



Astra Polymers - Revolutionizing Medical Care with Innovation Plastics



ASTRA POLYMERS
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We remember how fragile glass blood bottles didn't always make it to their planned destination. We can also remember them hanging dangerously next to the surgeons. Too often even a simple misstep would send that life-saving bottle crashing to the floor.

The above example would explain how far medical care has advanced due to the extensive introduction of plastics into operating, emergency, and examination rooms.

If we glance through the modern day operating room we can locate:

- Flexible plastic blood bags that are never opened to contaminants
- Sanitary plastic intravenous tubes that deliver blood, electrolytes, and medicine
- Germ-free plastic syringes that are used only once, to help prevent infection
- Plastic gloves that protect surgeons and their patients
- Medical equipment contained in tough, hygienic plastics
- Life-extending, implantable medical devices such as artificial hearts

Operating lights, blood pressure gauges, bandages, respirators, surgical masks, monitors, gauze, tape ... the list goes on, right down to the clogs many surgeons wear.

These innovations are surprisingly new - for example, plastics became common in the operating room only in the last quarter century.

Pharmaceutical packaging is also one of the most essential components in medicine industry with its sole purpose being the safety of pharmaceutical preparations in order to keep them free from contamination, hinder microbial growth, and ensure product safety through the intended shelf life for the products. . Due their inherent physical properties - plastics make possible many of the life-saving innovations in the operating room and beyond. Two basic advances alone - sterile plastic packaging and disposable medical items - have helped prevent countless infections, one of the world's leading causes of death.

Protecting health and safety is always the first priority. And, while medical packaging design includes lids, pouches, bags and trays, the drugs and devices within are what truly drive design. That means almost every package involves customization, whether to support sterilization or ease of administration.

Why Astra Polymers?

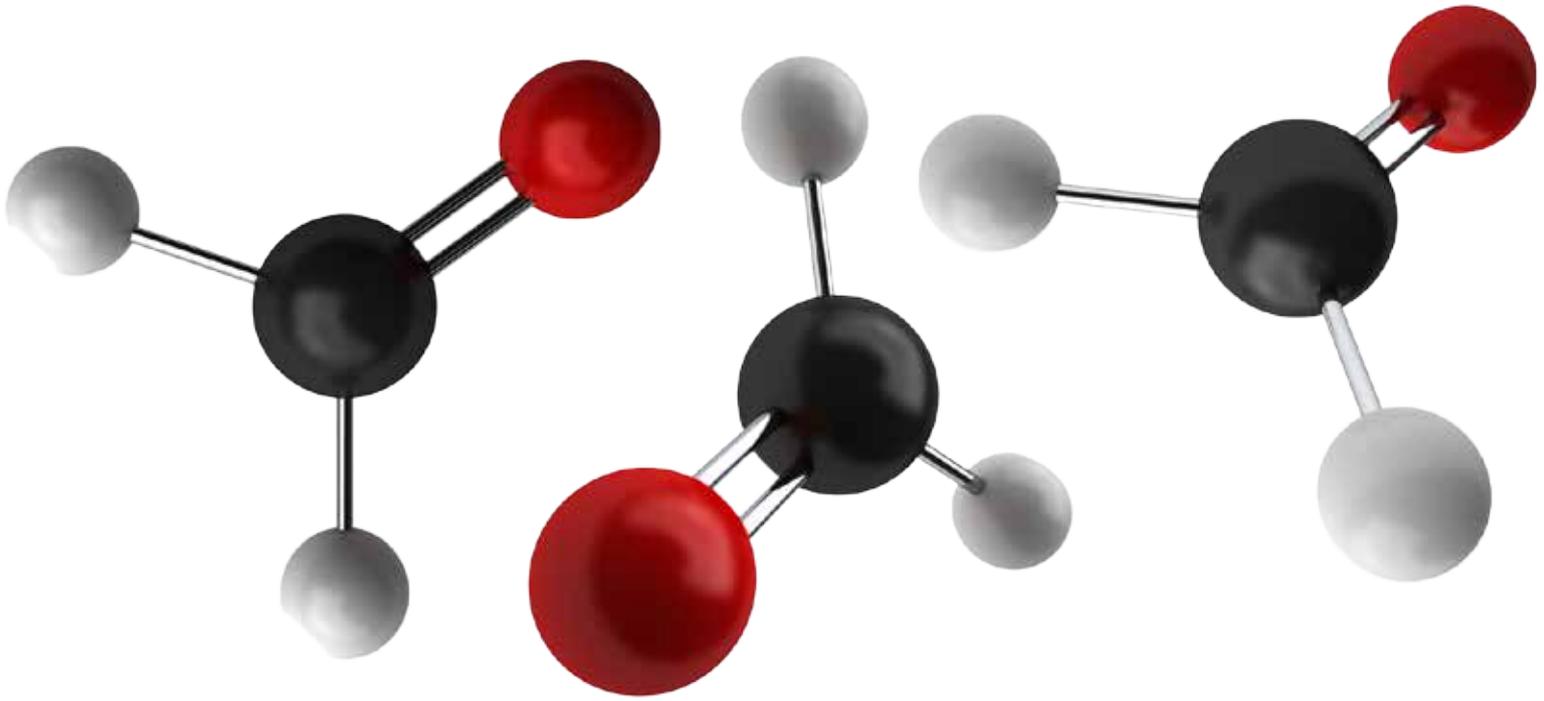
Astra Polymers has more than 22 years' of experience in producing high-quality masterbatch for all sorts of plastic manufacturers and converters strictly complying with quality standards and requirements especially for regulatory firm industry such as pharmaceutical production and packaging. Packaging is a critical tool in this industry for product delivery and regulatory compliance, pharmaceutical companies will do all their packaging within a contamination free environment requiring highly sophisticated machinery and raw material, and we at Astra Polymers make sure all such requirements are met with strict compliance. Our products address a long checklist of essentials. They include compliance with regulations, ease of use for patients and caregivers, compatibility

with sterilization methods, and efficient manufacturing.

What makes Astra Polymers stand out in regional masterbatch market is the fact that:

- Astra medical and pharmaceutical packaging raw materials are compatible with many sterilization methods are tamper resistant, and have excellent film clarity.
- All products are manufactured according to rigorous regulatory standards.
- High emphasis on continuous innovation and research.
- Continuous acquisition of latest Industrial Safety & Quality accreditations.
- Proximity of material Supply through one of the most efficient supply chain systems in the modern business.
- Fully automated modern plants across continents with a highly skilled workforce.
- Volume capacity and technical ability with commitment to quality
- Solid financial base to back up all the research, development and trials.
- Technical support, R & D facilities available at all manufacturing plant.
- Well trained marketing and technical support staff.
- Existing Sales Offices across all Astra Polymers branches.
- Relationships with agents across Middle East, Asia, Africa and Europe.
- Excellent association with leading government and private institutions across the Kingdom.

Astra Polymers is a preferred partner for technological innovations by leading pharmaceutical manufacturing and packaging companies. Our fully equipped laboratory enables our technical staff to rapidly prototype new formulations conduct extensive in house testing and offer our customers a first rate sampling service for their required packaging and containing solutions making Astra an instinctive choice for high quality precision plastic raw materials.



What is a good polymer?

Any Polymer is a collection of repeat unit, Poly means many and mer means unit. Monomer means single unit, dimer means two repeat units together, trimer means three repeat units together and so onwards oligomer means several repeat units together. So PET - Poly Ethylene Terephthalate or generally called as Polyester is a collection of many ester repeat units.

Basic property of a polymer is the identity of its constituent monomers. A second set of properties, known as Micro-structure, describe the arrangement of these monomers within the polymer at the scale of a single chain. These basic structural properties play a major role in determining bulk physical properties of the polymer, which describe how the polymer behaves as a continuous macroscopic material. Chemical properties, at the nano-scale, describe how the chains interact through various physical forces. At the macro-scale, they describe how the bulk polymer interacts with other chemicals and solvents.

The physical properties of a polymer are strongly dependent on the size or length of the polymer chain. As chain length is increased, melting and boiling temperatures increase quickly. Impact resistance tends to increase with chain length, as does the viscosity, or resistance to flow, of the polymer in its melt state. Increase in polymer chain length results in a viscosity increase, increasing chain length furthermore tends to decrease chain mobility, increase strength and toughness, and increase glass transition temperature (T_g).

Properties of a good polyester:

A good polyester is one having even distribution of chain length, I.V. as per requirement,

minimum ash contents, minimum yellowness as possible and better filter-ability.

Common way of expressing chain length is degree of polymerization which quantify number of monomers present in chain length.

Chain length is expressed in terms of molecular weight either as weight average mol. wt. (M_w) or Number average mol. wt. (M_n)

Polycondensation process yields a range of chain length, polyester is polydisperse substance i.e., it contains a distribution of molecular sizes and weights. The pattern of distribution is a reflection of polymerisation parameters.

Molecular weight distribution (MWD) is expressed as Poly dispersity (PD) = (M_w)/ (M_n).

A good polymer usually have PD= 50 000/25 000 = 2.0

Intrinsic Viscosity (I.V.) increases with increasing molecular weight. Generally I.V. range for textile grade polyester chips is 0.60 to 0.65. For staple fiber usually lower range 0.6 to 0.62 is preferred to achieve easy drawing while in filament higher range 0.63 to 0.65 is preferred to achieve better tensile strength (Tenacity).

Beside I.V. other properties of good textile grade chips ranges as follows:

- DEG% < 1.2
- CEG ueq/g < 30
- Melting point deg C > 255
- Glass transition temperature deg. C > 80
- Hunter scale color
- L values > 90
- b values < 4.2
- Ash % for BR 0.1 +/- 0.05 for SD 0.35 +/- 0.05
- Oligomer contents % 1 to 2

Whiteness is indication of good polyester. Yellowness of polyester shows degradation or certain side reactions have taken place during process. The color depends on degree of decomposition in esterification as well as in in prepolycondensation stage but mainly is produced in the final polycondensation stage due to side reactions driven by the part of metal ions from catalyst. The factors responsible for color deterioration are temperature, residence time, oxygen or moisture ingress in process, quality of raw materials viz.

catalyst, dulling agent, stabilizers, etc. Another phenomenon is the natural aging of products on long storage and climatic conditions.

TiO₂ quality contributes to color deterioration due to presence of rutile % and iron contents and nonuniform distribution of particle size inhibits agglomeration & clustering thus results in poor filtration and spinning.

For better spinning usually drop in I.V. is controlled with delta I.V. of < 0.02 i.e., difference in I.V. of wet chips (or melt leaving DRR) and free fall yarn. This indicates that, degradation is under control and polymer chain and color is good. This is achieved via plant design based on residence time of about 28 to 30 minutes and transfer of melt to spinning beam with minimum heat treatment as possible. Also good filtration improves spinning.

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Gatron (Industries) Ltd.
January 2015

Poison in Plastic Baby Bottles:

How to Know What's Safe for Your Baby

by Mudassir M. Khan, Sanaka Plastic & Scientific



The Dangers of BPA

Some baby bottles, water bottles, and other clear plastic containers are made of polycarbonate (PC) plastic, a polymer made with the chemical bisphenol-A (BPA). BPA is a hormone-disrupting chemical that in animal studies has been associated with reproductive abnormalities such as lower

sperm counts, hormonal changes, enlarged prostate glands, abnormalities in the number of chromosomes in eggs, and pre-cancerous changes in the breast and prostate. It also has been associated with obesity and insulin resistance—a condition that commonly precedes the development of diabetes.

The Government Needs Stronger Protections for Consumer Products

Considering the potential hazards of BPA on infants and babies, EU, USA, Canada (including most of the North American countries), Australia, China, Far-eastern countries, GCC (including most of the Arab countries) and many of the African countries (less developed than Pakistan) have already banned BPA containing plastics for the manufacturing of baby bottles and sippy cups. It is very unfortunate that till to-date no NGO or government organization has bothered to say a single word on this potential hazard. Pakistan government should immediately

1) draft a law to protect the consumers from such dangerous chemicals.

- 2) strictly ask the plastic articles producers to show the plastic type on the article and packing also make it mandatory to show BPA Free sign on the packaging accordingly.
- 3) ban the import and local manufacturing of the baby feeders made of Polycarbonate or any other BPA containing plastic.
- 4) give incentives to the local manufacturers to promote production of BPA free baby feeders and other products.

What can I do to prevent exposure to BPA?

If you are concerned, you can make personal choices to reduce exposure:

- Don't use polycarbonate (PC) plastic food containers.
- Avoid plastic containers made with Polycarbonate (PC) and/or with the #7 on the bottom
- Use infant formula bottles that are BPA free and look for toys that are labeled BPA free.

Plastics

■ Choose safer plastics:

Safer choices

Avoid



One Stop Shop for All Your Plastic Packaging Need

By Bin Qasim Packages (Pvt) Ltd

A Valued change in the market of packaging industry in upcoming days which bring diversification in the flexible & rigid packaging industry. The combination of BQP & A-PAK helps to provide unique packaging solution to the clients of various sector. To be the most admired and trusted organization through excelling in everything we do, following ethical business practices, compliance and adding value to stakeholders.



Bin Qasim Packages Private Limited are the manufacturer of PP Woven Laminated & Non-Laminated Bags, PP Gusseted Bags, HDPE

Liners, PE Shopping Bags/ Wrapping Sheets etc.

While A-Pak is involved in the business different molded product range of Injection & Extrusion blow molding. Beside these all it is honor for us that we are the pioneer leading manufacture of EPS product (glass, cup, fish box and etc.).



Our passion to achieve excellence in all the spheres of the business has consistently fueled our growth in the competitive market.

- Stringent Quality Control
- Advanced Manufacturing Units
- Waste Management Cycle

- On Timely Delivery
- Competitive Pricing

We realize that every problem is slightly different from the one before it, as is every customer's requirement. Which is why, we never offer a "one size fits all" solution to our customers. Every customer and indeed, every order, is preceded by a thorough understanding of the customer's needs, problems and the limitations with the current approach to solving those problems.



Our future goal is to bring multi-layer extrusion lines to provide multi-layer films similarly to enhance the printing technology by including gravure phenomena in the process that enables us to improve the printing graphics.

Consistently High Quality Pet Bottles With New eHR Solution For Sidel Matrix Blower Range

Sidel, the leading global provider of PET solutions for liquid packaging, has introduced a revolutionary PET blowing solution - the Sidel Matrix™ blower eHR - to produce hot fillable PET bottles of consistently high quality. By heating the mould via electrical heat resistance (eHR) instead of hot oil, the Sidel Matrix blower eHR achieves various benefits in terms of bottle quality, performance, process flexibility, uptime, energy savings and operator safety.

Enhancing consistent performance, saving energy

Sidel's eHR electrical heating replaces traditional heating of the mould for the PET bottle body by oil. Very responsive, it creates a temperature increase three times quicker than heating by oil, accurately providing the correct temperatures from the first bottles produced. Probes are directly located in each mould shell to regulate the temperature as closely as possible to the PET bottle as it is formed. Temperature discrepancies between different blowing stations are kept to an absolute minimum. As a result, all bottles undergo the same thermal conditioning and therefore offer a consistent performance when placed on the supermarket shelf and when in the hands of the consumer.

The latest generation of blowing valve on the Sidel Matrix blower, combined with the mechanical blow nozzle system, electrical stretching and automation, gives high control of the blowing curve. This allows mechanical output to be increased by up to 2,000 bottles per hour per mould representing a speed improvement of more than 10% compared with the previous generation of Sidel HR blowers. At the same time, it still maintains enough cycle time to ensure a consistent blowing process.

Electrical heating also offers energy savings of up to 45% compared with the previous generation of Sidel SBO Universal HR blowers. This is much more efficient than oil mould heating. The performance of the Sidel Matrix Ecovern with the infra-red lamps and ceramic technology reduces use of power by a further 25% and by implementing the AirEco2 air recovery option, air consumption can be reduced by up to 45%.

Hygiene and safety

By eliminating oil altogether, the Sidel Matrix blower eHR prevents hazards caused by leakages, such as operators' slipping and contamination. With electrical stretching, there is no need for lubrication above the neck of the bottle, removing the risk of contamination. Some components are lubricated for life and for those parts that do need lubrication, food-grade grease is used.

The Sidel Matrix blower eHR benefits from other proven Sidel Matrix developments such as oven ventilation with air filtration for more hygienic production.

As the moulds are insulated from the mould supports, the hot temperature is focused on the moulds while the ambient temperature in the Sidel Matrix blower eHR remains lower than in a traditional HR blower. This avoids any thermal constraints on other nearby machine components. Parts that operators may come into contact with inside the machine are at a lower temperature which contributes to safer intervention conditions.

Staying ahead with innovative developments

With 35 years' PET experience, Sidel has delivered almost 560 HR blowers around the world. This know-how is complemented by its experience in the hot filling of beverages, which it started almost four decades ago, first in glass containers and then in plastic. Damien Fournier, Blowing Product Management Director at Sidel, comments - "Sidel has been a central player in the hotfill segment of the beverages market ever since the introduction of the blow moulding HR PET process in 1986 and Sidel Matrix eHR provides unique operational benefits to beverage producers." The Sidel Matrix blower eHR combines the innovative eHR solution with the latest proven technologies of Sidel Matrix blowers. Mechanical settings are the same and 73% of the eHR blowing station components are similar to those of standard Sidel Matrix blowers. It can be combined for example with the Sidel Matrix Intelliblower™, which brings control and self-regulation to the blow moulding process, independent of any operator intervention. As it is contactless, electrical stretching is robust and gets no wear, delivering consistently high quality PET bottles and contributing to increased output.

Benefits of eHR blowing with Sidel Matrix Combi Hot Fill

This new electrical heating resistance blowing process is integrated into the Sidel Matrix Combi Hot Fill that integrates the blowing, filling and capping functions in one machine. Sidel Combi systems offer line efficiency levels up to 4% higher than standalone machines and by reducing the number of machines involved, can cut operating costs by up to 12%. Compact and ergonomic, they optimise line layout with a smaller footprint and their controlled production environment ensures hygiene and food safety are kept under control.

The Sidel Matrix Combi Hot Fill has electronic filling valves, equipped with individual flow meters for accurate volume dispensing with minimal wastage. Hygienic design and

contactless filling valves ensure complete beverage safety. It can accommodate a broad range of beverages with and without pulps or particles, and it can easily manage neck changeovers.

Meeting the challenges of hot filling PET bottles

'Hot filling' is a method of safely bottling sensitive beverages like juices, nectars, soft drinks, isotonic and teas (JNSDIT), by heating them. This heat sterilises the beverage and, once the bottle is filled, capped and tilted, then the bottle and cap. The temperature required (between 80° and 95° C) is above the normal thermal resistance of conventional PET bottles.

The production of a quality HR PET bottle to withstand these higher temperatures requires processing via a particular stretch blow moulding method. This involves blowing bottles in efficiently heated moulds at temperatures above 120°C with reliable controlled blowing. Traditionally, this temperature is attained by circuits of hot oil connected to a thermo-regulator. The mould base - and sometimes the mould neck - is usually connected to a second thermo-regulator. These conditions minimise PET stresses during the blow moulding phase, creating a heat-induced crystallinity and the hot moulds 'lock in' the crystalline microstructure.



The new Sidel Matrix™ blower eHR combines the innovative eHR solutions with the latest proven technologies of Sidel Matrix.



Recycling and Pharmaceutical Industry



As a matter of fact plastics are essential in modern day health care. Plastic products are used in surgery, health care products, pharmaceuticals, drug delivery systems and medical packaging.

Essential medical applications include:

- Blood bags
- Fluid bags
- Heart and lung bypass sets
- Blood transfusion sets
- Surgical gloves
- Drug containers and bottles

Unlike the household plastic products the medical products are mostly disposable and hence contribute to huge amount of waste which has to be disposed. This waste can be classified in to two main categories namely;

- 1- Postconsumer waste
- 2- un-used or company waste.

Postconsumer waste:

Hospitals produce most of the postconsumer waste in form of used syringes, drip bags, surgical gloves, bottles etc. Nowadays, approximately 16 billion injections are administered worldwide, every single year. Hospitals all across the globe pay a significant amount of money on utensils manufactured from virgin materials and invest even more in waste disposal.

Unattended, openly dumped waste, especially under warm and moist conditions, becomes an ideal breeding place for disease-causing organisms. These badly managed heaps of waste are time bombs which can cause serious health hazards.

Unused or company waste:

Plastic waste generated during the production of medical products such as syringes, drip bags etc is due to the test production and machine errors caused during moulding process. This waste is usually cleaner as compared to the post-consumer waste and hence easily recycled through shorter process mainly shredding and pelletizing only.

This type of waste is sold in the market at comparatively good rates and is usually bought

by small scale plastic goods manufacturers like toys and house hold products manufacturers.

Plastics Recycling:

Plastic recycling is the process of recovering scrap or waste plastic and reprocessing the material into useful products, sometimes completely different in form from their original state. Since plastic is not normally biodegradable, recycling it is part of global efforts to reduce plastic in the waste stream, especially the approximately eight million metric tonnes of waste plastic that enter the earth's ocean every year. This helps to reduce the high rates of plastic pollution.

In theory, any grade of Plastic can be recycled over and over again. In practice, due to contaminants and moisture, plastics can normally be recycled upwards of 10 times. This of course is a big environmental benefit. The few grades that cannot be recycled are generally supplied to heating plants for energy recovery.

Recycled Plastics are mainly used for:

- Garbage bags
- Dustbins
- Pallets
- Baskets and crates
- Cheap household products and auto parts

Recycling Post Consumer Plastic waste

Used syringes are a big source of recyclable poly propylene, these syringes are collected from hospitals and are sent to recycling factories where they are first shredded by a shredding machine usually known as a crusher. Then the shredded material is put on a magnetic conveyer which separates the needles and any other metallic particles from the mixture, it is then washed manually or using automated rinsing system in soap water where the dirt and other chemicals are separated from the plastic. The shredded plastic is now dried in either open air or mechanically before going to the extruder in which it is melted and transformed into pellets, sometimes dyes are added in the pelletizing process to give the desired

colour to the recycled material. Recycled polypropylene from the used syringes is commonly used in manufacturing low quality house hold plastic products like; buckets, soap holders, dust bins, cups etc. Other than these, many other plastic goods are made by mixing recycled material with virgin plastic to reduce the cost and at the same time maintain reasonable quality of the product.

Very similar to the recycling of Plastic syringes is the process of recycling fluid bags i.e. drip bags and blood bags, which are made from Low Density poly ethylene.

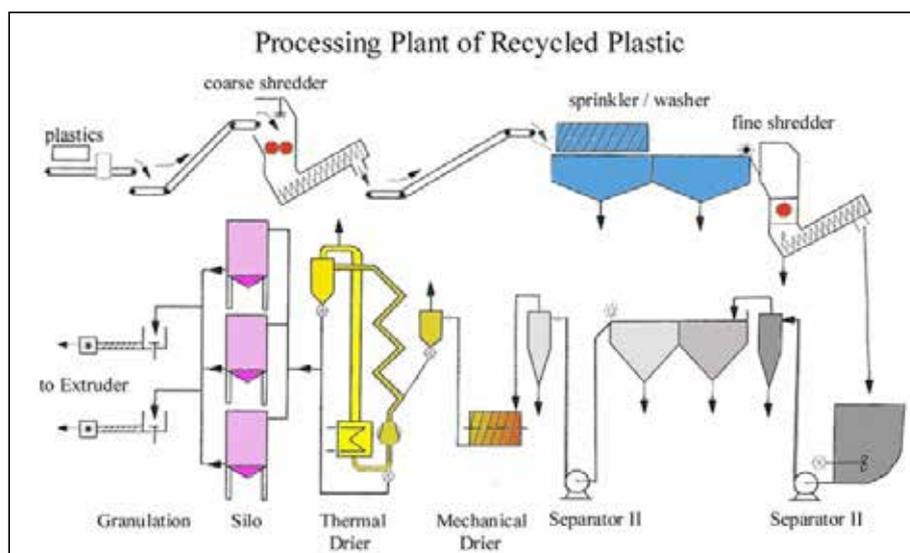
Benefits of Recycling Medical Waste

Collecting, recycling and reusing medical waste can avoid environmental hazards, protect natural resources and can provide economic benefits for health care facilities.

Recycling medical waste reduces consumption of raw material and reduces the volume of the waste materials that must be disposed in a landfill. Less medical waste in a landfill will mean reduced emission of green house gasses, less burning of fossil fuels as well as less carbon dioxide in the atmosphere. So, with using resources that are already processed hospitals can protect the environment and the already strained natural resources.

In addition to the reduction of pollutants in the environments, hospitals can save a significant sum of money with recycling and re-using. "Health care facilities could save the industry between \$4 billion and \$7 billion by adopting greener practices" (Howell, 2011). By recycling medical waste hospitals save \$5.4 billion in five years and up to \$15 billion in 10 years. That money comes from the recycling centres that treat the medical waste properly and then sell it for only 40 to 60 percent of the original price. Also, those recycling companies pay money to those hospitals that provide them with medical waste that can be sterilized and re-used.

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FAV's Masterbatches for Pharmaceutical Applications



It is a unique achievement for a young and zealous local company to supply top quality masterbatches that are used in maximum industries. It is also significant for a relatively new entrant in the realm to supply material that large numbers of quality conscious companies use in their leading products. According to Farid Ahmed Vawda, the pioneer and CEO of FAV Plastico Pvt. Ltd, dreaming big does make a difference but at the end of the day, success comes after well drawn out feasibilities which are meticulously followed by hard work and high end technology, without compromising on quality.

Global demand for masterbatch is projected to reach \$12.1 billion by 2019. Growth will be driven due to continuing robust progress in the Asia-Pacific and South American regions. The European region remains the largest market for masterbatch, followed by North America. The Asia-Pacific market is slated to be the key growth area due to combination of swift growth in plastics processing and the need to produce at higher standards. This has also helped with the masterbatch market demand.

Numerous raw materials which are used in Pharmaceutical packaging are usually imported from different countries round the globe. However, the pharmaceutical industry is increasingly observing the local manufacturers and sourcing high-quality, cost-effective products. The packaging technology of local manufacturer needs to meet strict global standards. This will create new possibilities for our customers to improve the sustainability offering and overall performance of their finished products. Being, a trusted supplier in color and performance. FAV Plastico has over five years of experience in this segment.

FAV Plastico's advanced colors and performance of materials for medical and pharmaceutical applications help customers respond quickly to rapidly changing preferences and demands. They meet the latest industry trends for surface functionality and aesthetics considering safety and regulatory compliance.

FAV Plastico is manufacturing range of polyethylene (PE) and polypropylene (PP)-based masterbatches. This range of white masterbatches and compounds is targeted for use in production of pharmaceutical tips, seals and containers for ocular and nasal drugs. It complements a range of colors and additives for medical devices and pharmaceutical packaging. Based on pre-tested ingredients, this helps reduce development time and costs of matching special colors, and the possibility of additional regulatory evaluation. Classification of our raw materials and final masterbatches through careful selection, pre-testing and evaluation gives customers a clear picture of their material of choice.

However, because of the wide variety of medical device applications, sterilization regimes, etc, it is the responsibility of the device manufacturer to perform further appropriate tests for compliance with all requirements for the intended end-use application. To reduce development time, we have few 'Standard Colors' based on pre-tested ingredients, especially for Pharma Industry. This avoids development time and costs of matching special colors, and the possibility of additional regulatory evaluation.

Medical & Pharmaceutical industry is continuously challenged with tight regulatory controls governing end users product and packaging material ingredients. This has in-

turn increased responsibility of packaging convertors to adhere to maintain traceability of raw materials, ensuring batch-to-batch consistency and high level of material safety. FAV Plastico is constantly working to provide a wide range of masterbatches which can be widely used in Pharma industry in Pakistan.

Pet Amber is one of our thriving products in Pakistan Pharma Industry, which has high quality with good heat stability and migration. The leading supplier has developed amber masterbatch for the PET used pharmaceutical prescription bottles. This grade facilitates molders color PET in their premises rather rely on pre-colored resin. This grade meets strict light fastness, U.V. protection, clarity, color and other requirements set for pharmaceutical bottles.

As Pharmaceutical industry is considered very strenuous and sensitive, FAV Plastico takes extra care in producing medicated product Masterbatches with high quality Titanium dioxide, pigments and other raw materials. We have a wide range of White Masterbatches, which are especially made for ocular and nasal drugs containers manufacturers. Since the beginning of FAV Plastico's career, we are providing these products to well known companies with a surety that our products are non-hazardous.

Our well equipped analytical and color laboratories allow us to quickly develop formulations of a project. We are then able to continually optimize products from the initial trial stages through to full commercialization. As we are constantly working on developing a range for pharma industry to support and share the responsibility of this sector which aim to provide affordable medical facilities to people of Pakistan.