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News

Innovation and Industry

Plastics recycling



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Japan Environment PLANNing

Press release

Axens, IFPEN and JEPLAN announce the start-up operation of Rewind® PET semi-industrial unit in Japan for the chemical recycling of PET

Rueil-Malmaison, 26 October 2023,

Axens, IFPEN and JEPLAN entered into a partnership in 2020 to develop and license an innovative recycling process, called Rewind® PET, that can be used to recycle all types of waste Polyethylene Terephthalate (PET), especially those difficult to recycle mechanically. With the support of the French Environment and Energy Management Agency (ADEME), this collaboration has resulted in the construction, commissioning and recent start-up of their Rewind® PET semi-industrial unit, which modifies and expands JEPLAN's existing Kitakyushu Hibikinada Pilot (KHP) demonstration plant, in Kitakyushu-city, Japan. The production capacity

of the Rewind® PET semi-industrial unit keeps the same capacity of the KHP demonstration plant before modifications, at one thousand tons per annum (1 KTA).

The aim of this unit is to show future industrial customers how the innovative PET recycling process, developed by the three partners, can be integrated into their own production and recycling facilities. This is a key step for the three partners in view of the commercialisation (licensing) by Axens, which is intended to start by the end of 2023 once the process has been fully validated. The **Rewind® PET** process will produce a high-quality, virgin-like, recycled PET, suitable for all PET applications including food contact packaging or textiles. An event was held at the semi-industrial unit on October 24th to celebrate its launch.



(Left) Exterior view

(Right) An event was held at the industrial unit on October 24th to celebrate its launch. From the left : Patrick Sarrazin, Executive Vice President of Axens, Cécile Barrère-Tricca, Chemistry for Industry Business Unit Director of IFPEN, Masaki Takao, Representative Director, President, and CEO of JEPLAN.

An innovative process for the chemical recycling of PET

The innovative **Rewind® PET** process involves a continuous depolymerization of PET by glycolysis, followed by a deep purification of the obtained monomer, BHET (Bis(2-Hydroxyethyl) terephthalate). Its major advantage for manufacturers lies in its ability to separate all additives and colorants to restore a pure BHET monomer, which can easily be polymerized again in existing (or new) polymerization plants. It can be used to process all types of waste PET, including coloured and opaque bottles, multilayer trays, packaging film and polyester textiles. This innovation is the result of more than 10 years of development at Axens, IFPEN and JEPLAN, and of the synergy established by the three partners for over three years now. It will greatly help the PET industry meet its targets for the integration of recycled materials, complementing mechanical recycling. This will also contribute to reaching Europe's target of 30% recycled content in PET-made packaging by 2030.

Promoting a circular plastics chain

The **Rewind® PET** process is part of Axens and IFPEN's global strategy in the field of the plastics circular economy, with the development of several chemical and physical recycling processes designed to complement mechanical recycling in order to achieve the ambitious targets for the incorporation of recycled material in many industrial sectors, starting with packaging and textiles. It is a powerful response to the challenges of ecological transition faced by manufacturers and brand owners looking for reliable, long-term solutions to adapt their industrial facilities.

The start-up operation of the **Rewind® PET** semi-industrial unit represents a crucial stage in the partnership between JEPLAN, IFPEN and Axens. It will provide a tangible demonstration of the benefits and efficiency of **Rewind® PET** for all stakeholders of the circular economy of plastics, from the waste management companies to the PET producers and brand owners of the packaging and textile sectors.

Axens is responsible for marketing and licensing the **Rewind® PET** process. **The Rewind® PET** semi-industrial unit will enable future clients to check the robustness and reliability of the process, while meeting the most stringent quality, integration and economic viability requirements. In order to support its clients in developing their PET-recycling projects, Axens will offer a comprehensive package including basic design, performance guarantees, the supply of proprietary equipment, and technical assistance for the start-up and operation of these clients' own industrial units.

Masaki Takao, Representative Director, President, and CEO of JEPLAN, said "JEPLAN's KHP demonstration plant was completed in 2017. To make this "bottle-to-bottle" and "clothes-to-clothes" PET chemical recycle technology useful to society, we needed to further expand the scale of our business, which required us to collaborate with partners. We are very happy to have met such encouraging partners as IFPEN and Axens, and to have been able to start this demonstration of **Rewind® PET** thanks to the responsiveness of each company."

Pierre-Franck Chevet, President of IFPEN, said "We are delighted to be working, alongside our partners and thanks to our synergies, to develop **Rewind® PET**, an innovative technology for chemical recycling PET. This successful demonstration marks the culmination of ten years of R&D efforts at IFPEN. Our commitment to this partnership reflects our drive to meet the needs of industry and society in terms of promoting circular economy and reducing plastic waste."

Jean Sentenac, CEO of Axens, explains "This semi-industrial unit illustrates the full potential of the **Rewind® PET** process for PET industrial players of the packaging and textile sectors. The Axens teams will put in all their energy and expertise to support them in their transition to a circular economy, from the project study stage right through to an optimized and profitable operation. We're proud to be involved in a project like this and to be responsible for marketing it."

About JEPLAN

JEPLAN, INC. (www.jeplan.co.jp/en/) was founded in 2007 and aims to realize a world where there is no waste and everything can be put back into circulation.

In 2017, JEPLAN initiated operations at its KHP demonstration plant (1 kTA) in Kitakyushu-city for clothes-to-clothes PET chemical recycling. In 2018, JEPLAN acquired its commercial plant (PET Refine Technology Plant, 22 kTA) in Kawasaki-city (PRT - www.prt.jp/en.html) which restarted operations in 2021 and uses chemical recycling technology to manufacture rPET resin (bottle-to-bottle). PRT has more than ten years of experience in operating this plant.

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About IFPEN

IFP Energies nouvelles (IFPEN – <https://www.ifpenergiesnouvelles.fr>) is a major research and training player in the fields of energy, transport and the environment. From research to industry, technological innovation is central to all its activities, based on three strategic priorities: sustainable mobility, new energies and responsible oil and gas. IFPEN is committed to innovation to underpin a sustainable energy mix and supports the fundamental transformation of the energy sector. IFPEN is contributing to

this transformation by developing production processes for advanced biofuels, bio-based products and plastics recycling processes. IFPEN is also working on solutions for CO2 capture and storage, ocean energies and energy storage.

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About Axens

The Axens Group (www.axens.net) offers a complete range of solutions for the conversion of oil and biomass into cleaner fuels, the production and purification of major petrochemical intermediates, the chemical recycling of plastics, natural gas treatment and conversion options, water treatment and carbon capture. Their offer includes technologies, equipment, furnaces, modular units, catalysts, adsorbents and related services. Axens is ideally positioned to cover the entire value chain, from feasibility studies to start-up and monitoring of units throughout their lifecycle. This unique position guarantees optimum performance and a reduced environmental footprint. Axens' international offering is based on highly qualified human resources, modern production facilities and an extensive global network for industrial, technical support and sales services. Axens is an IFP Group company.

Learn more on our [website](#), and follow us on [Twitter](#) and [LinkedIn](#).

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