not equal biodegradable

The property of biodegradation does not depend on the resource basis of a material but is rather linked to its chemical structure. In other words, 100 percent biobased plastics may be non-biodegradable, and 100 percent fossil based plastics can biodegrade.

Two major advantages of biobased plastic products compared to their conventional versions:

- They save fossil resources by using biomass which regenerates (annually) and provides the unique potential of carbon neutrality.
- Biodegradability is an add-on property of certain types of bioplastics. It offers additional means of recovery at the end of a products life.

Environmental benefits of bioplastics

Biobased plastics have the unique advantage over conventional plastics to reduce the dependency on limited fossil resources and to reduce greenhouse gas emissions or even be carbon neutral. Consequently, biobased plastics can help the EU to meet its 2020 targets of greenhouse gas emissions reduction. Moreover, bioplastics can make a considerable contribution to increased resource efficiency through a closed resource cycle and use cascades, especially if biobased materials and products are being either reused or recycled and eventually used for energy recovery (i.e. renewable energy).

Contribution of the Bio-Based Industries to the SDGs

As global goals for people and planet, the SDGs provide a powerful aspiration for improving our world-laying out where we collectively need to go and how to get there. Fulfilling the SDG ambitions will take an unprecedented effort by all sectors in society-and business has to play a very important role in the process.

Bioeconomy

The bioeconomy is at the centre of sustainable development strategies worldwide and contributes to many SDGs2. One of the bioeconomy stakeholders in the EU is the Bio-based Industries Consortium (BIC), representing the private sector in a Public-Private Partnership with the European Union since 2014, known as the Bio-Based Industries Joint Undertaking3 (BBI JU), which kick-started the European bioeconomy by supporting innovative bio-based demonstration and flagship projects.

Industrial & Nano Masterbatch Base

Nano Zinc Oxide

Zinc oxide is an inorganic compound with the formula ZnO. It usually appears as a white powder, nearly insoluble in water. The powder is widely used as an additive into numerous materials and products including plastics, ceramics, glass, cement, rubber (e.g., car tires), lubricants, paints, ointments, adhesives, sealants, pigments, foods (source of Zn nutrient), batteries, ferrites, fire retardants, first aid tapes, etc. ZnO is present in the Earth's crust as the mineral zincite; however, most ZnO used commercially is produced synthetically. In materials science, ZnO is often called a II-IV semiconductor because zinc and oxygen belong to the 2nd and 6th groups of the periodic table, respectively. This semiconductor has several favorable properties: good transparency, high electron mobility, wide bandgap, strong room-temperature luminescence, etc. those properties are already used in energy-saving or heat-protecting windows, and electronic applications of ZnO as thin-film transistors and light-emitting diodes are forthcoming as of 2009.

Mechanical properties: ZnO is a relatively soft material with approximate hardness of 4.5 on the Mohs scale. Its elastic constants are smaller than those of relevant III-V semiconductors, such as GaN. The high heat capacity and heat conductivity, low thermal expansion and high melting temperature of ZnO are beneficial for ceramics.

Among the tetrahedrally bonded semiconductors, it has been stated that ZnO has the highest piezoelectric tensor or at least one comparable to that of GaN and AlN. This property makes it a technologically important material for many piezoelectrical applications, which require a large electromechanical coupling.

Electronic properties: ZnO has a relatively large direct band gap of 3.3 eV at room temperature; therefore, pure ZnO is colorless and transparent. Advantages associated with a large band gap include higher breakdown voltages, ability to sustain large electric fields, lower electronic noise, and high-temperature and high-power operation. The bandgap of ZnO can further be tuned from 4-3 eV by its alloying with magnesium oxide or cadmium oxide.

Most ZnO has n-type character, even in the absence of intentional doping. Nonstoichiometry is typically the origin of n-type character, but the subject remains controversial. An alternative explanation has been proposed, based on theoretical calculation, that unintentional substitutional hydrogen impurities are responsible. Controllable n-type doping is easily achieved by substituting Zn with group-III elements such as Al, Ga, in or by substituting oxygen with group-VII elements chlorine or iodine.

Reliable p-type doping of ZnO remains difficult. This problem originates from low solubility of p-type dopants and their compensation by abundant n-type impurities. This problem is observed with GaN and ZnSe. Measurement of p-type in "intrinsically" n-type material is complicated by the inhomogeneity of samples.

Current limitations to p-doping do not limit electronic and optoelectronic applications of ZnO, which usually require junctions of n-type and p-type material. Know p-type dopants include group-I elements Li, Na, K; group-V element N, P and As; as well as copper and silver. However, many of these form deep acceptors and do not produce significant p-type conduction at room temperature. Electron mobility of ZnO strongly varies with temperature and has a maximum of 2000 cm^2/ (V.s) at 80K. data on hole mobility are scarce with values in the range 5-30 cm^2/ (V.s).

Chemical properties: ZnO occurs as white powder known as zinc white or as the mineral zincite. The mineral usually contains a certain amount of manganese and other elements and is of yellow to red color. Crystalline zinc oxide is thermochromic. Changing from white to yellow when heated and in air reverting to white on cooling. This color change is caused by a very small loss of oxygen at high temperatures to form the non-stoichiometric Zn1 + xO, where at 800°c, x = 0.00007. Zinc oxide is an amphoteric oxide. It is nearly insoluble in water and alcohol, but it is soluble in (degraded by) most acids, such as hydrochloric acid.

Powder Predisperse Solid
(mono pigment)

While extruders provide adequate mixing of powder additives into polymers for many applications, there are scenarios where the end use, additive type and percentage, properties of the base polymer, or limitations of the extruder, require a more consistent or higher degree of dispersion by which the final compound to will be adequately mixed.

To accomplish this, powdered predisperse solid, which have significantly higher surface area than do normal pellets, can be used as is or mixed in with the additives to provide the process with much more efficient and intimate mixing of components.

Typical powder sizes range from 300 to 1200 microns depending on the polymer and application. Upon customer request, our laboratories can meet specific particle size requirements.

We offer a wide range of standard powders predisperse solid for masterbatch or compounding manufacturing:

- Polyethylenes: LDPE, LLDPE, HDPE, VLDPE
- Polypropylenes: Copolymer and Homopolymer
- Modified Polyolelfins: EVA, EAA, Plastomers
- Styenics: ABS, PS, HIPS, SAN
- Engineering Polymers: PC, Nylon6, PPMA, PET, PBT, POM.

PET
PP
PA
PVA
PE
PS

Polymers,Yarns,Fibers

Polymer science addresses the chemistry and physics of large, chain-like molecules. As with the molecules themselves, this technical pursuit is diverse and complicated. In most cases the parts are small molecules which react together hundreds, or thousands, or millions of times. A polymer made entirely from molecules of one monomer is referred to as a "homopolymer". Chains that contain two or more different repeating monomers are "copolymers". The resulting molecules may be long, straight chains, or they may be branched, with small chains extending out from the molecular "backbone". The branches also may grow until they join with other branches to form a huge, three-dimensional matrix. Variants of these molecular shapes are among the most important factors in determining the properties of the polymers created. The size of polymer molecules is important. This is usually expressed in terms of molecular weight. Since a polymeric material contains many chains with the same repeating units, but with different chain lengths, average molecular weight must be used. In general, higher molecular weights lead to higher strength. But as polymer chains get bigger, their solutions, or melts, become more viscous and difficult to process. Proteins and Carbohydrates Life as we know it could not exist without polymers. Proteins, with large numbers of amino acids joined by amide linkages, perform a wide variety of vital roles in plants and animals. Carbohydrates, with chains made up of repeating units derived from simple sugars, are among the most plentiful compounds in plants and animals. Both of these natural polymers are important for fibers. Proteins are the basis for wool, silk and other animal-derived filaments. Cellulose as a carbohydrate occurs as cotton, linen and other vegetable fibers. The properties of these fibers are limited by the form provided in their natural state. Some, like linen and silk, are difficult to isolate from their sources, which makes them scarce and expensive. There are, of course, many other sources of proteins and cellulose, such as wood pulp, but natural polymers tend to be very difficult to work with and form into fibers or other useful structures. The inter-chain forces tend to be strong because of the large number of polar groups in the molecular chains. Thus, natural polymers usually have melting points that are so high that they degrade before they liquefy. The most useful molecules for fibers are long chains with few branches and a very regular, extended structure. Thus, cellulose is a good fiber-former. It has few side chains or linkages between the sugar units forcing its chains into extended configurations.

Synthetic Polymers

Synthetic polymers offer more possibilities, since they can be designed with molecular structures that impart properties for desired end uses. Many of these polymers are capable of dissolving or melting, allowing them to be extruded into the long, thin filaments needed to make most textile products. Synthetic polymer fibers can be made with regular structures that allow the chains to pack together tightly, a characteristic that gives filaments good strength. Thus, filaments can be made from some synthetic polymers that are much lighter and stronger than steel.

There are two basic chemical processes for the creation of synthetic polymers from small molecules condensation, or step-growth polymerization, and addition, or chain-growth polymerization.

Step-Growth Polymerization

In step-growth polymerization, monomers with two reactive ends join to form dimers (two "parts" joined together), then "trimers" (three "parts"), and so on. However, since each of the newly formed oligomers (short chains containing only a few parts) also has two reactive ends, they can join together; so a dimer and a trimer would form a pentamer (five repeating "parts"). In this way the chains may quickly great length achieve large size. This form of step-growth polymerization is used for the manufacture of two of the most important classes of polymers used for textile fibers, polyamide (commonly known as nylon), and polyester.

There are many different commercial versions of polyester in a wide variety of applications, including plastics, coatings, films, paints, and countless other products. The polymer usually used for textile fibers is poly(ethylene terephthalate), or PET, which is formed by reacting ethylene glycol with either terephthalic acid or dimethyl terephthalate. Antimony oxide is usually added as a catalyst, and high vacuum is used to remove the water or methanol byproducts. High temperature (>250 ˚c) is necessary to provide the energy for the reaction, and to keep the resultant polymer in a molten state.

PET molecules are regular and straight, so their inter-chain forces are strong - but not strong enough to prevent melting. Thus, PET is a “thermoplastic” material; that is, it can be melted and then solidified to form specific products. Since its melting point is high, it does not soften or melt at temperatures normally encountered in laundering or drying. Another important property of PET is its Tg, or “glass transition temperature”. When a polymer is above its glass transition temperature, it is easy to change its shape. Below its Tg, the material is dimensionally stable and it resists changes in shape. This property is very important for textile applications because it allows some fibers, and the fabrics made from them, to be texturized or heat-set into a given shape. This can provide bulk to the yarn, or wrinkle resistance to the fabric. These set-in shapes remain permanent as long as the polymer is not heated above its Tg. Because its chains are closely packed and its ester groups do not form good hydrogen bonds, polyesters are also hydrophobic (i.e., they do not absorb water). This property also requires special dyeing techniques.

There are also many important classes of synthetic polyamides (nylons) and they have a wide variety of commercial uses. These are usually distinguished from each other by names based on the number of carbon atoms contained in their monomer units. As with polyesters, polyamides are formed by step-growth polymerization of monomers possessing two reactive groups. Here, the reactive functions are acids and amines. The monomers used may have their two reactive functions of the same chemical type (both acids, or both amines), or of different types. Thus, nylon 6,6 - a very common fiber polymer - is made by reacting molecules of adipic acid (containing six carbons in a chain, with an acid function at each end) with hexamethylene diamine (also six carbon atoms, with amine functions at each end). In another variant the diamine contains ten carbons atoms, the product designated nylon 6,10.

The other common polyamide fiber polymer is nylon 6. Its monomer has six carbons in the chain, with an amine at one end and an acid at the other. Thus only one form of monomer is needed to conduct the reaction. Commercial production of nylon 6 makes use of caprolactam, a derivative which provides the same result.

As with the polyesters, nylons have regular structures to allow good inter-chain forces that impart high strength. Both nylon 6 and nylon 6,6 have melting points similar to PET but they have a lower Tg. Also, since the amide functions in nylon chains are good at hydrogen bonding, nylons can be penetrated by water molecules. This allows them to be dyed from aqueous media, unlike their polyester counterparts.

In addition to nylon, there is another commercially important group of synthetic polyamides. These are the aramids, which contain aromatic rings as part of their polymer chain backbone. Due to the stability of their aromatic structures and their conjugated amide linkages, the aramids are characterized by exceptionally high strength and thermal stability. Their usefulness for common textile applications is limited by their high melting points and by their insolubility in common solvents. They are expensive to fabricate, and they carry an intrinsic color that ranges from light yellow to deep gold.

Other step-growth polymers - the polyurethanes - are produced by the reaction of polyols and polyisocyanates. For fiber purposes, this class of linear polymers is formed from glycols and diisocyanates. Usually, the reactions are carried out to form block copolymers containing at least two different chemical structures - one rigid, and the other flexible. The flexible segments stretch, while the rigid sections act as molecular anchors to allow the material to recover its original shape when the stretching force is removed. Varying the properties of the segments, and the ratio of flexible to rigid segments controls the amount of stretch. Fibers made in this way are classified as spandex and they are used widely in apparel where stretch is desirable.

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Chain-Growth Polymerization

Chain-growth polymerization occurs when an activated site on a chemical, such as a free radical or ion, adds to a double bond, producing a new bond and a new by activated location. That location then attacks another double bond, adding another unit to the chain, and a new reactive end. The process may be repeated thousands, or millions, of times, to produce very large molecules. This is usually a high energy process and the intermediate species are so reactive that, in addition to attacking available monomer, they also may attack other chains, producing highly branched structures. Since these branches prevent the molecules from forming regular structures with other molecules, their inter-chain forces are weak. The resulting polymers tend to be low-melting and waxy.

The breakthrough in making chain-growth polymers useful for fibers and for most commercial plastics came with the development of special selective catalysts that drive the production of long, straight polymer chains from monomers containing basic carbon-to-carbon double bonds.

Ethylene and propylene form the simplest chain-growth polymers. Since their polymer chains contain no polar groups, these polyolefins must rely on close contact between the molecular chains for strength. Thus, the physical characteristics of polyethylene are very sensitive to even a small number of chain branches. Very straight chains of polyethylene can form strong crystalline structures which exhibit exceptional strength. Protective fabrics made from this type of highly structured polyethylene are virtually impossible to penetrate or cut.

Polypropylene is more complicated. Even without chain branching, each monomer unit adds one methyl group pendant to the chain. The arrangement of these side groups is described as the “tacticity” of the polymer. A random arrangement is considered “atactic”, or without tacticity. Regular arrangement with all side groups on one side of the chain is “isotactic”, and a regular alternating structure is “syndiotactic”. Polypropylene molecules can only pack closely in an isotactic arrangement. Synthesis of these polymers was a major challenge, but several stereoselective catalysts are now available, and high-density polypropylene has become a commodity product. Fibers made from it are lightweight, hydrophobic and highly crystalline. Their resistance to wetting gives them good moisture wicking and anti-staining properties. This also makes them virtually undyeable, except when the dye is applied to the polymer in its molten state - a process know as “solution dyeing”.

By contrast, the pendant nitrile functions in polyacrylonitrile are sufficiently polar to produce very strong inter-chain forces. Pure homopolymers from acrylonitrile are non-thermoplastic and difficult to dissolve or dye. Thus, for most commercial acrylonitrile polymers, small amounts of other monomers with bulky side chains are introduced to force the chains apart, to reduce the inter-chain forces. Common co-monomers for these fiber applications include vinyl chloride, vinyl acetate, acrylic acid, and methyl acrylate.

Specialty fiber polymers

There are also a number of complex, specialty fiber polymers with methods of synthesis that are not easily classified. These materials are occasionally used in high performance materials where the complex structures impart exceptional strength, thermal stability, electrical conductivity, and others desirable properties. They include PBI (polybenzimidazole) and sulfar. Their chemistry is beyond the scope of this introductory discussion.

PET

Polyethylene terephthalate (PET or PETE) is a strong, stiff synthetic fibre and it is a member of the polyester family of polymers. PET is spun into fibres for permanent-press fabrics, blow-molded into disposable beverage bottles, and extruded into photographic film and magnetic recording tape.

PET is produced by the polymerization of ethylene glycol and terephthalic acid. Ethylene glycol is a colourless liquid obtained from ethylene, and terephthalic acid is a crystalline solid obtained from xylene. When heated together under the influence of chemical catalysts, ethylene glycol and terephthalic acid produce PET in the form of a molten, viscous mass that can be spun directly to fibres or solidified for later processing as a plastic. In chemical terms, ethylene glycol is a diol, an alcohol with a molecular structure that contains two hydroxyl (OH) groups, and terephthalic acid is a dicarboxylic aromatic acid, an acid with a molecular structure that contains a large, six-sided carbon (or aromatic) ring and two carboxyl (CO2H) groups. Under the influence of heat and catalysts, the hydroxyl and carboxyl groups react to form ester (CO-O) groups, which serve as the chemical links joining multiple PET units together into long-chain polymers. Water is also produced as a by-product. The overall reaction can be represented as follows:

The presence of a large aromatic ring in the PET repeating units gives the polymer notable stiffness and strength, especially when the polymer chains are aligned with one another in an orderly arrangement by drawing (stretching). In this semicrystalline form, PET is made into a high-strength textile fibre. The stiffness of PET fibres makes them highly resistant to deformation, so they impart excellent resistance to wrinkling in fabrics. They are often used in durable-press blends with other fibres such as rayon, wool, and cotton, reinforcing the inherent properties of those fibres while contributing to the ability of the fabric to recover from wrinkling.

PET is also made into fibre filling for insulated clothing and for furniture and pillows. When made in very fine filaments, it is used in artificial silk, and in large-diameter filaments it is used in carpets. Among the industrial applications of PET are automobile tire yarns, conveyor belts and drive belts, reinforcement for fire and garden hoses, seat belts (an application in which it has largely replaced nylon), nonwoven fabrics for stabilizing drainage ditches, culverts, and railroad beds, and nonwovens for use as diaper top sheets and disposable medical garments. PET is the most important of the man-made fibres in weight produced and in value.

At a slightly higher molecular weight, PET is made into a high-strength plastic that can be shaped by all the common methods employed with other thermoplastics. Magnetic recording tape and photographic film are produced by extrusion of PET film. PET can be blow-molded into transparent containers of high strength and rigidity that are also virtually impermeable to gas and liquid. In this form, PET has become widely used in carbonated-beverage bottles and in jars for food processed at low temperatures. The low softening temperature of PET-approximately 70 °C (160 °F) prevents it from being used as a container for hot-filled foods.

PET is the most widely recycled plastic. PET bottles and containers are commonly melted down and spun into fibres for fibrefill or carpets. When collected in a suitably pure state, PET can be recycled into its original uses, and methods have been devised for breaking the polymer down into its chemical precursors for resynthesizing into PET.

It is designed for direct addition on the production of PP synthetic fiber or nonwoven fabric. drying machinery or high-speed mixer should be used to dry the masterbatch before application. Our Masterbatch narrow MWD and at the same time reduce averag molecular weight. The decrease in melt viscosity, expressed by an increase in melt flow index (MFI), is controlled by the amount of right raw material addition. Application include PP film, extrusion coating, Fibers (spunbond, meltblown) and injection molding.

Packing: 25 KG LDPE Bags

MFI change by our produc: As example: PP MFI 25 with adding of 3-2 % of our products will be reached to MFI 90-70.

PP

Polypropylene (PP) produced with Ziegler-Natta catalysts typically has a broad molecular weight distribution (MWD) This results in a very high melt elasticity which causes problems with high-speed equipment.

The most common method of Polypropylene melt flow modification is this chemical degradation through the use of liquid additive by adding of specific % of our Masterbatch to PP in an extruder. The problem can be overcome. Allowing for controlled degradation of the polymer (visbreaking). Controlled rheology polypropylene (CR-PP) extends and improves the characteristics of PP.

Carrier Resin: Polypropylene

Appearance: Granule (Pellet)

Half Life Time: 10h/1h/1min 120/142/190˚c

Recommended Storage Temperature: 10 to 30˚c

Storage Stability: 6 months

Application:

Increase of melt flow during processing

- In polymerization process
- In compounding process
- In fiber fabrication process like Spunbond & Meltblown

It is designed for direct addition on the production of PP synthetic fiber or nonwoven fabric. Drying machinery or high-speed mixer should be used to dry the masterbatch before application.

Our Masterbatch narrow MWD and at the same time reduce average molecular weight. The decrease in melt viscosity, expressed by an increase in melt flow index (MFI), is controlled by the amount of right raw material addition. Application include PP film, extrusion coating, Fibers (spunbond, meltblown) and injection molding.

Packing: 25 KG LDPE Bags

MFI change by our produc: As example: PP MFI 25 with adding of 2-3 % of our products will be reached to MFI 70-90.

(The A.M. is a test done by our lab single compounding, Processing Temperature 190/210/220/220/210 ˚c) ,Screw Speed of 70 RPM.)

Technical Data:

Polypropylene fiber used in residential and commercial carpeting has grown significantly since being introduced in the MID1970-s. Durability and color fastness make p.p. fiber particularly suited for commercial markets such as offices, hotels and restaurants.

High molecular weight hindered amine light stabilizers (HALS) are widely accepted as the state-of-the-art technology to enhance p.p. fiber performance under demanding condition. In figure 1, results obtained after florida exposure.

Sample: P-P homopolymer, 37/130 dernier, white pigment

Base stabilization: 0.2 % irganox B 501 W + 0.1 % calcium stearate

Exposure: Florida °45 south

Test criterion: hours to 50 % retained tensile strength

Light stabilizer: Control: 1.5 % Rangdaneh sirjan u.v.stabilizer with senergy effects kly (kilolangleys)140 kly

HALS chemical name: mixture of poly [[1,1,3,3)]-6,-tetramethyl, butyl) amino] -1,3,5-triazine2,4-diyl][-2,2,6,6 tetramethyl-4-piperidyl) imino] hexamethylene [[2,2,6,6,-tetramethyl-4-piperidyl) imino]] and dimethyl succinate polymer with -4hydorxy-2,2,6,6-tetramethyl-1-piperidineethanol.

Composition: Masterbatch of high molecular weight hindered amine light stabilizer (HALS) in polypropylene carrier

Active content: <= 20 % HALS

Synergy: A chemical phenomenon in which interaction of active components of a mixture is such that total effect is greater than the sum of the individual effect. Elements of synergy of HALS combinations.

- The solubility of HALS within the polymer matrix is increased
- The solubility of the nitroxyl radical (the active stabilizing species) is enhanced
- Stabilizer mobility is effectively balanced
- Rate of nitroxyl radial formation is optimized
- Compatibility with co-additives can be improved
- Different HALS mechanisms are complementary

Main Characteristics:

- Low volatility effective as anti-oxidant for long-term heat stability of polyolefins
- Gas fading resistance in light coloured fiber
- Improved colour yield in pigmented fiber
- Increasing of the solubility of HALS whitin the polymer matrix
- Balancing of stabilizer mobility
- Improving of compatibility with co-additives

Technical Data:

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PA

PA (PA 6, PA 6.6, PA 11, PA 12) - Polyamide

Polyamides are long chain polymers containing amide units (N-H-C=O). These polymers are obtained by polymerization of an acid with an amide e.g. polyamide 6.6 (PA 66) is obtained by reaction of adipic acid with hexamethylenediamine. Polyamide 6 or nylon 6 (PA 6) was first developed in 1952 while polyamide 66 or nylon 66 (PA 66) was first produced already in 1935 by DuPont. Polyamides are amongst the most widely used polymer families within engineering polymers due to it's excellent balance of performance and cost. Polyamide typical chemical structure.

The 2 main types of polyamide are:

- Polyamide 6 (PA 6)
- Polyamide 6.6 (PA 66)

But by modification of chemical structures (length of chains and chemical organization), several others families of polyamide are obtained such as:

- Polyamide 11 (PA 11) and polyamide 12 (PA 12)
- Polyamide 4.6
- Polyamide 6.10 ,6.12 ,10.10

Polyamide 11 (PA 11) is the unique high - performance polyamide produced from renewable source-castor oil. It is used for a wide range of applications thanks to its outstanding properties that are similar to those of polyamide 12 (PA 12): excellent chemical and thermal resistance, high dimensional stability and low density.

Polyamides (PA 6, PA 6.6 and others) are commonly used in many applications due to their extreme durability and strength.

Main characteristics of polyamides are:

- Resistance to aging at high temperatures and over long time periods
- High strength and high stiffness
- Functional toughness even at low temperatures
- High flow for easy mould filling
- Inherent ignition resistance
- Excellent di-electrical properties
- Good abrasion resistance
- Outstanding chemical resistance
- High barrier/resistance to chemical gasoline, fat or aroma materials
- High oxygen barrier
- Water absorption
- Excellent cost/performance balance

Main applications of PA 6, PA 66 and other types of polyamides are:

- AutomotiveAir Fuel: Air Inlet Manifolds
- Power Train: Gears, Clutches, Chain Tensioners
- Covers: Engine Covers
- Blow Moulded Air Ducts
- Interior: Airbag canisters
- Exterior: Grills, Door Handles, Wheels covers, Mirror

Electrical & Electronics Power Distribution: Low Voltage Switch Gears
Connectors: Industrial CEE Connectors,
Terminal Blocks Electrical Components: Switches
General Industries Power Tools: Housings and Internal Parts
Sports: Ski Fixations, In-Line Skates
Railways: Railway Pads
Castors Wheels Furniture: Various Applications Off Shore tubing
Packaging films

PVA

Polyvinyl alcohol (PVA), a colourless, water-soluble synthetic resin employed principally in the treating of textiles and paper.

PVA is unique among polymers (chemical compounds made up of large, multiple-unit molecules) in that it is not built up in polymerization reactions from single-unit precursor molecules known as monomers. Instead, PVA is made by dissolving another polymer, polyvinyl acetate (PVAc), in an alcohol such as methanol and treating it with an alkaline catalyst such as sodium hydroxide. The resulting hydrolysis, or "alcoholysis," reaction removes the acetate groups from the PVAc molecules without disrupting their long-chain structure. The chemical structure of the resulting vinyl alcohol repeating units is: When the reaction is allowed to proceed to completion, the product is highly soluble in water and insoluble in practically all organic solvents. Incomplete removal of the acetate groups yields resins less soluble in water and more soluble in certain organic liquids.

PVA is used in sizing agents that give greater strength to textile yarns and make paper more resistant to oils and greases. It is also employed as a component of adhesives and emulsifiers, as a water-soluble protective film, and as a starting material for the preparation of other resins. By reaction with butyraldehyde ($CH_3CH_2CH_2CHO$) and formaldehyde (CH_2O), PVA can be made into the resins polyvinyl butyral (PVB) and polyvinyl formal (PVF). PVB, a tough, clear, adhesive, and water-resistant plastic film, is widely used in laminated safety glass, primarily for automobiles. PVF is used in wire insulation.

PE

By far the most popular thermoplastic commodity used in consumer products (especially products created by rotational moulding), polyethylene is created through the polymerization of ethylene (i.e., ethene).

Chemical CompositionThe ethylene molecule is C_2H4 ($CH_2=CH_2$)

Ethylene Monomer

Ethylene Polyethylene Polymer

Polyethylene Polymer A.K.A.Polyethene, Polythene, PE, LDPE, HDPE, MDPE, LLDPE

LDPELDPE (Low Density Polyethylene) is defined by a density range of 0.910-0.940g/cm^3. It has a high degree of short and long chain branching, which means that the chains do not pack into the crystal structure as well. It has therefore less strong intermolecular forces as the instantaneous-dipole induced-dipole attraction is less. This results in a lower tensile strength and increased ductility. LDPE is created by free radical polymerization. The high degree of branches with long chains gives molten LDPE unique and desirable flow properties.

HDPEHDPE (High Density Polyethylene) is defined by a density of greater or equal to 0.941g/cm^3. HDPE has a low degree of branching and thus stronger intermolecular forces and tensile strength. HDPE can be produced by chromium/silica catalysts, Ziegler-Natta catalysts or metallocene catalysts.

The lack of branching is ensured by an appropriate choice of catalyst. MDPE (Medium Density Polyethylene) is defined by a density range of 0.926-0.940g/cm^3. MDPE can be produced by chromium/silica catalysts, Ziegler-Natta catalysts or metallocene catalysts. LLDPE (Linear-Low Density Polyethylene) is defined by a density range of 0.915-0.925g/cm^3. is a substantially linear polymer, with significant numbers of short branches, commonly made by copolymerization of ethylene with short-chain alpha-olefins (e.g. -1 butene, 1 -hexene, and -1octene).

Properties LDPE Properties: Semi-rigid, translucent, very tough, weatherproof, good chemical resistance, low water absorption, easily processed by most methods, low cost.

LDPE Physical Properties:
Value: Tensile Strength: 0.20-0.40 N/mm^2
Notched Impact Strength: no break
Thermal Coefficient of Expansion: 220-100 x 6-10
Max. Continued Use Temperature: 65 ˚c (149 ˚f)
Melting Point: 110 ˚c (230 ˚f)
Glass Transition Temperature: -125 ˚c (-193 ˚f)
Density: 0.910-0.940 g/cm^3

HDPE Properties: Flexible, translucent/waxy, weatherproof, good low temperature toughness (to - 60 ˚c), easy to process by most methods, low cost, good chemical resistance.

HDPE Physical Properties:
Value: Tensile Strength: 0.20-0.40 N/mm^2
Notched Impact Strength: no break
Thermal Coefficient of Expansion: 220100 x 10-6
Max. Continued Use Temperature: 65 ˚c (149 ˚f)
Melting Point: 126 ˚c (259 ˚f)
Density: 0.941-0.965 g/cm^3

PS

Polystyrene (PS) - Polystyrene is an amorphous, glassy polymer that is generally rigid and relatively inexpensive. Unfilled polystyrene has a sparkle appearance and is often referred to as crystal PS or general purpose polystyrene (GPPS). High impact polystyrene grades (HIPS) are produced by adding rubber or butadiene copolymer which increases the toughness and impact strength of the polymer. Polystyrenes possess good flow properties at temperatures safely below degradation ranges, and can easily be extruded, injection molded, or compression molded. Considerable quantities of polystyrene are produced in the form of heat-expandable beads containing a suitable blowing agent which ultimately results in familiar foamed polystyrene articles.

Polystyrene (PS) has been known for well over one hundred years but its real molecular nature was not clarified until about 1920 when the work of Staudinger elucidated the materials molecular structure in the very early days of polymer science. About 1930 I.G. Farben, in Germany, first produced polystyrene, while at the same time the Dow Chemical Company commenced their ultimately successful development of the material.

Features: High Impact Resistance (346), Flame Retardant (243), Food Contact Acceptable (243), Good Processability (174), General Purpose (166), High Heat Resistance (160), High Flow (123), Good Flow (122), Expandable (121), Fast Molding Cycle (120), (144) More ...

Uses: Packaging (199), Sheet (158), General Purpose (155), Insulation (139), Household Goods (132), Toys (124), Electrical/Electronic Applications (113), Containers (108), Foam (106), Appliance Components(98), (142) More ...

Disadvantages:

- Flammable, but retarded grades available
- Poor solvent resistance, attacked by many chemicals
- Homopolymers are brittle
- Subject to stress and environmental cracking
- Poor thermal stability

Our Production Used in

- Plastic
- Textile - Fibers & Filament Yarns
- Pipes & Fittings
- Packaging
- Bio Plastic Product
- Cable & Wire Industries
- Polymer - Compound
- Automobile Parts
- Film
- Agriculture Industries
- Starp & Tape
- Kitchen Appliances
- Writing Supplies
- Home Appliances
- Electronics Industries
- Geomembranes

Plastic

Disposable Dishes
Boxes and Pallets - barrel
Kitchenware
Disposable tableware
Home appliances
Sport accessories
Batteries box
Computer & TV box
Refrigerator
Toys

Bottle CAP

For Packaging Water, drinkings
Sheet of Food Industries Packaging

BOPET/BOPP

Injection Molding

Blow Molding Products
Water Injection Tanks HDPE
Chemical Injection Tanks HDPE/PP
Injection Barrels (Food contact) HDPE/PP
The Fuel Tank PA
Automobile Parts

Textile

Bags, Sacks, Jumbo Bag PP, Carpet,

Fibers & Filament Yarns

PET Staple Fibers:
- Direct CP
- One - step(Short Spinning)
- Two - step

PP Staple Fibers:
- One - step(Short Spinning)
- Two - step

PA Staple Fibers:
- One - step(Short Spinning)
- Two - step

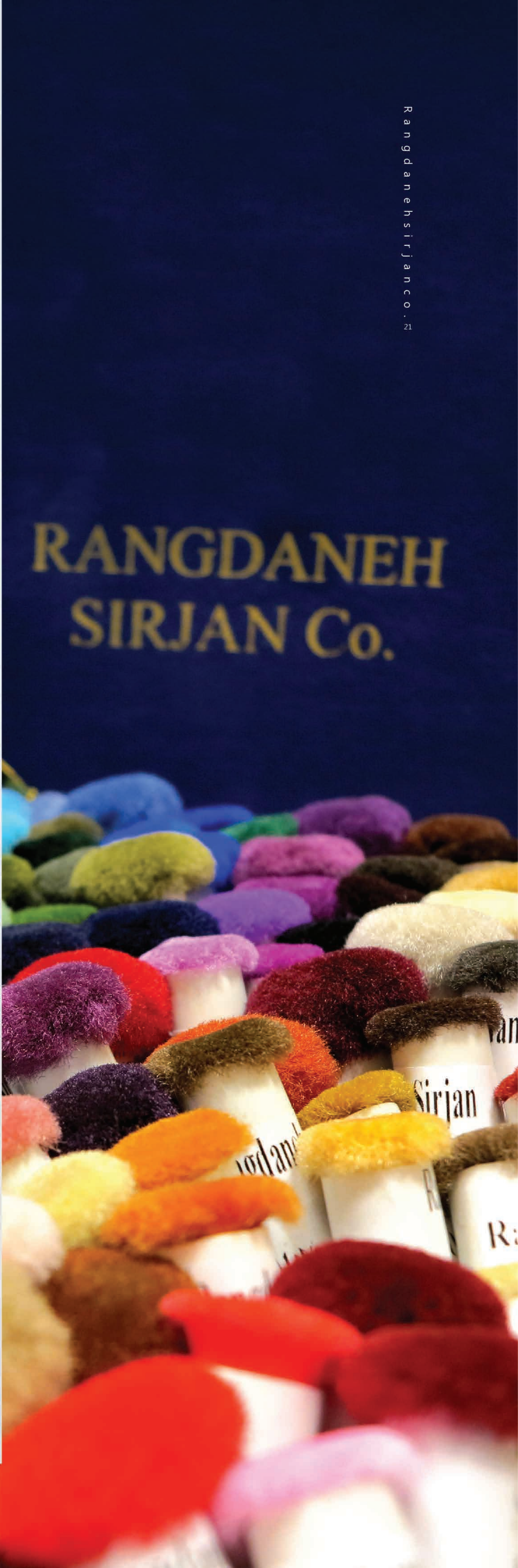
PVA Staple Fibers:
- One - step electrospinning

POY/FDY: ATY, TFO, Carpet, Upholstery, Tapestry, Socks, The Textile and Clothing Sports

BCF/ CF : Used in the production of carpet, the method of production:
CUT, LOOP, CUT/LOOP, FACE TO FACE,
WOVEN CARPET

Non-woven

Spun Bond, Melt Blown, Needle Punch, SS, SMS,
SMMS(Food contact)



Pipes & Fittings

PE8, PE100 For High-pressure Water & Gas Pipes
PPr Pipes
PE /PS / PP Pipes
Three Layers Pipes
Sewage Pipes
Drip Pipes

Agricultureal Pipes

AgroPETWire

AgroPET is a high quality-low cost alternative to galvanized wires. AgroPET is made up of polyester filament with high tenacity due to its mechanical properties. It has many uses in agriculture where we see it replacing wire in many applications including trellising, roofing and shading for greenhouses, fencing, netting installations and drip line support.

In the production of AgroPET, select raw material is used to provide a high quality product which exhibits superior strength and durability. An anti-UV additive is added to the product which protects and extends the life of the filament in all weather conditions and climates.

Packaging

Packaging & Films Food Cantact
(Food Contact)

IML Laminated

PET/PP/PS/PE

Three Layers Laminated
PET/PP/PS

Single Layers Laminated & two Layers Laminated
PET/PP/PS/PA

Packaging Sausage
PET/PP/PS/PE/PA

Corrugated Plastic PP

Pharmaceutical Industries Packaging

Bio Plastic Product

Starch-based polymer

Cable & Wire Industries

Telecommunication Cables
Copper cables
Optical cables

Power Cables
LV cables
HV cables

Data & HF Cables
Coaxial cables

Composite Cables
SM-NZ-MM
Composite & CCTV

Automobile Parts

Film

Mulching Spun Bond Film
Bio Plastic

Geomembranes

Agriculture Industry

Starp & Tape

Kitchen Appliances

Writing Supplies

Home Appliances

Electronics Industry

Textile Filament Yarn & Fiber,
Packaging, Plastic,
Polymer Compound,
Automobile Parts,
Geomembranes,
Pipes & Fitting,
Cable & Wire Industries,
Agriculture Industies,
Film, Strap & Tape,
Writing Supplies,
Kitchen Appliances,
Home Appliances &
Electronics Industries
and ...

الیاف کورتا®
رنگدانه

ELBACERT
ISO 9001:2008
ISO 14001:2004
OHSAS 18001:2007

Ministry Of Industry
R&D

REACH
ISO 4427:2007
ISO 4437:2014
ISO 17025:2005
SG

Notice

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