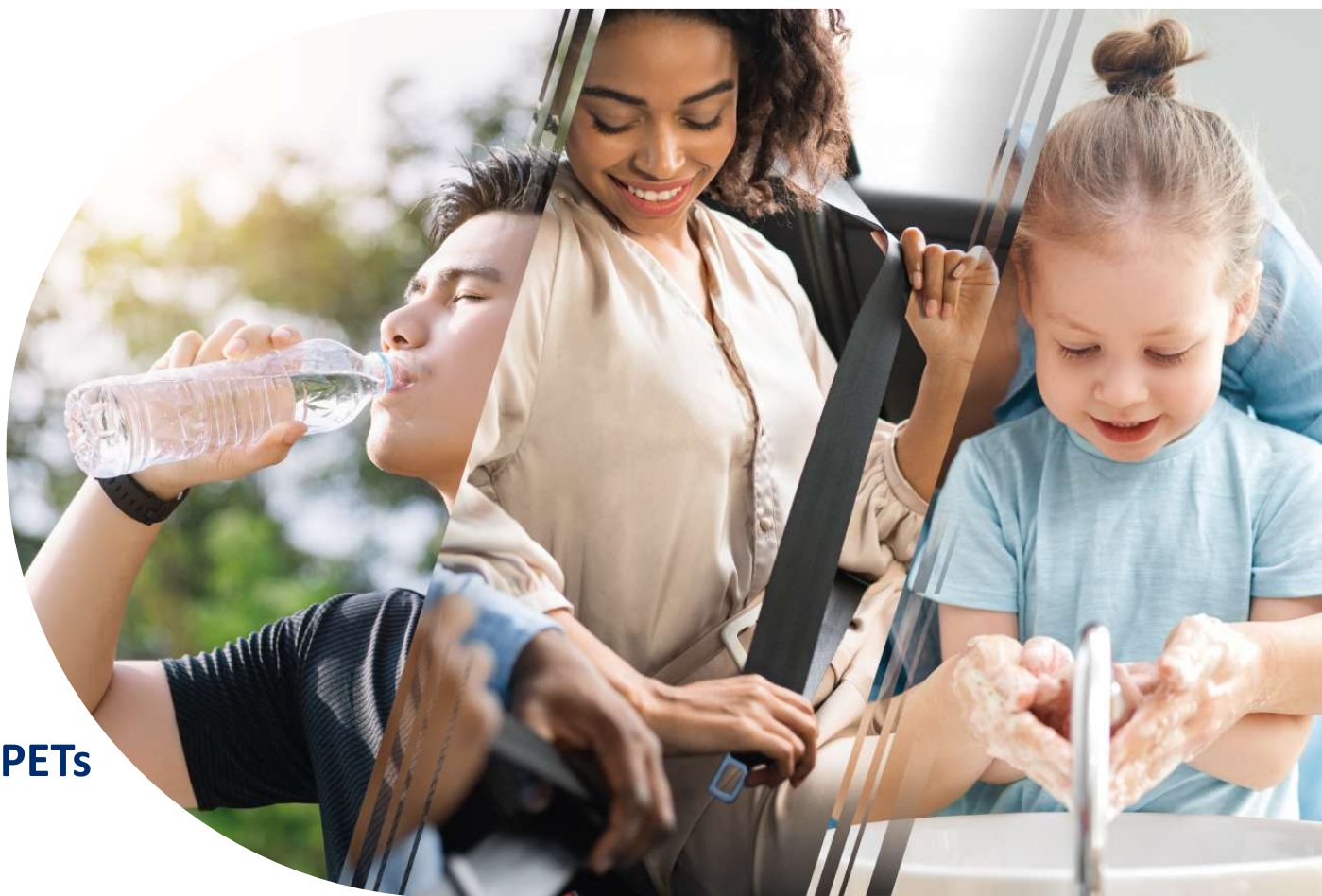




Indorama Ventures Specialty Chemicals Naphthalates and O₂ Barrier PETs

August 25



Indorama Ventures Company snapshot



Presence in
31
countries



Consolidated revenues of
\$15.6B
(FY2023)



117
manufacturing
locations



about
26,000
employees

~19

MILLION TONS
Capacity*

~\$1.3

BILLION
EBITDA*

~\$12

BILLION
Capital
Employed*

Business segments



**Combined PET
(CPET) & Packaging**



Indovinya



Fibers

Indorama Ventures is a global chemical company based in Thailand. Founded by Group CEO Alope Lohia over 30 years ago, Indorama Ventures expanded quickly as a family-owned business to become a leading global PET manufacturer. In 2010, Indorama Ventures listed on the Thailand Stock Exchange and reset its vision to become a global chemical company by building a global portfolio of integrated assets across its chosen petrochemical value chain. Today, it has three business segments, Combined PET (CPET) & Packaging, Fibers, and Indovinya.

**Data as of financial year 2023*

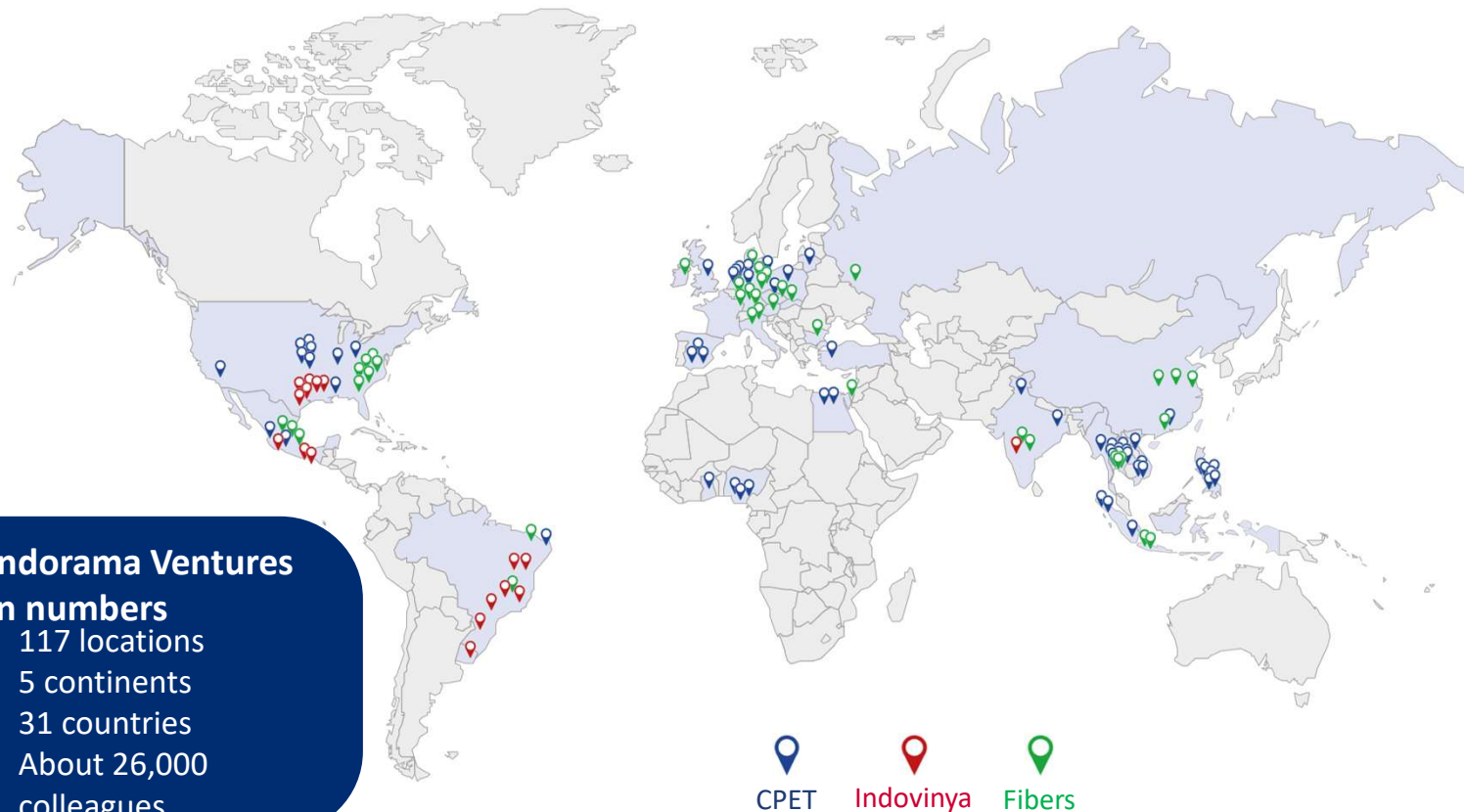
Indispensable Chemistry



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2

Our global manufacturing footprint



Indorama Ventures in numbers

- 117 locations
- 5 continents
- 31 countries
- About 26,000 colleagues

Americas

Brazil	Uruguay
Mexico	USA

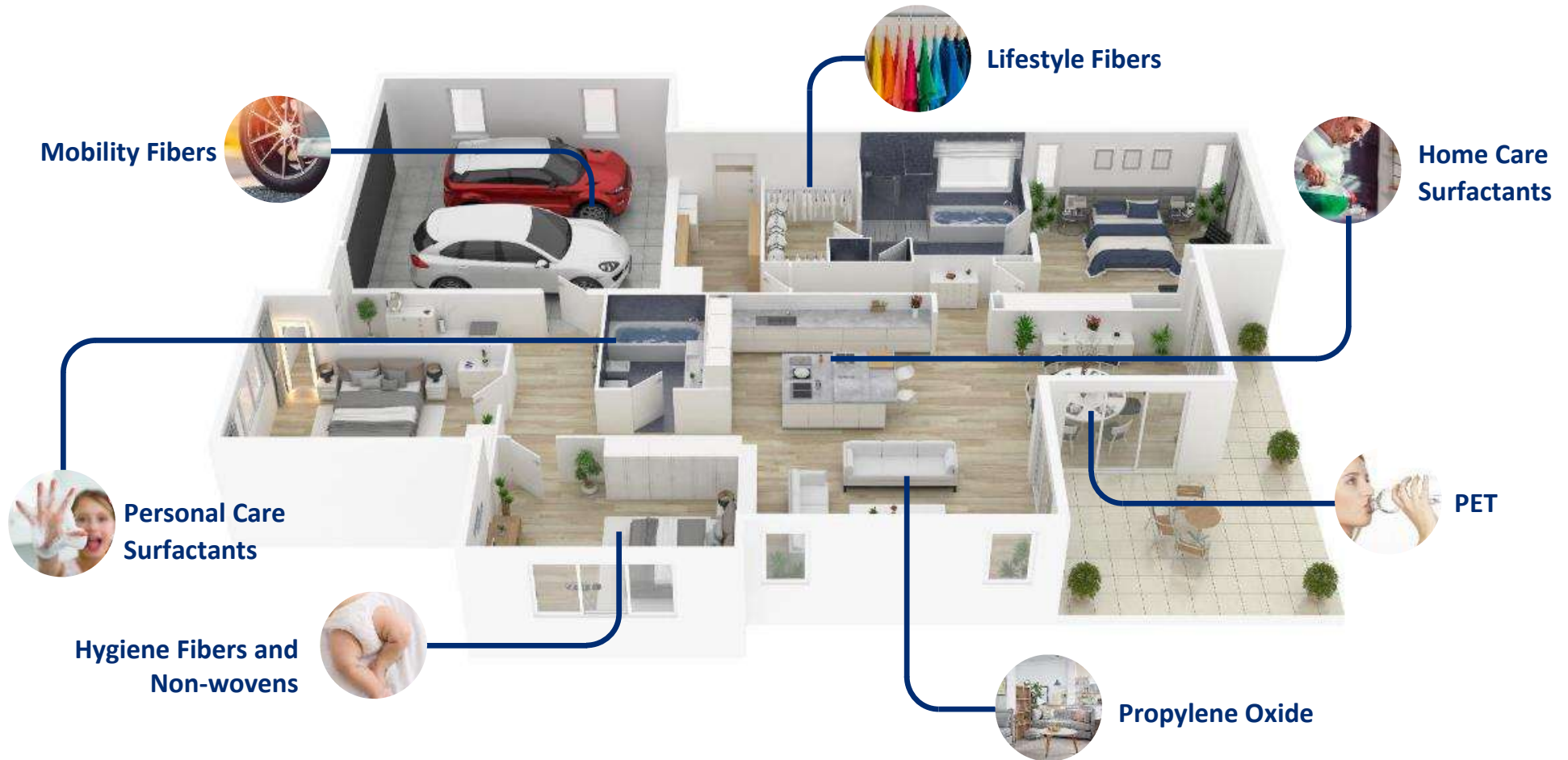
EMEA

Bulgaria	Luxembourg
Czech Republic	Netherlands
Denmark	Nigeria
Egypt	Poland
France	Russia
Germany	Slovakia
Ghana	Spain
Ireland	Turkey
Italy	UK
Lithuania	

APAC

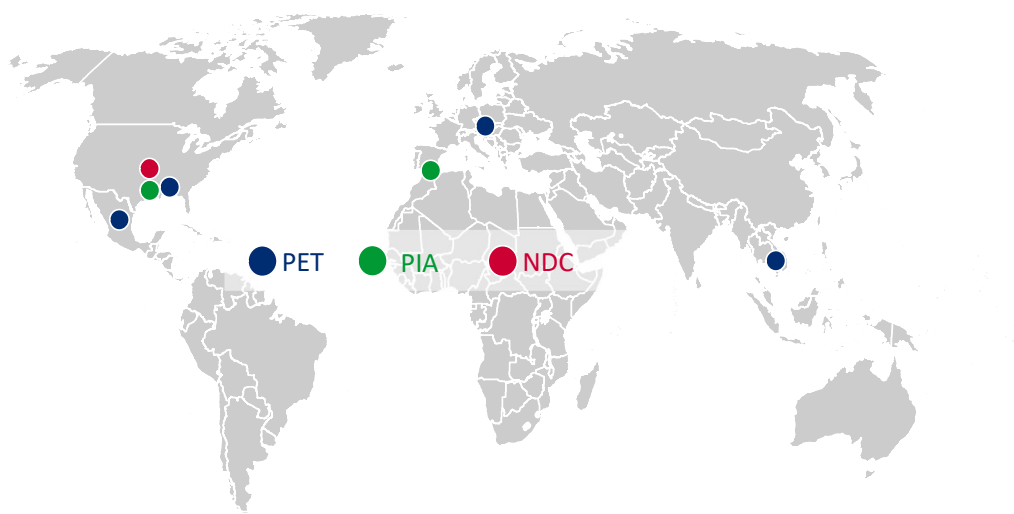
China	Myanmar
India	Philippines
Indonesia	Thailand
Israel	Vietnam

Indispensable chemistry in everyday life



Indorama Ventures has established a new Specialty Chemicals Business within the Combined PET Segment

Our Global Footprint



~600
EMPLOYEES

5
PRODUCTION
SITES

4
COMMERCIAL
OFFICES

Indispensable Chemistry



OBJECTIVES OF OUR SPECIALTY CHEMICALS BUSINESS

Synergizing strengths of the Specialty PET, PIA and NDC segment

Generate substantial growth across Indorama Ventures market presence

Become leader in environmental stewardship, social responsibility, and economic viability within the global chemical industry

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5

Indorama Ventures Specialties Capabilities



Indorama Auriga Polymers Plant

Capabilities:

- Batch Polymerization Lines
- Continuous Polymerization Lines
- Specialty Fibers Production
- Located in Spartanburg, SC

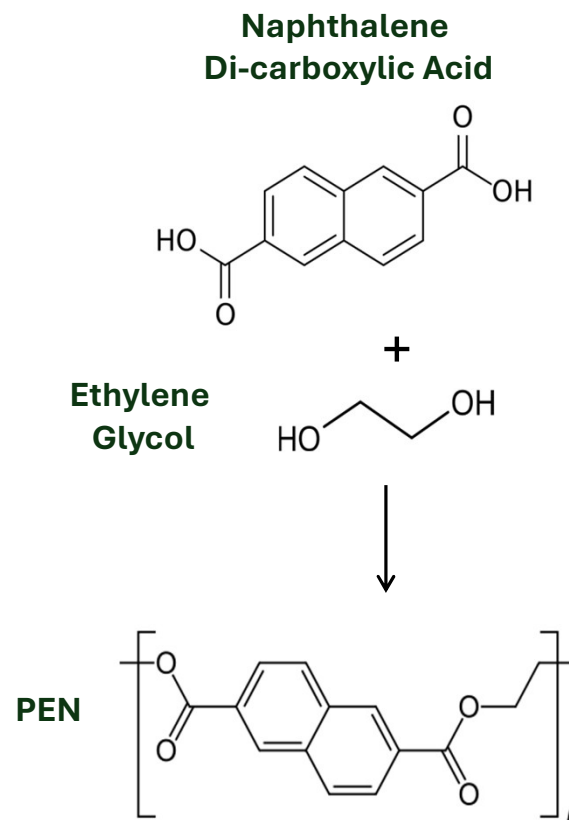
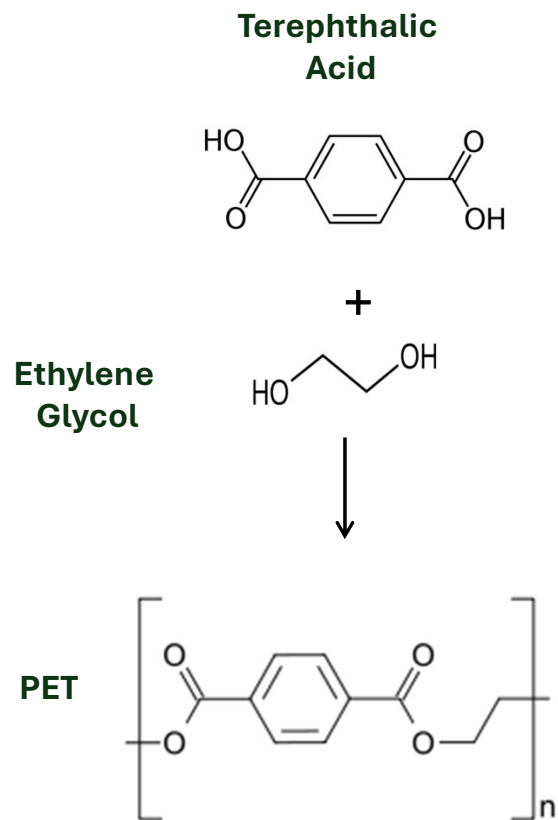


Indorama Xylenes/Terephthalates Plant

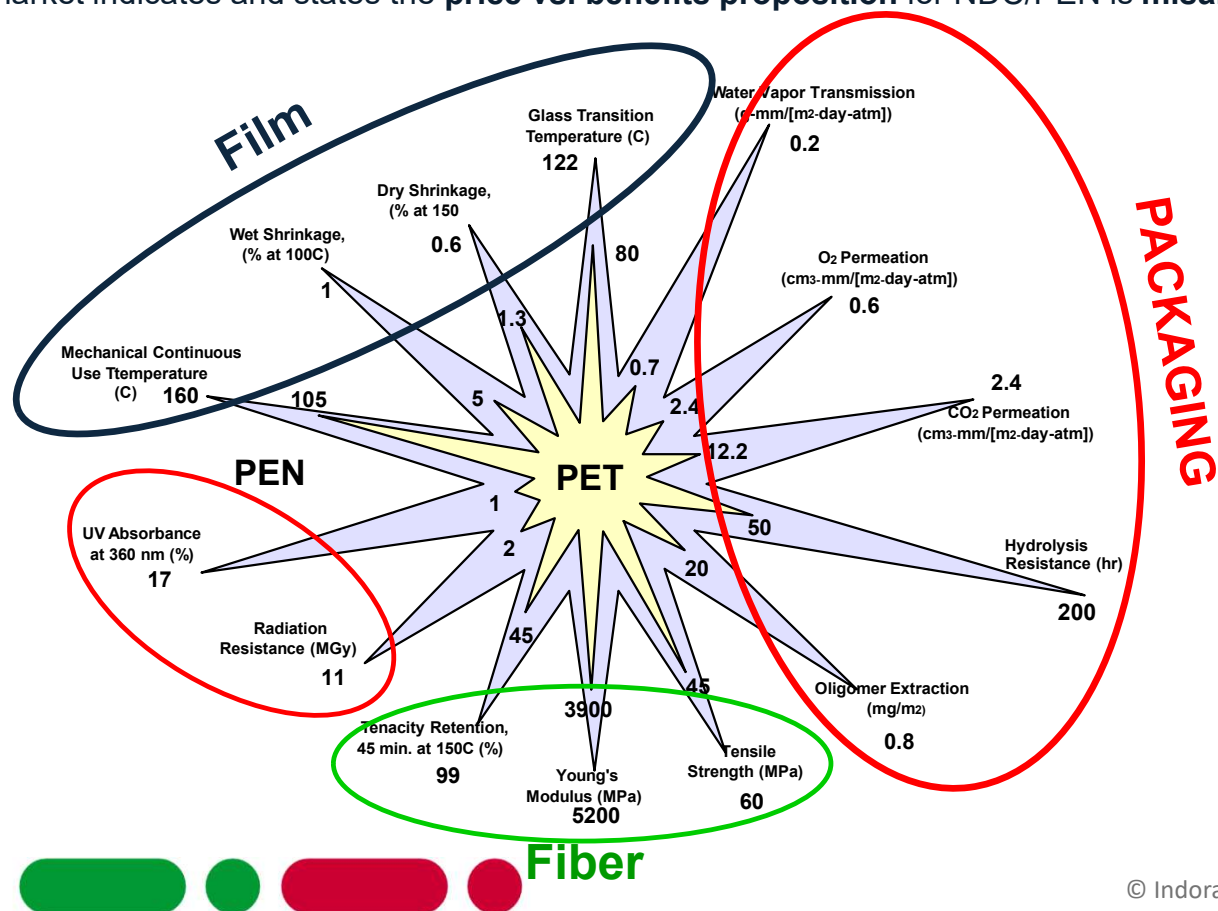
Capabilities:

- NDC Production Plant
- Terephthalic Acid Production Plant
- Plant acquisition in mid 2016
- Located in Decatur, AL

Basic Chemistry - PET vs. PEN Polymers

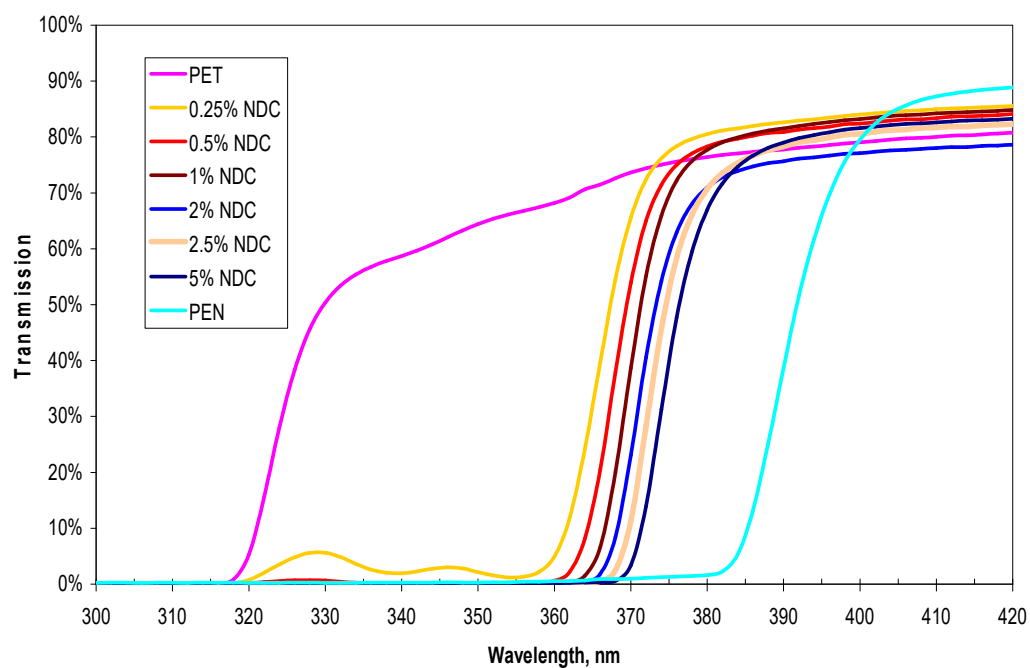


The market indicates and states the **price vs. benefits proposition** for NDC/PEN is **misaligned**.



PEN and PETN – UV Blocking

UV Light Transmission on 300 micron Film

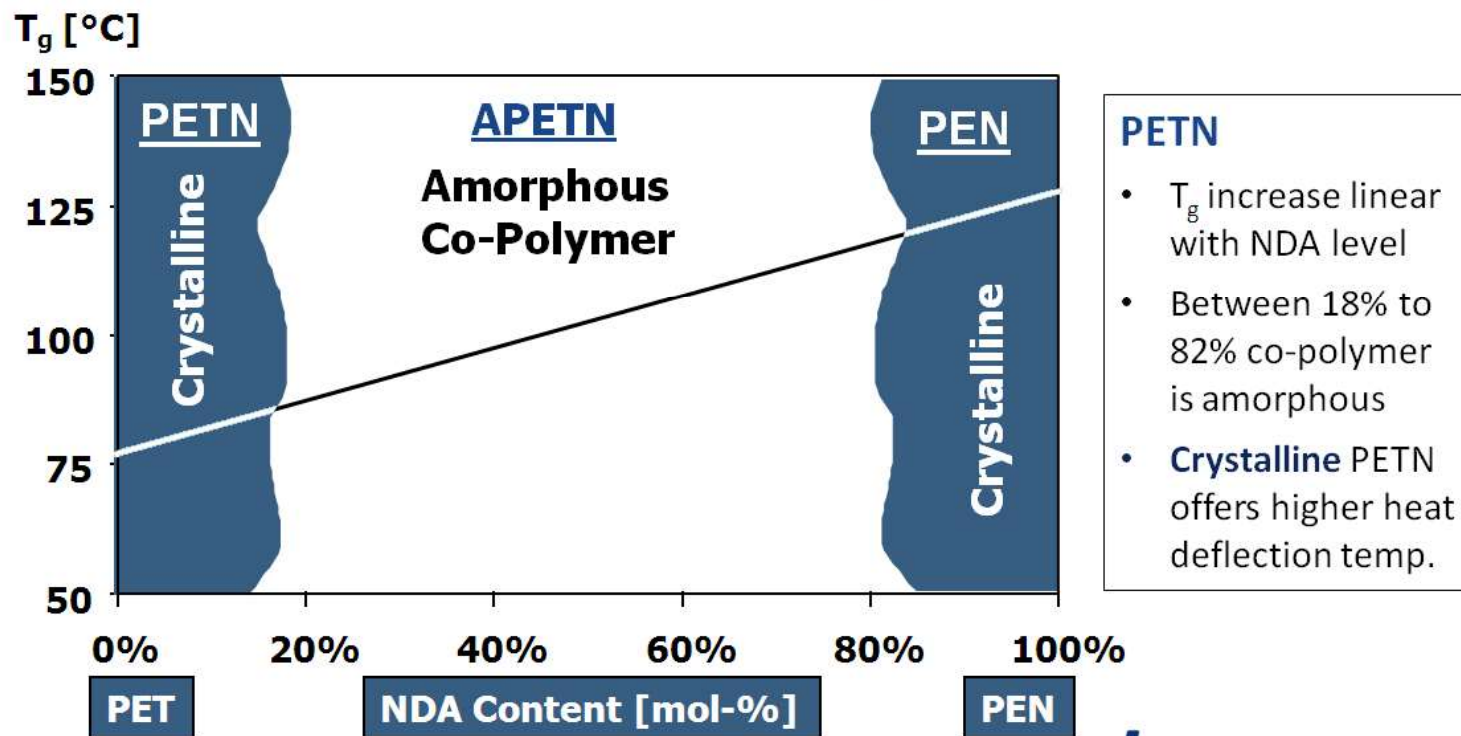


0 0.25 0.5 1.0%
Testing with FD&C Red No.
40

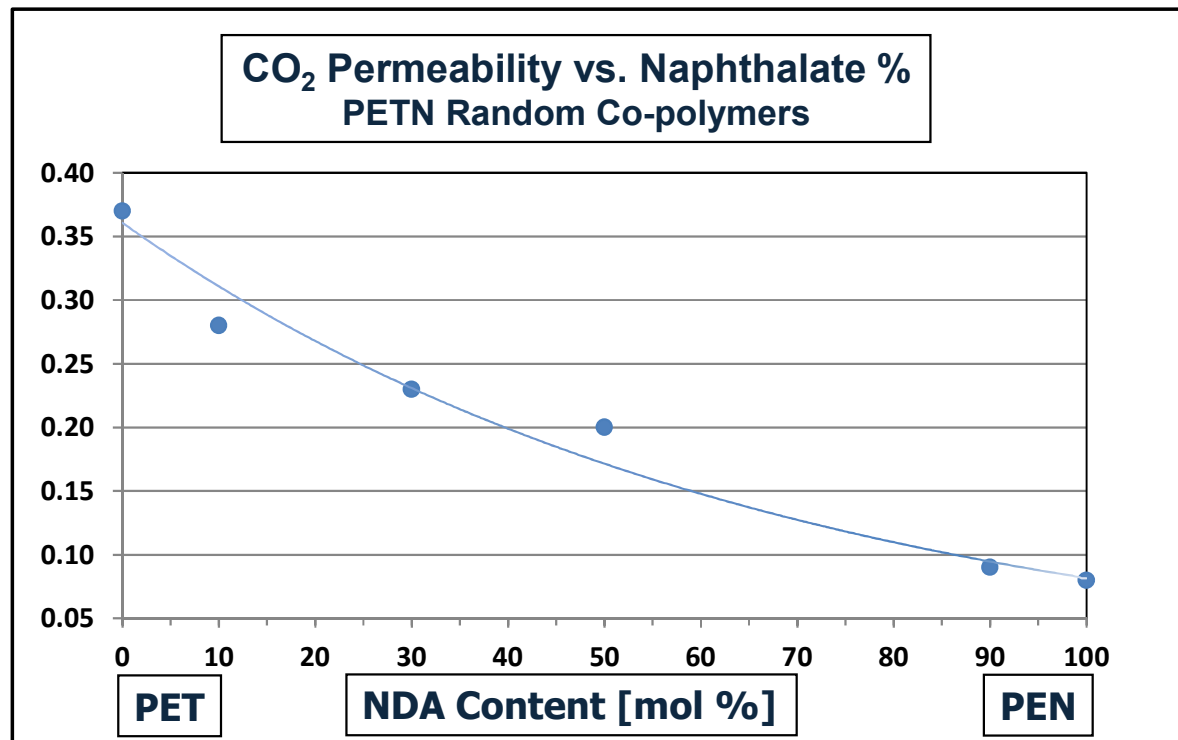
**Small % NDC
modifications provide
excellent UV protection to
PET containers.**

PEN and PETN Co-Polyesters

Glass Transition Temperature (T_g) versus NDA Content



PEN and PETN Co-Polyesters



Reference: Polymer Eng. and Science, 2009, pp. 1635 – 1641. O₂ and CO₂ Transport through High Barrier Polyester Blends, M.A Hernandez Rivera et al.



PEN with Good Barrier Properties



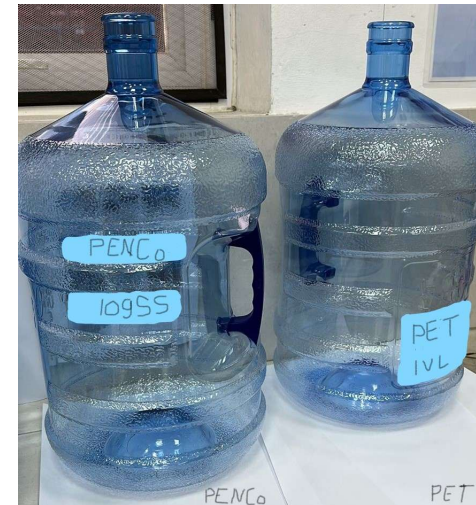
PEN 0 0.25 0.5 1.0 Mole %

Small % NDC modifications provide excellent UV protection to PET containers.



PEN provides Strong Chemical Resistance and Lower Extractables

PENCo provides Barrier



PENCo Takes the Heat



Oxygen Ingress Barrier for PET Containers

oxyclear[®]
BARRIER PET



1. Exceptional Oxygen Barrier

- High capacity barrier providing excellent oxygen ingress barrier
- Shelf life greater than 12 months, depending on wall thickness
- Protects oxygen sensitive products, such as juice, wine, ketchup, etc.

2. Excellent Clarity and Appearance

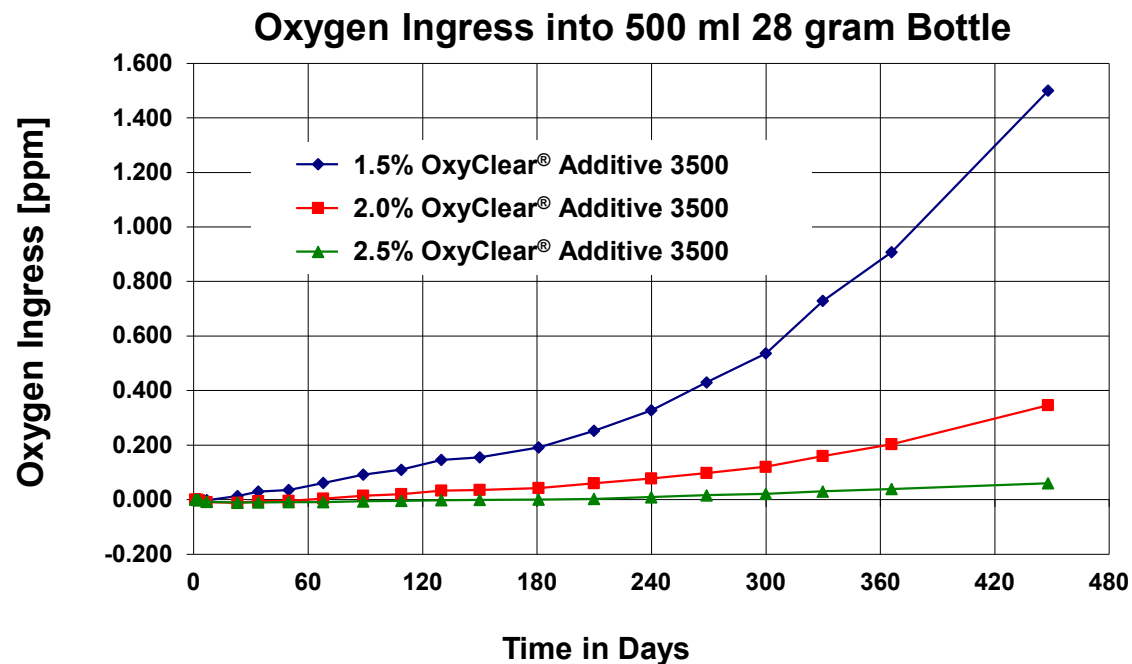
- Offers glass-clear, attractive and effective barrier packaging
- No additional haze over standard PET in colorless containers

3. Can be recycled with PET stream

- Polyester-based oxygen barrier
- Nylon-free and nitrogen-free
- Can be recycled with PET with limited yellowing



Exceptional Oxygen Barrier



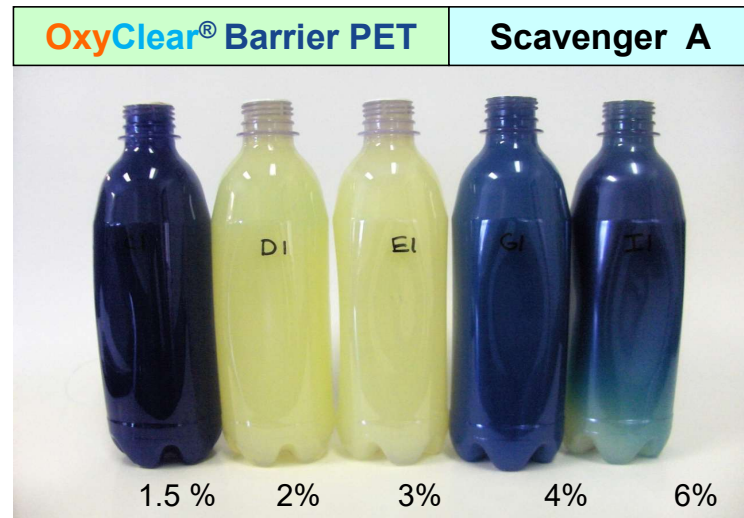
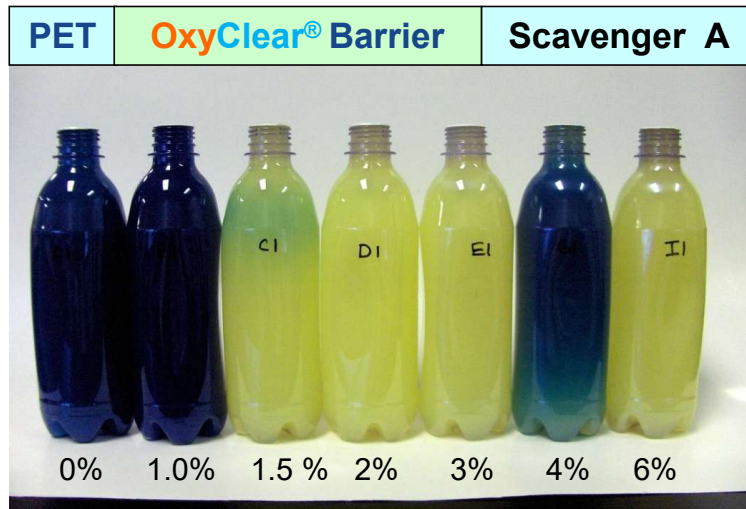
- 1.5 % **OxyClear® barrier resin** shows less than 1 ppm ingress over 1 year
 - 2.0 % **OxyClear® barrier resin** shows < 0.2 ppm in 1 year and < 0.5 in 1.5 years
- 28 gram 500 ml straight wall bottle with 10 mil or 250 micron average wall thickness

Oxygen Ingress after 3 and 6 Month



Guelph Food Technology

- Oxygen ingress Detection
- Bottles filled with indicator gel
- Oxygen turns the indicator blue
- Oxygen ingress can be located
- Oxygen ingress can be quantified



OxyClear® Barrier PET provides long Shelf Life

- Oxygen Ingress Barrier for long Shelf life
- **2% and 3% OxyClear® Additive** do not show any oxygen ingress in **6 months**

Delivering the Taste Promise



- **Excellent preservation of wine over entire shelf life**
 - ✓ Preserves fresh and pure taste over entire shelf life of at least 48 month
 - ✓ Maintains the sulfide levels over shelf life similar to glass bottle
- **Offers attractive packaging and sustainability**
 - ✓ Provides for attractive packaging in bottles with excellent clarity
 - ✓ Bottles allow for flexible designs and packaging differentiation
 - ✓ Bottles with **OxyClear® barrier resin** can be recycled with PET
- **Reduced handling, logistic and transportation cost**
 - Reduced loss due to breakage versus glass
 - Less container weight allows reduced shipping cost
 - Less warehouse space for empty bottles



Thermoformed Packaging



Effective Oxygen Barrier in attractive and clear PET trays

- ✓ Protects oxygen sensitive foods such as cheese, meat and RTD meals
- ✓ Provides required shelf life in attractive packaging with excellent clarity
- ✓ Containers can be recycled in the standard PET stream



Highly efficient barrier alternative to PP/ EVOH

- ✓ Levels as low as 1.5 % **OxyClear® barrier resin** have been shown to be effective
- ✓ Works in chilled and up to hot fill temperatures and conditions
- Oxygen barrier study and computer modeling under way to optimize required **OxyClear® resin** levels at given layer thickness and shelf life requirements

Specialty Polymers' customer-centric innovation & support



WORLD-CLASS R&D and TECHSERVICE

- Our R&D Team revels in the opportunity to create innovations that make customers more successful.
- Our R&D scientists and engineers work alongside clients around the globe to make custom products for companies and their needs.
- Our Technical Service Team can help clients to conduct trials with our products and evaluate their ability to meet special or routine requirements.



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Copolyesters and Engineering Polymers



Product offering

PENstar

Value Proposition

- Improved heat and dimensional stability with PEN Film
- Increased light output and contrast in Film for LCD screen
- Good chemical resistance from PEN
- Easier Processing (Extrusion, Stretching on film and fiber application)
- Weather resistance
- UV blocking and gas barrier properties in Packaging

Applications

- Packaging
- Film application
- Fibers

Technical Platform

- Biaxially Oriented Film
- Thermoforming
- Composites

Commercial applications

- Returnable bottles & kegs
- Pressure bottles
- Film for displays & electronics

Copolyesters and Engineering Polymers

PEN Resin

PENSTAR N1AA

- Strong heat resistance
- Inherent screening of non-visible UV radiation below 380 nm
- Excellent moisture and oxygen barrier properties
- High dimensional stability
- Superior strength and stiffness
- Low oligomer extraction
- Anti-hydrolysis



PENCo Resin

PENSTAR N9S6

- Exceptional chemical & heat resistance
- FDA food-contact approved
- Sterilizable using steam, gamma, & EtO
- USP <87> compliance



Copolyester resin

PENSTAR 2389

- High heat copolyester
- High clarity sheet
- Chemical resistance



THANK YOU!

