





PET Bottles **– *The Truth***

- 
- **Why packaging ?**
 - **Why is PET the 'Preferred & Safe' packaging material ?**
 - **Myths on PET.....the facts !!!**
 - **Toxicological Status of PET**
 - **Water in PET bottle**
 - **PET packaging application**
 - **Does PET use up scarce oil resources?**
 - **PET as Eco Friendly & Recyclable**
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Why Packaging ?

➤ Earlier View

- To hold the material.



➤ Modern View

- Brand creation.
- Protect material.
- Ease in transportation/ handling.
- Attract Customers.



Why PET ?

- **Transparent**
- **Unbreakable**
- **Light Weight**
- **Inert, Pure and food contact approved**
- **Safety: Pilfer- proof, user friendly**
- **Eco-friendly - recycled to Fiber/Resin**

- when burnt generates only heat, CO₂ and water.



PET is Leaner, Cleaner & Greener

PET Bottles are safe ??

100% Yes

➤ General toxicity and genotoxicity of PET : NO THREAT

- PET - chemically inert
- PET- biologically inert if ingested
- PET - not hazardous if inhaled
- PET - dermatically safe

➤ FDA Approval



- With respect to Safety and Health of consumers, **PET complies with 21CFR 177.1630 of the US Food and Drug Administration FDA**

PET is “100% Safe” & FDA approved

Others Approvals

- Apart from FDA compliance, PET also meets statutory regulations of various Governments too



**European Union
Directive 2002/72/EC**



**Bureau of Indian Standard
IS:12252-1987**

Universally Approved

Myths on PET.....the facts

➤ Do PET bottles contain Bis Phenol-A?

BPA is **not at all** used in PET's manufacture. Factual errors or confusing statements occasionally appear, which are totally wrong.

➤ Some plastics often contain plasticisers and stabilizers that can transfer to foods; does PET contain any similar additives?

PET used for food applications is in a very pure form, free from any plasticizers such as Diethylhydroxyl amine (DEHA) or any added stabilizers/additives, which can migrate into or affect the packaged foodstuff.

➤ Can PET release other harmful chemicals to foodstuffs?

No harmful chemical has been detected in any measurable amounts from PET under any condition of use.

Nontoxic and pose no threats to human health

Migration Standard of PET Components

European Union food contact materials and articles legislation Directive 82/711/EEC prescribes following SML for the monomers commonly used in making PET -

Monomer	SML (Specific migration limit)
Terephthalic acid (PTA)	7.5mg/kg
Dimethyl terephthalate (DMT)	No SML
Isophthalic acid (IPA)	5mg/mL
Ethylene glycol (EG)	30mg/kg
Diethylene glycol (DEG)	30mg/Kg

Migration Results are well below these standards

What happens to the catalysts used in manufacture of PET, are they hazardous?

- **NO.** Antimony based catalyst used in PET manufacture are present at very low levels, typically less than 300 ppm, and is locked within the polymer matrix.
 - Repeated extraction tests with food simulants show that the **amount of extractables is well below any FDA/EC legal limits.**
 - Moreover, the **extractables are neither toxic nor hazardous.**
- The guidelines recommended for Antimony levels in drinking water by different agencies are as follows -
 - a) World Health Organisation (WHO) : 20 micro grams/liter
 - b) Environmental Protection Agency, US : 6 micro grams/liter
 - c) Health Canada and the Ontario Ministry of Environment : 6 micro grams/liter
 - d) German Federal Ministry of Environment : 5 micro grams/liter
 - e) Japan : 15 micro grams/liter

Migration study show only trace levels of antimony (less than 0.005 micro grams/ltr)

Toxicological Status Of PET

- **No evidence of toxicity** has been detected in feeding studies using animals.
- **Negative results from Ames tests** and studies into unscheduled DNA synthesis indicate that **PET is not genotoxic**.
- Study at Goethe University Frankfurt on mineral water samples from plastic bottles have shown an hormone like oestrogenic activity in 12 out of 20 mineral waters.
 - However when evaluating the study, German BfR concluded that the results do not permit any conclusions about the origin of substances with hormone-like activity from PET bottles.
- BfR believes that the results of the study **do not lead to any need for consumers to stop consuming mineral water from PET bottles** or switch to mineral water in glass bottles.

PET is



and pose no threats to human health

Why we need Bottled Water in PET?

- PET is clean and lightweight.
- A PET bottle doesn't break or shatter like glass bottle and safe to use.
- Because of Lightness, compact and easy in transportation, PET bottles are largely used for rescue works when disasters strike
- There are also many occasions when tap water becomes polluted or is not available and water companies have emergency bottled water stocks to take account of this.



Is it safe to leave a PET bottle in the car?

Yes. The idea that PET bottles "leach" chemicals when heated in the car is not based on any science, and is unsubstantiated by any credible evidence.



With respect to leaving bottled water in a hot car, FDA has stated:

“The levels of migration expected, including during periods of exposure to elevated temperatures in storage and transport (such as might be experienced in a closed vehicle in the sun) have, been determined by the agency to be **well within the margin of safety**. Therefore, the agency **does not consider this situation to be a safety concern.**”

Water in PET bottle in your car is safe to use

Food Packaging Applications of PET



Beverages, soft drinks, fruit juices, and mineral waters.

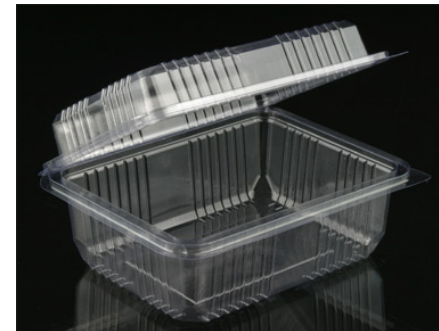
Especially suitable for carbonated drinks, cooking & salad oils, sauces & dressings.



PET bottles and jars are manufactured by the process of *injection stretch blow moulding*, a process developed specifically to maximize the beneficial properties of PET

Food Packaging Applications of PET

PET Product	Applications
Wide mouth jars	Jams, preserves, fruits & nuts, confectionery and dried food
Thermoformed Trays	Bakery items like pastry & cakes, cut salads & fruits
PET products with added oxygen barrier	Beer, processed meats, 'Bag in Box' wines, condiments coffee, syrups



Non Food Packaging Applications of PET

PET Product	Applications
Straps	As a replacement for steel straps for various industrial applications to avoid human injury & ease in operation
Liquid Soap	PVC has been replaced by PET rectangular shape bottles
Engine Oil	New initiative to replace the traditionally HDPE bottles

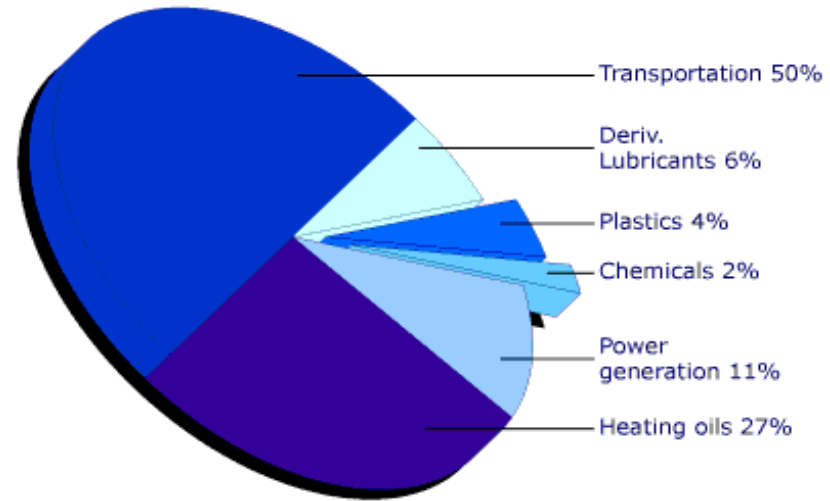


Does PET use up scarce oil resources?

➤ **No**, as most [88%] of the oil extracted from the earth is used as –

- fuel for transport systems,
- heating appliances or
- for generation of electricity.

➤ The amount used for chemicals and plastics is small in comparison (< 6%).



➤ **PET uses less than 0.15%** of the worlds oil resources.



Eco Friendly

- PET Bottles / Jars / Trays are **100% recyclable**.
- PET when burnt generates only heat, CO₂ and water.
- The recycling code for PET is 1. **This symbol is nothing to do with the single use or repeated use of PET bottle**
- Being extremely light, PET bottles help to **reduce the emission** of contaminants during their transport
- Since they require less fuel during transport, they also **help saving energy**.

To learn more about PET recycling, watch the “PET Lifecycle” video – Click on the link <http://www.petcore.org/Content/Default.asp?PageID=28>



Clean Environment

Eco Friendly

- Does the use of PET packaging help reduce energy use Vs more traditional packaging?
 - Report by GUA (Gesellschaft für umfassende Analysen GmbH) showed that:
 - packaging beverages in PET vs glass/metal **reduces energy consumption by 52%**.
 - **Greenhouse gas emissions were reduced 55%** on the same basis
 - **PET cuts the transportation energy by half** used in the global food supply chain -
 - The transportation energy in PET beverage packaging is 13.7 MJ diesel/kg vs 25.4 diesel MJ /kg for the average glass beverage packaging

Use PET to conserve energy

Eco Friendly **Benefits of Recycling of PET Bottles**

➤ Oil Conservation

Recycling one ton of PET bottles saves approximately 3.8 barrels of oil.

➤ Energy Conservation

Producing Polyester Fibre products from the recycled PET uses 2/3rd less energy than from virgin raw materials.

➤ Reduced Greenhouse Gas Emissions

When recycled PET is substituted for virgin material, greenhouse gas emissions are reduced versus alternative materials like glass and metals

➤ Beneficial Reuse

These are used back to make fibres/bottles/straps which in turn are used for making clothes, carpets, road construction, building & other industrial application besides for food grade bottles also.

Recycling... Good for Environment

Eco Friendly

➤ The earth's materials are a *closed system*, not an infinite reservoir

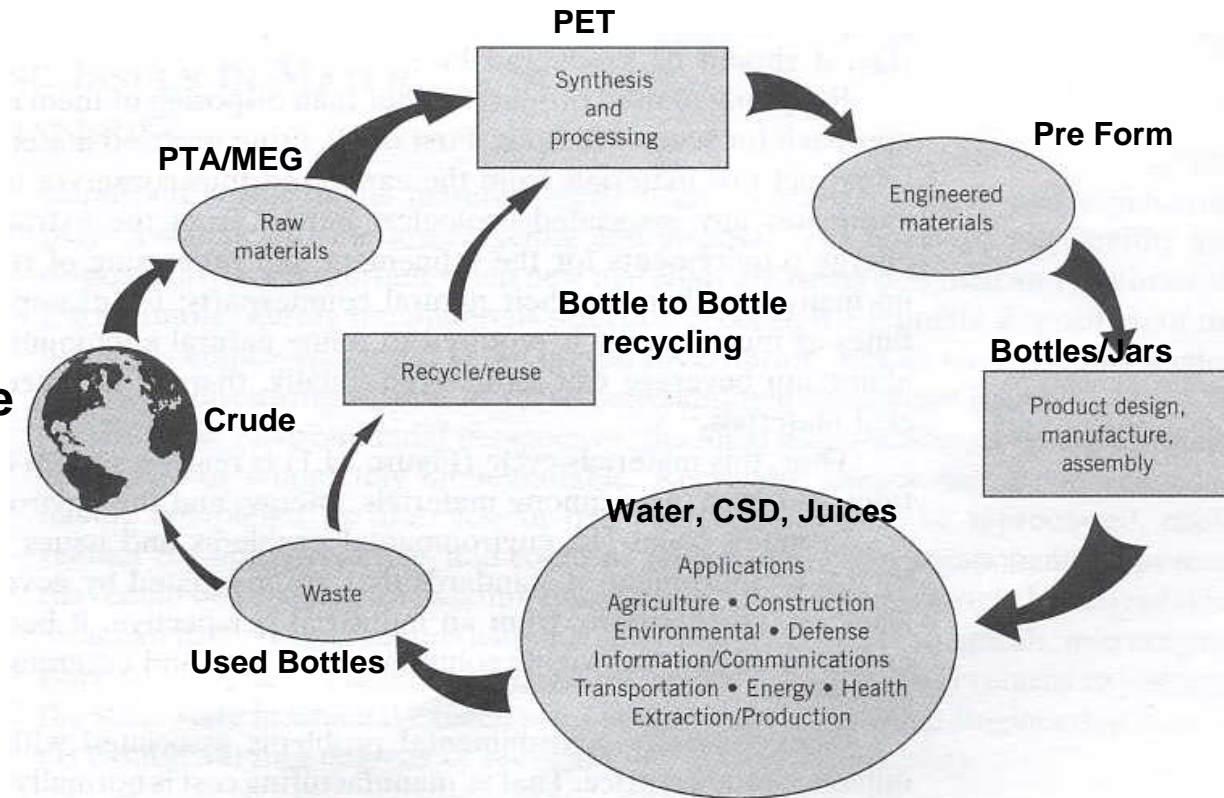


FIGURE 24.1 Schematic representation of the total materials cycle. (Adapted from M. Cohen, *Advanced Materials & Processes*, Vol. 147, No. 3, p. 70, 1995. Copyright © 1995 by ASM International. Reprinted by permission of ASM International, Materials Park, OH.)

PET recycling conserves resources

PET Recycling “the new theme in sustainable development”

➤ Beverage & FMCG MNCs riding high on green movement -

- **Coca-Cola Inc invested US\$60m in PET recycling plant**

- Built world's largest B2B recycling plant – 45kTA

- Recycled content in bottles to increase from 10% to 15% by 2015

- **Coke bottler CCE (Great Britain, France & Benelux) sets target of 25% RPET by 2010**

- **Nestle announced use of 25% RPET by 2013**

- **Supermarket chain Tesco, UK is using 100% RPET bottles in own brands**



➤ Save Landfill Space

- **Recycling one ton of plastic saves 7.4 cubic yards of landfill space**

Go Green.....New Corporate Initiative

In summary

- PET is 100% recyclable
 - PET is Non Toxic
 - PET bottles have statutory FDA approval
 - PET bottles are 100% safe and pose NO threat to either human beings or environment
 - In comparison to glass or metal, use of PET helps in Energy Conservation & reduction in Greenhouse Gas Emission
- **Will you still prefer Glass/Metal over PET ???**

**Use PET- it's safe, recycle it and contribute
in conserving resources**



References:-

1. Report on “Polyethylene Terephthalate (PET) For Food Packaging Applications” by International Life sciences Institute(ILSI),Europe
2. www.plasticseurope.org
3. <http://www.accessdata.fda.gov>
4. www.petcore.org.
5. www.earth911.org
6. www.napcore.com
7. http://www.bfr.bund.de/cd/template/index_en



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