



SynergyX

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Chemical Formula: $(C_{10}H_8O_4)_n$

Chemical Name: Polyethylene Terephthalate

Use case:

- a. What is the use of this compound?

PET is a type of plastic used a lot for packaging food and drinks, as well as in electrical stuff like smart metres and electronics. In 2022, most of the PET used (about 96%) went into packaging.

The global packaging industry is the biggest user of PET. More people, more money, and different ways of living are making this industry grow. Things like fast-moving consumer goods (FMCG), food and drinks, and medicine are all using more plastic packaging. The amount of plastic packaging made worldwide is expected to go up from 140 million tons in 2023 to about 180 million tons in 2029. This means the demand for PET is going to keep rising.

Electrical and electronics is another big area where PET is used. It's growing fast because more people are buying gadgets and electronics. By 2029, the consumer electronics market is expected to be worth around \$1,103 billion. People like electronics that are light, easy to buy online, eco-friendly, and made by big brands. This means more PET will be needed for making stuff in this industry too.

- b. Are there any alternatives to this compound? Name a few.

Polyhydroxyalkanoates (PHA), Polyethylene Furanoate are some of the alternatives for this compound. The pros we have over this compounds is PET can be recycled while these compounds cannot be recycled due to absence of their traditional usages

- c. Why is PET superior to its alternatives?

- PET plastic (Polyethylene terephthalate) is often better than other options like PHA and PEF for a few reasons:



Market Analysis Report

- Cost: PET is cheaper to make compared to others, which helps keep prices down for products made from it.
- Versatility: PET can be shaped into lots of different things, from bottles to clothes, making it useful for many purposes.
- See-through: PET is clear, so you can see what's inside containers easily. This is handy, especially for drinks.
- Recycling: PET is recycled a lot. It's turned into new things, which is good for the environment.
- Strength: PET is tough and can handle being bumped or dropped without breaking easily.
- Chemical Resistant: PET can handle different chemicals without getting damaged, which is important for packaging food and drinks safely.
- Keeps things fresh: PET keeps out moisture and air, helping food stay fresh for longer.
- Approved for safety: PET is approved by regulators for food and drink packaging, so you know it's safe to use.

d. Is this compound imported in India? What is the magnitude of imports?

- Products worth \$483,119,048 under HS Code 39076090 have been imported
- Average import price for Products under HS Code 39076090 was \$1.10.
Please use filters at the bottom of the page to view and select unit type. You may also use the analysis page to view month wise price information.
- Products under HS Code 39076090 were imported from 59 countries
- China was the largest exporter of Products under HS Code 39076090 accounting for 47.89% of the total imports of Products under HS Code 39076090
- TTTaiwan was the second largest exporter of Products under HS Code 39076090 accounting for 14.14% of the total imports of Products under HS Code 39076090
- The month of Jun 2015 accounted for highest number of import shipments.

Compound (HS code)	Exports(Apr21 -Feb 22) In \$Million	Exports(Apr22 -Feb 23) In \$Million	% Change	Guesstimate (2029)
PET(39076190	713.9	553.7	-22.4%	1000

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PET(3907699	269.7	185.7	-31.1%	600

Economic feasibility:

- What input raw materials are needed for its synthesis (same as reported in the Patent application)?

RAW MATERIALS REQUIRED:

- Pure terephthalic acid (PTA)
- Ethylene glycol (EG)
- Antimony Triacetate (Catalyst)

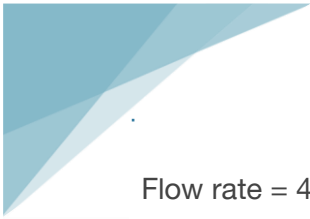
UTILITIES REQUIRED:

- Paste Tank
- Esterification Reactor (CSTR)
- Distillation Column
- Pre-Polycondensation Reactor (CSTR)
- DRR (Disc Ring Reactor)
- Scraper Condenser
- Emulsion Storage Vessel
- Coolers
- Candle Filters
- Drying Section

- Provide preliminary economic feasibility based on cost of raw materials, solvents and product selling price.

Raw Material Cost

1.PTA Cost



Flow rate = 4001 Kg/h

Flow rate = 35049 Ton/yr

Co

cost = 640 \$/ton = 0.64 \$/Kg

Total Cost = 22.431 million \$/yr

2. MEG Cost

Flow rate used = 3.07 Ton/h

Recovered = 1.4 ton/hr

Used MEG = 3.07

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1.4 = 1.6 ton/hr = 14016 ton/yr

Cost = 856 \$/ton

3.2. Antimony Triacetate(Catalyst)

Negligible Quantity Required

Added in miscellaneous arrears

Total Cost = 11.9976 million \$/yr

Operating Labour

Minimum Wage = 0.4 \$/h

Capacity = 100 ton/day

= 100,000 kg/day

Operating Labor = 50 h/day

Processing Step = 5

Operating Labor = 50 x 5 = 250 h/day

Operating Cost of Labor = 250 x 365 x 0.4



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Total production Cost

1. Variable Cost

Variable Cost = Raw Materials + Miscellaneous Materials

Variable Cost = 34.42 + 0.2 million \$/yr

Variable Cost = 34.62 million \$/yr

Expenses = 4.11 million \$/yr

Total Production Cost = Manufacturing Cost + General Expenses
= 56.988 million \$/yr

Total Selling Cost Cost

Flow Rate = 100 ton/day = 36500 ton/yr

Cost = 1700 \$ /ton (expected)

Total cost = 62.05 Million \$/yr

Gross Income = Total Income – Total Production Cost

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Depreciation

= 62.05 – 56.988

= 0.19 million \$/yr

Gross Income = 4.87 million \$/yr

Taxes = 40% of Gross Income

Taxes = 2.1 million \$/yr

Net Income = Gross Income

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Taxes

= 4.87

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2.1 million \$/yr

Net Income = 2.71 million \$/yr

Rate of Return

83%

References:

<https://www.mordorintelligence.com/industry-reports/polyethylene-terephthalate-market>

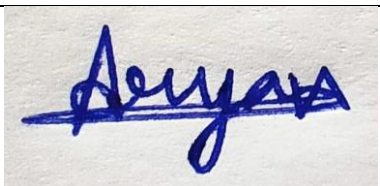
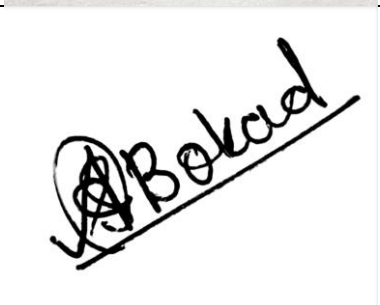
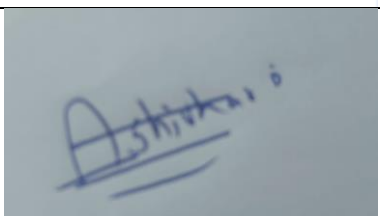
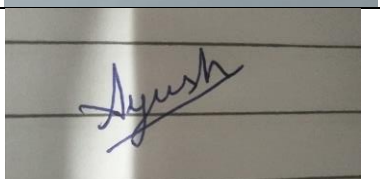
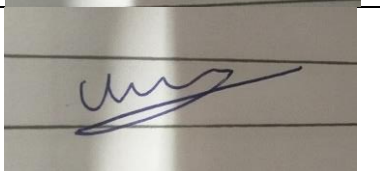
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<https://www.volza.com/p/polyethylene-terephthalate/export/export-from-india/>

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[India Polyethylene Terephthalate Market Size, Share & Growth \(chemanalyst.com\)](#)

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