



Factory 1

19# Dongsha Changfu Road, Nanfeng Town, Zhangjiagang City, Jiangsu Province, China.



Factory 2

7# Yuefeng road, Nanfeng town, Zhangjiagang city, Jiangsu province, China.

International Sales Department:

B1705, Building A, Huijin Business Center, Yangshe Town, Zhangjiagang City, Jiangsu province, China.

Aceretech Machinery Co.,Ltd

Tel: +86-512-58622012 Fax: +86-512-58622013 E-mail: info@aceretech.com



PET food-grade recycling technology
Leading the future of plastic recycling



**ADVANCED
PLASTIC RECYCLING
TECHNOLOGY**

www.aceretech.com

CONTENTS



1 ABOUT US

Global Perspective on PET Recycling	03/04
The Necessity and Significance of Food-Grade PET Recycling	05/06
Profile of ACERETECH company	07
Technological Innovation and Commitment to Sustainable Development	08

2 PRODUCT INTRODUCTION

Food Grade R-PET Pelletizing Line	09/10
Food Grade R-PET Sheet Extrusion Line	11/12
Solid State Polymerization (SSP)	13/14
Liquid State Polymerization (LSP)	15/16
PET Bottles Washing Line	17/18
R-PET Chemical Recycling Technology	19/20
One-Step Solution for R-PET Recycling Applications	21/22



Global Perspective on PET Recycling

Efforts in global PET recycling can be elaborated and enriched from four main perspectives: technological innovation, policy response, market dynamics, and societal awareness, integrating Acere-tech's technology and products to specifically demonstrate how these efforts are applied in practice.



Technological Innovation

Physical and Chemical Recycling Technologies:

Globally, the ongoing development of physical recycling technologies (such as Acere-tech's PET Washing Line and PET Pelletizing Line) and chemical recycling technologies has paved new avenues for enhancing PET recycling efficiency and quality. Acere-tech's technological innovations, such as efficient washing and pelletizing lines, directly meet the global demand for improved quality of recycled materials.

Product Application Innovation:

Acere-tech's safPET series, including Bottle to Bottle, to Fiber, and to Sheet solutions, demonstrate how recycled PET can be used in a variety of end applications, thereby expanding the market demand and application range for recycled PET.



Societal Awareness

Raising Public Environmental Awareness:

The growing concern over plastic pollution among global consumers and the public is prompting businesses to act to reduce plastic waste. Acere-tech's solutions offer concrete ways to achieve this goal by minimizing waste through efficient recycling technologies.

Education and Collaboration:

By raising awareness about the value of PET recycling and through cross-industry collaboration to advance recycling technology and applications, Acere-tech demonstrates how businesses can participate in these global efforts, promoting knowledge sharing and best practices exchange.



Policy Response

Global Environmental Regulations:

As global regions strengthen environmental regulations and promote circular economy policies, Acere-tech's technology and solutions support businesses in complying with these increasingly stringent environmental requirements and recycling goals.

Carbon Emission Reduction Targets:

Facing global carbon neutrality goals, Acere-tech's technology helps reduce the demand for new plastic production and associated carbon emissions by improving recycling efficiency and promoting resource circularity.



Market Dynamics

Consumer and Market Demand:

With growing consumer demand for sustainable products, Acere-tech enables brands to produce eco-friendly products that meet consumer expectations by providing high-quality recycled PET materials.

Corporate Social Responsibility:

Businesses are increasingly recognizing their role in environmental protection and sustainable development. Acere-tech's technology allows them to achieve these goals by using recycled materials while maintaining product performance and quality.



Through the detailed description from these four perspectives, Acere-tech's technology and products not only respond to the challenges and trends in global PET recycling but also showcase in practice how innovative solutions can drive the development of the plastic circular economy, meet environmental requirements, fulfill market demand, enhance societal awareness, and ultimately contribute to global environmental protection and sustainable development goals.



The Necessity and Significance of Food-Grade PET Recycling

The importance of non-degrading, food-grade PET resource recycling in environmental protection, resource conservation, and the promotion of a circular economy is widely recognized, with Aceretech's advanced technology playing a key role in achieving this goal. Aceretech's solutions not only support the recycling of food-grade PET but also ensure the material's quality does not degrade during the recycling process, which is crucial for extending the lifespan of PET materials and enhancing overall resource efficiency.



Application of Aceretech Technology

Efficient Washing and Pre-treatment Technology:

Aceretech's PET Washing Line employs effective sorting and washing technologies to thoroughly remove impurities, pollutants, and odors from PET waste, laying a solid foundation for food-grade quality.

Advanced Pelletizing and SSP Processes:

Through the safPET Pelletizing Line and Solid State Polymerization (SSP) technology, Aceretech's powerful detoxification and purification capabilities ensure the purity and molecular weight of recycled PET pellets, meeting the stringent requirements for food-grade applications.

Food grade Quality Software Control System:

Aceretech uses strict software quality control and testing systems to ensure that each batch of recycled PET complies with food-grade standards, guaranteeing the safety and consistency of the products.



Market and Social Impact

By investing in food-grade PET recycling technology, Aceretech not only responds to the global demand for sustainable packaging solutions but also enhances the market competitiveness of its business clients. Aceretech's solutions enable businesses to produce products that meet consumers' growing demand for high-quality, safe, and eco-friendly products, while also strengthening the brand's environmental image and social responsibility.

Promoting Non-degrading Recycling

Aceretech's technology and solutions significantly increase the recycling lifecycle of PET, and by ensuring that the material's quality does not degrade during the recycling process, greatly enhance PET's resource efficiency and sustainability. This non-degrading resource recycling has a profound impact on achieving a true circular economy, not only reducing the demand for new materials and minimizing environmental impact but also promoting efficient and sustainable resource use.



Aceretech's technology plays a vital role in the non-degrading, food-grade PET resource recycling process, not only advancing the standards for food safety and environmental protection in PET materials but also contributing significantly to the development of a global plastic circular economy. By providing efficient and reliable food-grade PET recycling solutions, Aceretech is leading the industry towards a more sustainable and environmentally friendly future.






Profile of ACERETECH company



ACERETECH stands at the forefront of China's recycling equipment manufacturing, renowned for our commitment to quality and innovation. We are recognized as the leading technology supplier for Plastic Recycling Machines in China.

Our extensive product lineup caters to the entire spectrum of the recycling industry's needs, including advanced shredders, crushers, washing and pelletizing systems, and specialized PET food-grade recycling systems. Our offerings underscore our mission to support sustainable and efficient recycling practices globally.

■ We operate as a consortium of 5 specialized companies, providing a comprehensive close-loop solution for plastic recycling:

 <p>Delivers comprehensive solutions in Plastic Recycling & Pelletizing, Compounding lines, as well as size reduction equipment including Shredders and Crushers.</p>	 <p>Specializes in advanced Solid Waste Recycling Systems, Plastic Washing Lines, and Water Treatment Systems, catering to the evolving needs of the recycling industry.</p>	 <p>Concentrates on state-of-the-art Polymer Filtration Systems and precision machining of mechanical parts, ensuring high-quality output and reliability.</p>
 <p>Commits to the development and manufacturing of Film Blowing Machines & Moulds, representing a strategic collaboration among ACERETECH, Taiwan Matila, and a leading Taiwanese die head company.</p>	 <p>A pioneering joint venture with the Academy, offering cutting-edge LSP and SSP systems, along with PET Sheet Extrusion Machines for food-grade applications, setting new standards in recycling technology.</p>	

■ Our range is designed to enhance the efficiency of recycling processes, reduce machine costs, and optimize the quality of recycled particles, affirming ACERETECH's role in driving the recycling industry towards a more sustainable future.



Technological Innovation and Commitment to Sustainable Development

At ACERETECH, we are committed to becoming a leader in innovative plastic recycling technology and sustainable development. Our mission is to drive the development of a global circular economy for plastics through advanced technological solutions and deep industry expertise, ensuring responsibility towards our clients, society, and the future of our planet.

■ Commitment to Technological Innovation

We pledge to continuously invest in research and development, pushing the boundaries of plastic recycling and processing technology. Our goal is to develop more efficient and environmentally friendly equipment and systems to meet the evolving market demands and environmental challenges. Our innovation focuses include, but are not limited to:

- Efficient food-grade PET recycling technology to ensure the quality and safety of recycled plastics.
- Advanced physical and chemical recycling methods to enhance the value and application range of recycled materials.
- Intelligent and automated technologies to increase the efficiency of recycling processes and reduce energy consumption.

■ Commitment to Sustainable Development

At ACERETECH, we recognize the crucial role businesses play in promoting sustainable development. We commit to:

- Minimizing our environmental impact through our technologies and solutions, including reducing greenhouse gas emissions and waste generation.
- Promoting effective resource circulation, reducing reliance on virgin resources, and contributing to sustainable resource management.
- Working closely with global partners, customers, and communities to promote the concept and practice of a circular economy and raise public awareness of the value of plastic recycling.
- Adhering to the highest environmental and social responsibility standards, conducting our business responsibly worldwide.



We at ACERETECH believe that through technological innovation and a steadfast commitment to sustainable development, we can bring revolutionary changes to the plastic recycling industry while protecting our environment and enhancing the quality of life in our society. We are dedicated to being your trusted partner, together creating a greener, more sustainable future.



safPET®

Food Grade R-PET Pelletizing Line

100%Reuse | C to H | All foods contact



The food-grade PET granulating system consists of a pre-crystallization drying system for bottle flakes, an optimized extrusion system with a powerful decoloring function, back-flushing filters, and a water-jet automatic strand cutting unit, among other components.

The entire PET food-grade granulating line is equipped with an online viscosity meter to ensure production yield while monitoring the quality of the products in real-time.

■ Features:

- The vacuum compaction bin equipped with pre-crystallization drying functionality ensures that the raw materials are thoroughly dried and prevents yellowing of the bottle flakes due to oxidation.
- Precrystallization drying using frictional heat is more energy-saving compared to electric heating.
- A set of three-stage Roots vacuum pumps ensures the effective removal of volatile substances.
- Automatic backwashing waste discharge filters ensure filter accuracy and reduce the frequency of replacement for the melt filter screen.
- Online viscometer for real-time detection of melt viscosity, visualizing the viscosity of the extruded melt.
- Automatic strands cutting and pelletizing saves labor and ensures uniform final chips' dimensions.

Food Grade R-PET Sheet Extrusion Line

100%Reuse | E to G | All foods contact



Food-grade PET sheet (Polyethylene terephthalate) is a type of material used for food packaging, such as plastic bottles and containers. It boasts good transparency, durability, barrier properties, and is harmless to food. This sheet material is typically used to thermoform bottles and other containers, especially for packaging soft drinks, water, juice, food, and other liquids.

The SafPET bottle-to-sheet unit can effectively utilize bottle flakes to produce food-grade PET sheet products in a one-step process. Benefits from SafPET vacuum drying technology and an excellent melt decoloring process, it can significantly reduce color change and maintain viscosity, thereby producing sheet products with stable physical properties that are suitable for food extrusion.

Solid State Polymerization (SSP)

Solid state polymerization (SSP) is a post-processing technique used to increase the molecular weight of polyethylene terephthalate (PET), which in turn enhances the melting point, mechanical properties, and chemical stability of PET. This process is commonly employed in the production of bottle preforms and other PET products. The solid state polymerization process takes place at temperatures below the glass transition temperature and above the melting point of PET, allowing the PET particles to remain in a solid state.

The advantage of solid state polymerization (SSP) lies in its ability to increase the molecular weight of PET without compromising the material's properties. This is directly related to the performance of the final product, such as improved mechanical strength and enhanced chemical stability. Furthermore, the SSP process can also remove low molecular weight substances from the material, such as residual monomers and oligomers, thereby increasing the purity of the product.

SSP (Solid State Polymerization) is an indispensable step in the manufacturing of PET bottles, containers, packaging tapes, and other engineering plastic products, especially for applications that require high-performance PET.

■ The basic steps of the SafPET solid state polymerization process are as follows:



Preliminary Treatment

PET pellets first need to undergo drying treatment to remove moisture, as water can cause degradation reactions during the polymerization process.



Heating

After removing the moisture, the material is gradually heated to a temperature approaching but below the melting point of PET, typically between 180°C to 220°C, to promote the polymerization reaction.



Solid phase polymerization

Under controlled temperature conditions, PET particles are kept in an inert gas (nitrogen) for a period of time (depending on the desired increase in viscosity). At this time, the PET molecular chain continues to polymerize, and the molecular weight increases.



Cooling

The polymerized PET material needs to be slowly cooled to room temperature to prevent internal stresses that may be caused by rapid cooling.



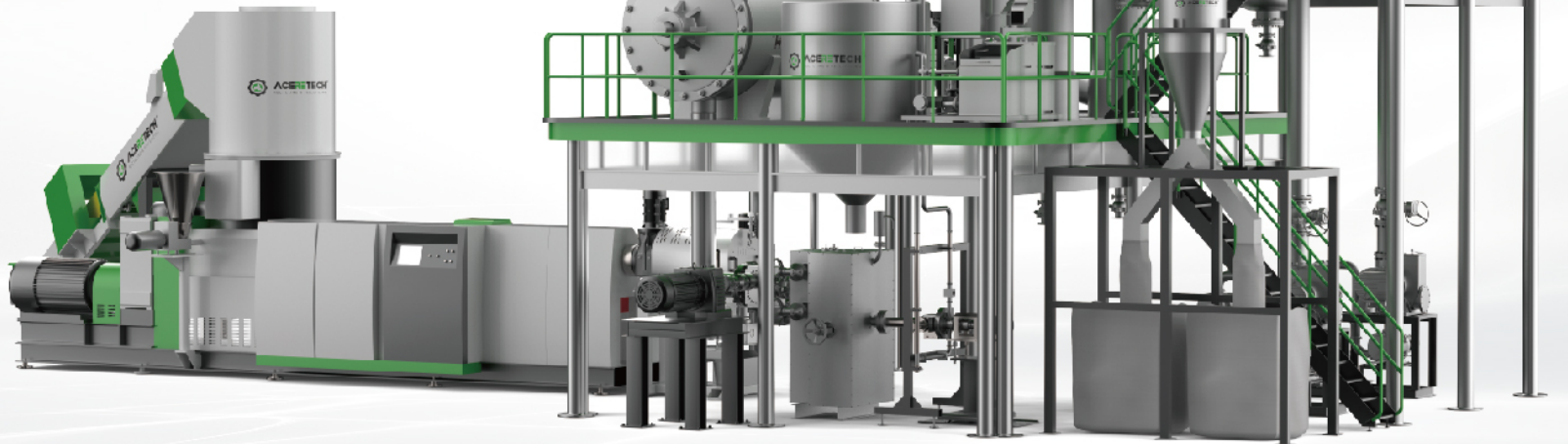
Post-processing

According to requirements, subsequent sorting and packaging processes are carried out.

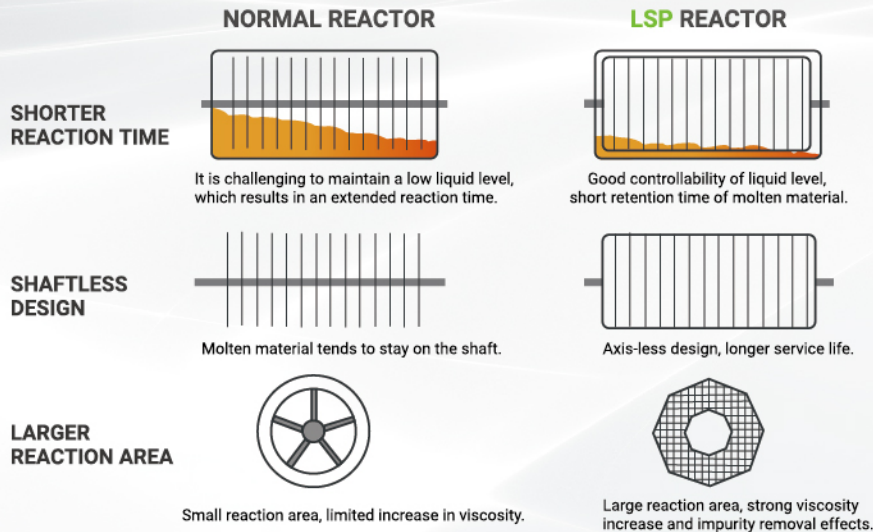


■ Features:

- Higher viscosity increase efficiency, with a maximum actual viscosity increase of 0.02 per hour.
- Two sizes, 12000L and 24000L, modular design, can be freely combined according to production capacity.
- Digital control, user-friendly interface, easy to operate.
- Compared to traditional polymerization processes, the production assembly is modularized and miniaturized, making post-maintenance and operation simple.



■ **Innovative design**



The homogenization viscosity reactor has an internal structure similar to the final polymerization pot in continuous polymerization units, both using horizontal polymerization pots. The internal structure of the horizontal reactor can be divided into two types: disc-shaped and cage-shaped. Disc-shaped reactors have a smaller surface area and lower film formation efficiency, with a central shaft that is prone to material buildup. Cage-shaped reactors, on the other hand, have a larger surface area, higher film formation efficiency, and no central shaft connection, thus eliminating the issue of material buildup. Our company uses an independently developed cage-shaped reactor, which boasts excellent film formation effects and high polymerization efficiency, capable of shortening the reaction time.

■ **Applicable materials**

PET film, sheet, waste, perforated waste, or fabric fibers, polyester fabric, and waste yarn, etc.



■ **Features**

- **safPET[®]** LSP system is an extremely efficient alternative to a Solid State Polymerization (SSP) as there is no energy needed to cool the polymer down and then reheat it. Further, the reaction time in the melt phase is considerably faster than in the solid phase, which also contributes to the better economics of the LSPLINE[®] system.
- **safPET[®]** LSP system improves the quality of PET recycling material (fiber, bottle flake, film, popcorn. Low IV polymer) melt. To produce high grade PET fibre, PET packaging strap, PET pellet, PET film, improve the recycling utilization and quality of resources,

PET Bottles Washing Line

The ACERETECH team has integrated plastics washing technology from Europe and China and continuously optimized it. Ultimately, they have developed a series of modular equipment that can adapt to the different characteristics of materials such as HDPE/PP/PS/ABS/PC/PET.

- The SafPET bottle-grade bottle washing technology includes the dispersal and conveyance of bottle bricks, pre-treatment of impurities, full-bottle optical sorting, label removal and cap separation, crushing, washing (including hot washing), drying, and optical sorting of bottle flakes. Additionally, it can be optionally equipped with an online alkali solution metering and purification reuse system, water treatment system, and other features.



◀ PET bottles

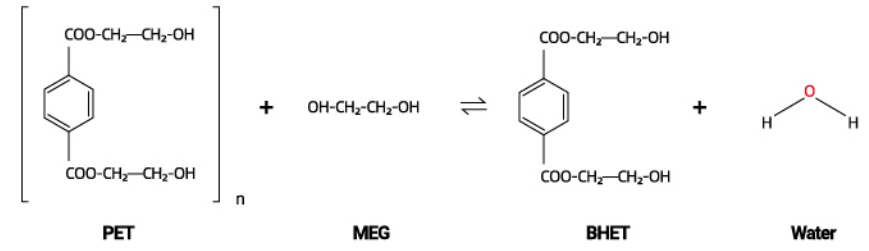
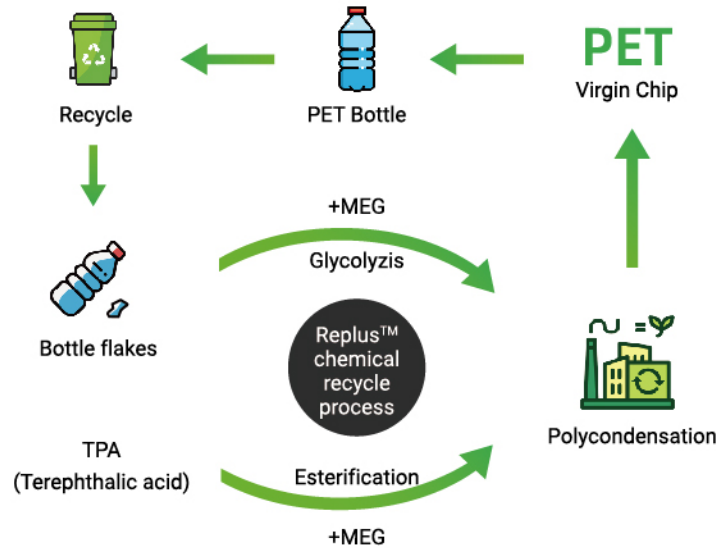


◀ PET bottles flakes

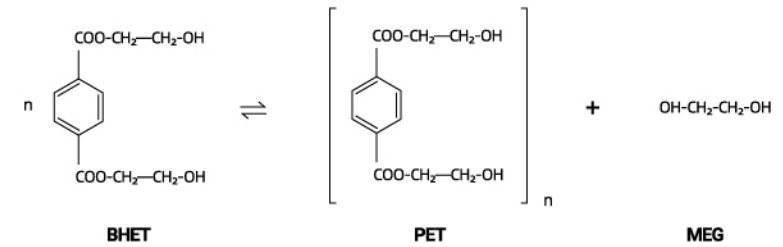
Product Parameters

Model	Capacity (KG/H)	Installation Power (KW)	Steam (KG/H)	Water Consumption (T/H)	Space (M²)
PET 1000	1000	385	500	2-3	1200
PET 2000	2000	520	800	4-6	1400
PET 3000	3000	720	1000	6-8	2200
PET 6000	6000	1180	1600	10-12	2600

R-PET chemical Recycling Technology



Depolymerisation reaction



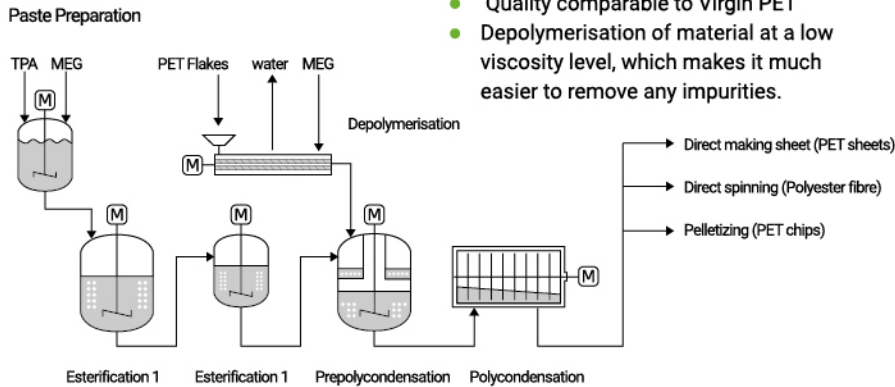
Polycondensation reaction

- The chemical recycling process is based on PET bottle flakes, which are filtered and adapted in their intrinsic viscosity before being introduced as a melt side-stream back into the prepolymer of the prepolycondensation process.

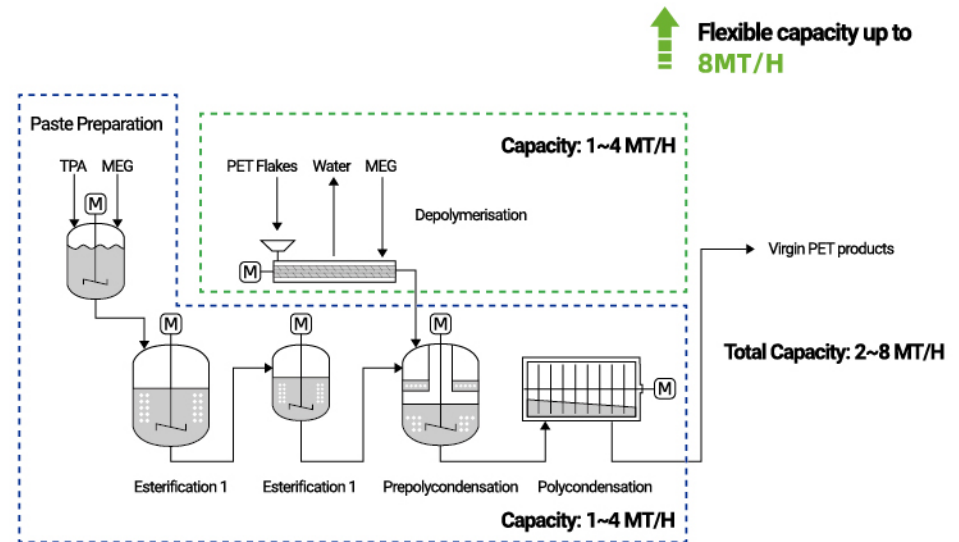
- Flexible production capacity can use up to 50% PET bottles and 50% virgin PET, and also can complete the production of Virgin PET products.

Advantage

- Quality comparable to Virgin PET
- Depolymerisation of material at a low viscosity level, which makes it much easier to remove any impurities.

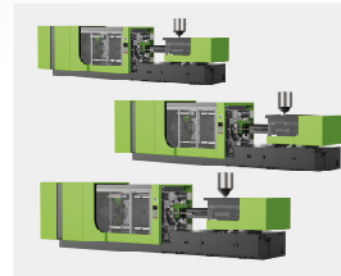


Chemical Recycling process



One-Step Solution for R-PET Recycling Applications

The safPET recycling system can be integrated with PET product production lines, such as bottle preform injection molding machines, spinning lines, and packaging tape production lines, to achieve one-step online recycling and production of products. This reduces the material handling process, lowers the energy consumption of the entire production line, and thereby improves production efficiency, maximizing the circular regeneration of PET bottles.



Injection molding machine



Spinning production line



Bagging production line

