Pristine Offers New Biodegradability and Compost Options for Plastic Manufacturing

GARDEN CITY, ID, UNITED STATES, March 25, 2024 /EINPresswire.com/ -- Plastic materials similar to the types we use today, such as celluloid, PVC, and bakelite, were invented in the early 19th century. Today, plastics like polystyrene, polyethylene, PET, PVC, and HDPE are ubiquitous in our lives and critical in virtually every industry, from healthcare to food packaging. Processing and manufacturing methods for these plastics include injection molding, extrusion, blow molding, and thermoforming.

Plastic Manufacturing Process

While plastics are essential in our daily lives today, they are also among the most challenging materials to dispose of and recycle safely. The impact of plastic pollution on ecology, marine life, and human health is considerable.

It includes microplastic contamination in the oceans, our food, and even in the air in the form of plastic dust. These dangers have raised questions regarding plastic manufacturing sustainability and the need for reliable and effective biodegradable plastic additive solutions.

5 Types and Methods of Plastic Processing

Most plastic materials produced today are manufactured using one of five processing methods. Each method is suited for different types of plastic materials and industrial applications, from the automotive industry to food packaging.

Injection Molding

The injection molding process involves melting raw plastic materials and injecting them into mold cavities. Once the mold has shaped the plastic, it cools down and solidifies into the desired shape.

Injection molding is suitable for high-volume production of parts with complex shapes. Applications include automotive industry parts such as bumpers, dashboards, trim pieces, cases, and shells for consumer electronics, toys, and plastic tools. Common materials used for injection molding include ABS, polycarbonate (PC), polypropylene (PP), and polystyrene.

Blow Molding

Like injection molding, the blow molding process starts with molten plastic. However, instead of being poured directly into a mold, it is first processed into a hollow preform and then clamped into a mold. Air is poured inside, forcing the plastic to expand to the shape of the mold. When it cools down, it solidifies into a hollow part.

Blow molding requires flexible and easily stretchable plastic materials like HDPE, PET, or PVC. It is ideal for producing hollow objects of all kinds, such as plastic drink bottles, drums, tanks, and containers.

Extrusion

Extrusion is a widely used plastic manufacturing process primarily used to produce long, continuous shapes, such as tubing, piping, or wiring. Molten plastic is pushed through a die until it adopts the manufacturer's desired shape. The plastic is then allowed to cool and solidify.

Most plastic materials are suitable for extrusion, with the most common being polyethylene (PE), PP, PVC, and polystyrene. Parts and products made with extruded plastic include window frames, wiring insulation, sheeting, and plastic pipes and tubes of all kinds.

Rotational Molding

The rotational molding process involves placing powdered plastic into a heated mold. The mold is then rotated on two perpendicular axes, allowing the plastic to melt and distribute evenly on the mold's surface until it fits the interior shape.

Rotational molding is primarily suited to produce large, hollow, durable parts such as large tanks, kayaks, or outdoor play structures. Roto-molded plastics include LDPE, PEX, and PVC. It is better suited than blow molding when manufacturers want durability, uniform wall thickness, and complex shapes.

Thermoforming

Thermoformed plastic begins as a flat sheet of the desired material. It is then stretched, shaped, and formed using heat, vacuum, air pressure, or mechanical force, depending on the type of mold. Once the plastic has adopted the desired shape, it is allowed to cool down, directly

producing the final product.

Thermoforming is ideal for producing simple containers and packaging, such as disposable drink cups, trays, lids, food-grade clamshell packaging, and refrigerator liners. Plastic materials used in this process include polystyrene, PET, and ABS.

Importance of Plastics in Daily Life

Plastics are indispensable to our daily lives, as evidenced by the huge variety of products that can be produced using each manufacturing process and material.

Every day, we interact with objects made from plastic, from blow-molded PET drink bottles and extruded PE charger cables to thermoformed PVC food trays. Our cars and trucks feature injection-molded PVC parts, both inside and outside. Our infrastructure relies on various roto-molded and extruded plastic elements.

We use and rely on plastics because they have improved our quality of life at every level, from daily conveniences to safety and healthcare. Here are a few examples:

Plastic packaging

Durable packaging has extended the shelf-life of food products and improved our food safety standards by keeping foods fresh and safe from outdoor contaminants.

Healthcare industry

Plastics such as PVC revolutionized the healthcare industry through the introduction of disposable plastic syringes, blood bags, easy-to-disinfect surfaces, prosthetic parts, and surgical devices.

Transportation industry

Replacing traditional materials like wood and steel with plastic has helped vehicles become lighter and more aerodynamic, improving fuel efficiency and reducing greenhouse gas emissions.

The DoE estimated that for every 10% of weight saved with lighter materials like plastic, an average car burns 6% to 8% less fuel.

Sustainability Concerns With Conventional Plastics Manufacturing

While plastics are essential for daily life, the processing, manufacturing, and disposal of plastic materials come with numerous sustainability challenges.

Plastic waste is currently one of the biggest pollutants on the planet, severely impacting the environment, marine life, wildlife, and human health. For instance, according to the UNESCO Ocean Library, 80% of all marine pollution is plastic waste, making up 8 to 10 million metric tons per year. Microplastics leach toxic chemical elements used in plastics manufacturing into the environment, such as phthalates and bisphenol A, endangering wildlife and human health.

Additionally, the world's waste disposal facilities are poorly equipped to deal with plastic materials, which are often non-recyclable, resulting in substantial waste management issues. These concerns highlight the importance of improving the sustainability of the plastic industry and creating healthier and environmentally friendly plastics.

The Future of Plastics with Biodegradable Solutions

Achieving better and more sustainable plastic manufacturing has long been possible. The first proposed solution was bioplastics such as polylactic acid (PLA), bio-PET, and PHA, manufactured from renewable and environmentally friendly materials. However, while they are more sustainable, producing these materials requires substantial infrastructure and investment in processing equipment, and PLA products are still not recyclable.

Solutions such as Pristine® offer a cost-efficient alternative. Pristine® is a plastic additive that can be integrated into the manufacturing processes of traditional plastic materials. Instead of making new, dedicated biodegradable plastics, Pristine® enhances the biodegradability of existing materials while using existing production facilities and current fabrication methods.

Additionally, Pristine® ensures that all additive-treated plastics can achieve efficient biodegradation even in standard landfills, traditional compost sites, or marine environments. Products with Pristine® added are also recyclable. Our solution has been independently tested and verified using recognized ASTM test protocols, such as ASTM-D5511, D6691, and D5338.

Pristine®: Leading the Way in Biodegradable Plastic Additives

Contact Pristine® LLC for the leading plastic additive that ensures efficient biodegradation of a wide range of plastic materials, including polypropylene, HDPE, LDPE, PVC, EVA, PET, EPDM, polyester, polycarbonate, and numerous others. Integrating Pristine® into your manufacturing processes ensures the biodegradation of these materials in standard landfills, compost sites, and marine environments.

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