Polyethylene Naphthalate (PEN) Market Growth Analysis - Market Size, Share, Forecast Trends and Outlook Report (2025-2034)

Market Report | 2025-08-12 | 162 pages | EMR Inc.

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Report description:

The global polyethylene naphthalate (PEN) market size reached a value of nearly USD 303.36 Million in 2024. The market is projected to grow at a CAGR of 11.20% between 2025 and 2034 and reach around USD 877.01 Million by 2034.

PEN offers oxygen permeability, improved hydrolysis resistance, high heat, temperature resistance, enhanced tensile strength and service temperature, and lower elongation and shrinkage due to its higher glass transition temperature. As a result, PEN outperforms PET in demanding electronics applications, such as electrical insulation, flexible printed circuits, and capacitors in the electronics sector.

Some of the factors driving the polyethylene naphthalate (PEN) market growth are the growing adoption of renewable energy resources and the robust growth of the food packaging sector. PEN-based back sheets for solar panels have high transparency, excellent thermal resistance, long lifetime, high chemical resistance, and good mechanical strength compared to PET. As a result, they find use in solar panel back sheets. In 2022, the global solar power generation increased by a record 270 TWh, a 26% year-on-year surge. Further, solar PV accounted for 4.5% of total global electricity generation.

Regulations for PEN Use in Food Packaging Applications in the USA

- If a manufacturer wants FDA to consider the use of recycled plastic for a food-contact application, they should provide a complete description of the recycling process and steps that are taken to ensure that the recyclable plastic is not contaminated.

- Surrogate contaminant testing is not needed to demonstrate that PCR polyethylene terephthalate (PET) or PEN produced by a tertiary recycling process is suitable for food-contact use. This is because the FDA has determined that tertiary recycling processes produce PCR-PEN or PET with suitable purity for food-contact use.

- Further, they need to provide a description of the proposed conditions of plastic use. For instance, information on the intended temperature of use, the food the plastic will come in contact with, the duration of the contract, and whether the plastic will be for repeated or single-use applications.

Key Trends and Developments

Excellent properties of PEN; the thriving electronics sector; growing demand for solar energy; and rising applications of PEN in electric vehicles are favouring the polyethylene naphthalate (PEN) market expansion

August 2021

DuPont Teijin Films announced the re-introduction of Kaladex polyethylene naphthalate (PEN) high-performance polyester films, which were originally produced at its facility in Dumfries, the United Kingdom.

June 2021

Indorama Ventures Xylenes & PTA, LLC (IVXP) added a new PNDA (Purified 2,6-Naphthalene Dicarboxylic Acid) production line, at IVXP's integrated manufacturing site in Decatur, Alabama, the United States.

The superior performance of PEN than PET

PEN films offer a higher glass transition temperature, long-term ageing performance at elevated temperatures and better dimensional stability, boosting their demand as an alternative to PET in different applications in sectors like electronics and automotive.

Downstream demand for PEN from the electronics sector

Capacitors are rising in prominence owing to the growing demand for consumer goods, such as smartphones, laptops, tablets, smart TVs, wearable technology, and IoT products, driving the market expansion.

Growing demand for PEN from the food packaging sector

PEN films are widely used for flexible food packaging as they add durability and strength to food and beverage packages.

Growing demand for solar energy

When compared to PET, PEN-based back sheets have superior mechanical strength, high chemical resistance, extended lifetime, and excellent transparency. As a result, they are used in solar panel back sheets.

Global Beverage Market Trends

Many notable consumer-packaged-goods companies such as Nestle S.A. and The Kraft Heinz Company are committed to reducing their packaging waste and increasing recyclability in packaging. This key trend favours the demand for esters such as PEN in the packaging sector due to their property of recyclability.

Furthermore, the PEN demand from the automotive sector is surging due to expanding EV demand. In 2022, the global electric car market witnessed exponential growth, with sales exceeding 10 million. In March 2023, the EU adopted new CO2 standards for cars

and vans calling for a 55% and 50% reduction in emissions of new cars and vans by 2030 as compared to 2021, and 100% for both vehicles by 2035. Such regulations are expected to favour the polyethylene naphthalate (PEN) market expansion in the coming years.

Market Segmentation

Global Polyethylene Naphthalate (PEN) Market Report and Forecast 2025-2034 offers a detailed analysis of the market based on the following segments:

Market Breakup by Type

- Film
- Fibre
- Resin

Market Breakup by Application

- Beverage Bottles
- Food Packaging
- Electronic Goods
- Rubber Tyres
- Textiles
- Others

Market Breakup by Region

- North America
- Europe
- Asia Pacific
- Rest of the World

Global Beverage Market Share

PEN film is expected to dominate the polyethylene naphthalate (PEN) share due to its increased use in isolation transformers and magnetic tapes.

PEN film offers high rigidity, dimensional stability, and electrical insulation. As a result, there is a rising demand for PEN film in various applications, including flexible printed circuits, solar and photovoltaic cells, automotive, flexible heaters, electronic components like capacitors and electrical insulation, batteries, and optical applications.

Besides, PEN fibres exhibit greater initial stiffness, making them an appealing alternative for various applications, including mooring ropes and more.

Meanwhile, PEN resins are crystallised, making it easier to shape transparent moulded products. As a result, these are widely used in bottles. They offer advantages like moisture barrier, gas barrier, heat resistance, and UV ray absorption, and are particularly suitable for components demanding transparency, heat resistance, or chemical resistance. As a result, they find applications in cosmetic packaging, tableware, medical product containers, and additives to enhance the performance of PET.

Competitive Landscape

Major players in the polyethylene naphthalate (PEN) market are increasing their collaboration, partnership, and research and development activities to gain a competitive edge

Indorama Ventures Public Company Limited

Indorama Ventures, headquartered in Thailand and founded in 1994, offers products, including PEN, NDC, PNDA, PENCo, PBN and PTN, among others.

DuPont Teijin Films Ltd. (Toyobo Co. Ltd.)

DuPont Teijin, headquartered in the United States and founded in 2000, is a global market leader in the chemical sector. The company provides PEN polyester films, including Kaladex polyester films, for electrical applications such as capacitors, wires, cables, and motors.

Kolon Plastics Inc.

Kolon Plastics Inc., headquartered in South Korea and founded in 1996, offers polyethylene naphthalate products under the brand NOPLA-PEN-PET, a transparent material commercialised as PEN-PET copolyester.

Global Polyethylene Naphthalate (PEN) Market Analysis by Region

The Asia Pacific accounts for a major market share due to government initiatives aimed at promoting the expansion of the chemical sector. Initiatives such as the 14th Five Year Plan in China for the development of the chemical fibre sector support the production and adoption of PEN. China is the largest producer and consumer of ethylene glycol, globally which is a key raw material for PEN production.

The Europe polyethylene naphthalate (PEN) market is driven by the growing need for sturdy packaging. The packaging sector accounts for about 40% of Europe's plastic production. PEN's attributes like shrinkage resistance, dimensional stability, superior barrier qualities, and heat resilience make it a favoured barrier material.

Meanwhile, North America holds a growing PEN market share, driven by the rapid growth of the food packaging sector. Due to its lightweight nature and recyclability, as well as the ability to reduce oxidation of food, PEN is witnessing a rise in popularity as a favoured material for food and beverage packaging.

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