Environmental Friendly Gravure Ink

Image to Print, 30th Nov 2011

Jakarta, Indonesia

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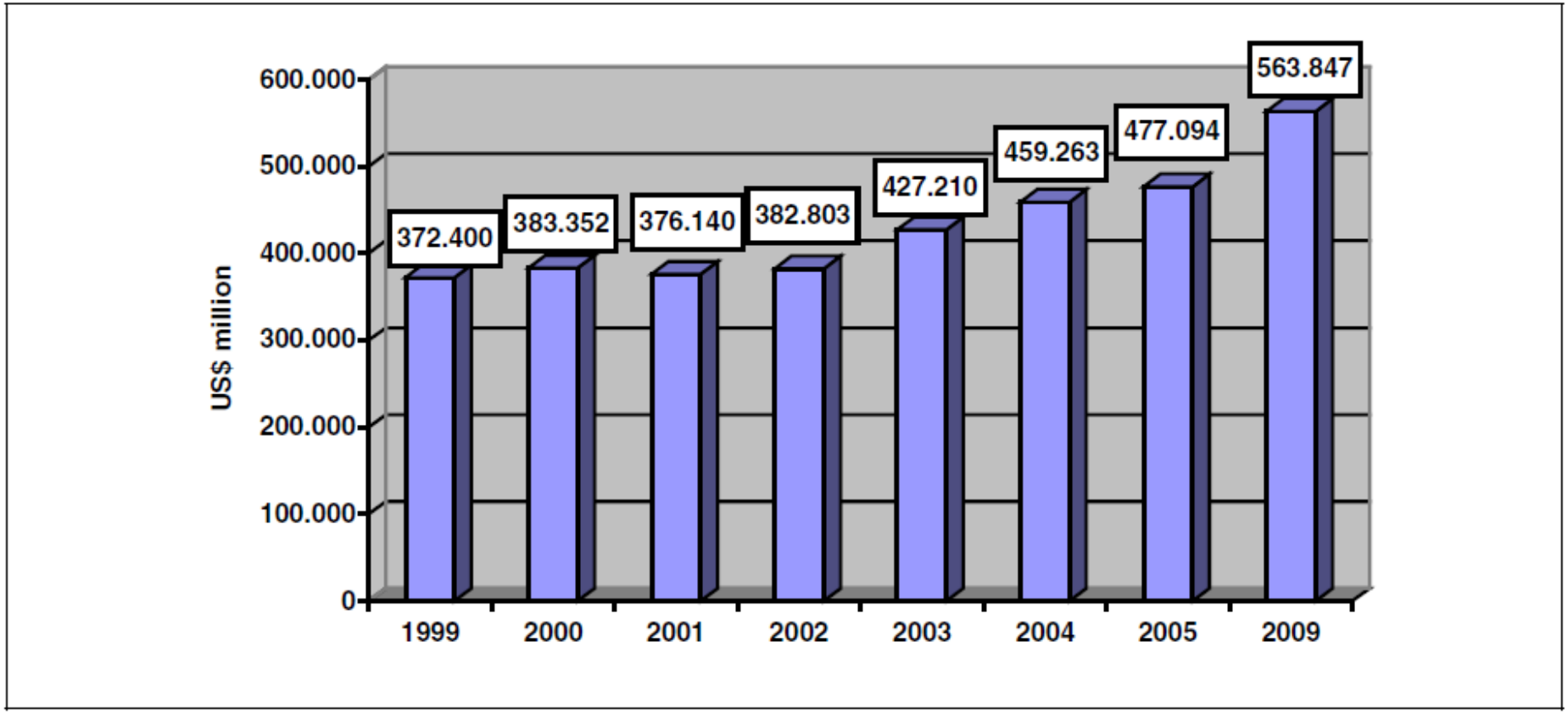
DIC Corporation

Global packaging Market

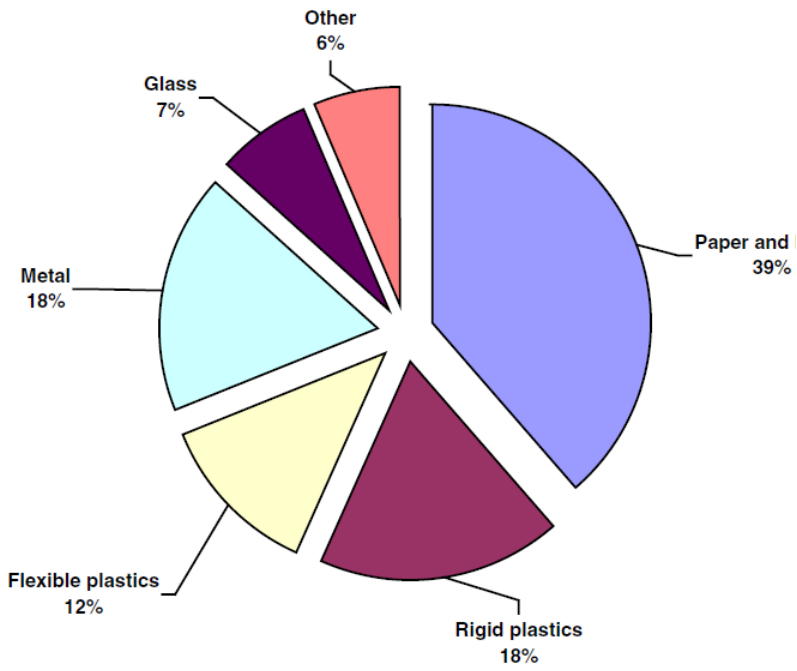


Note: constant 2004 prices from 2005 onwards

Source: Pira International Ltd

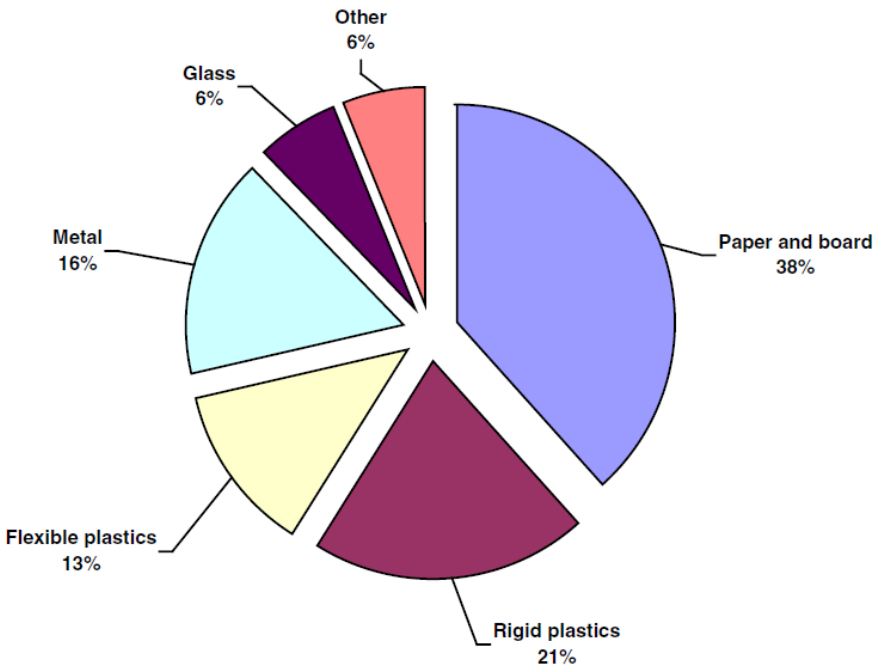
Flexible in Packaging Market

Y 2003



International Ltd

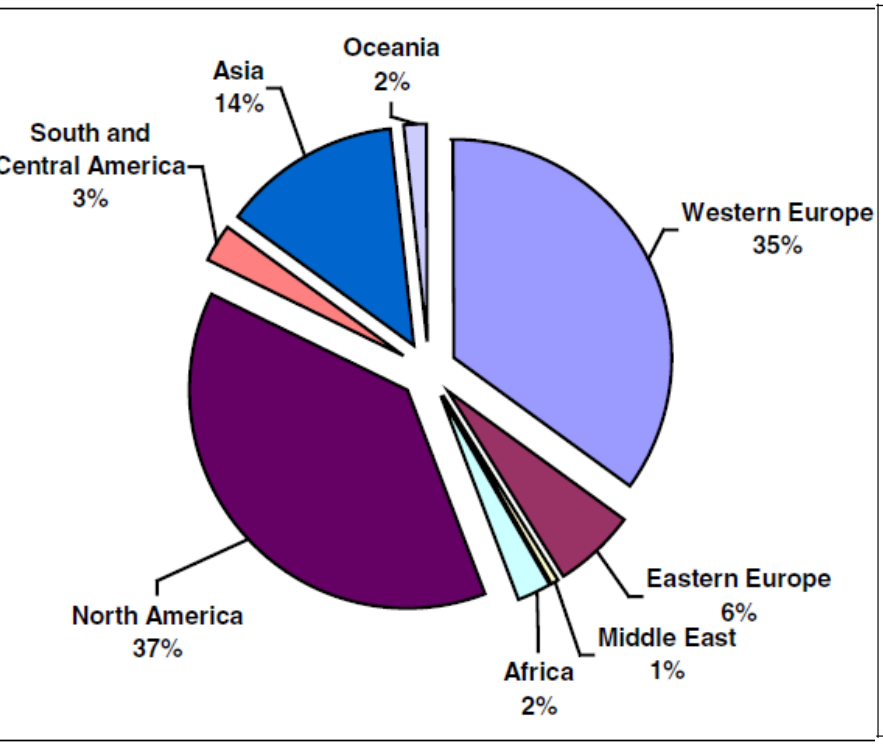
Y 2009



Source: Pira International Ltd

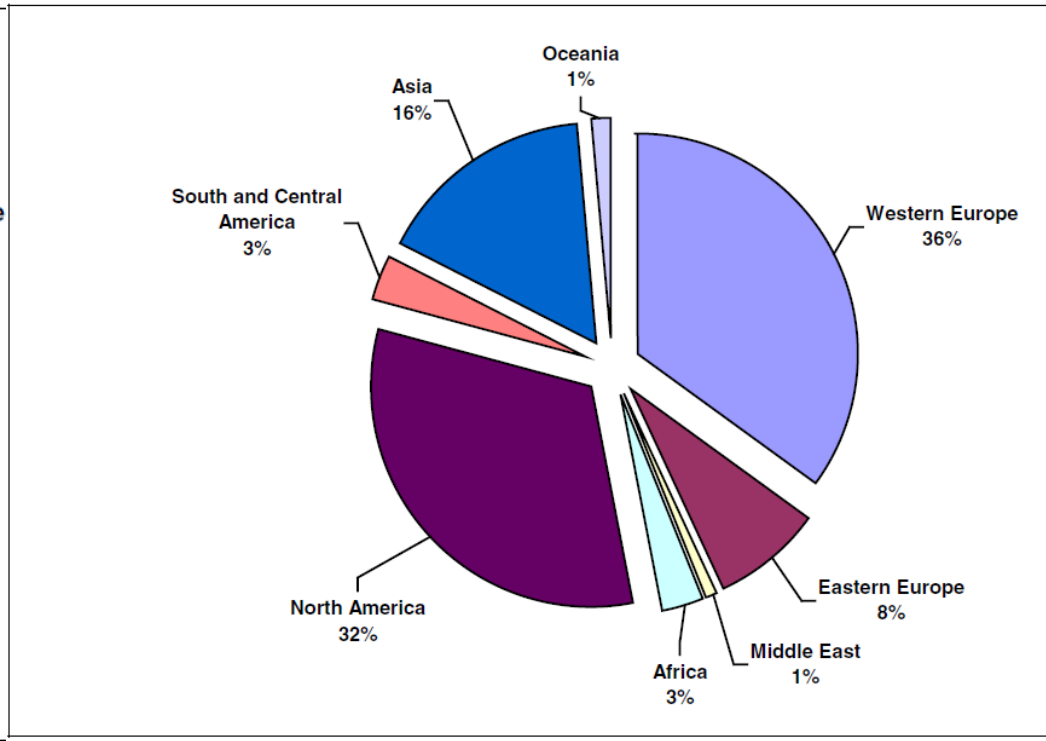
Region share for Flexible Packaging

Y 2003

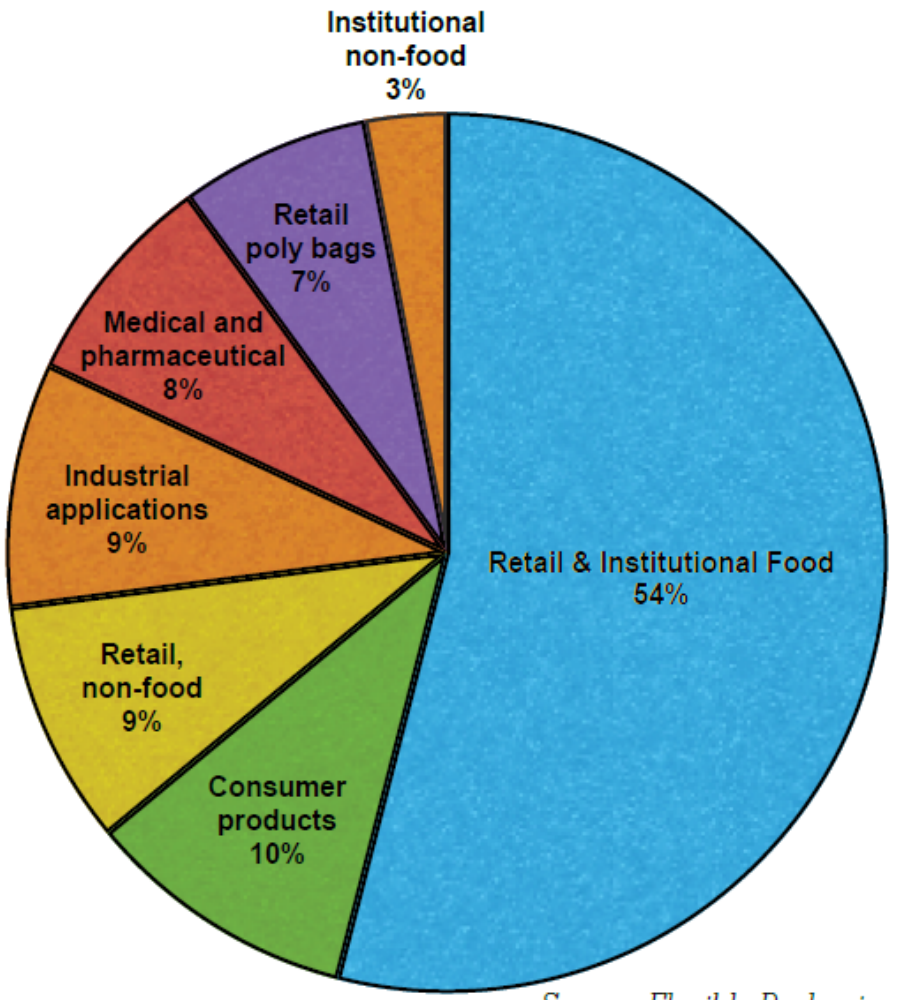


al Ltd

Y 2009



Source: Pira International Ltd

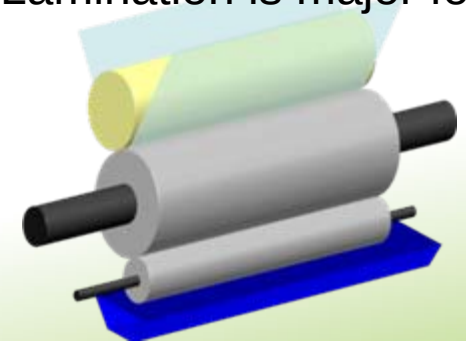


Source: Flexible Packaging Association

How many types of packages are printed?

Visit Supermarket to see a wide range of printed packaging, and the differences from Country to Country!

→Gravure Printing and Lamination is major for Flexible Packaging



Why Gravure?

-To cover the wide range of substrate (Paper, Film…)

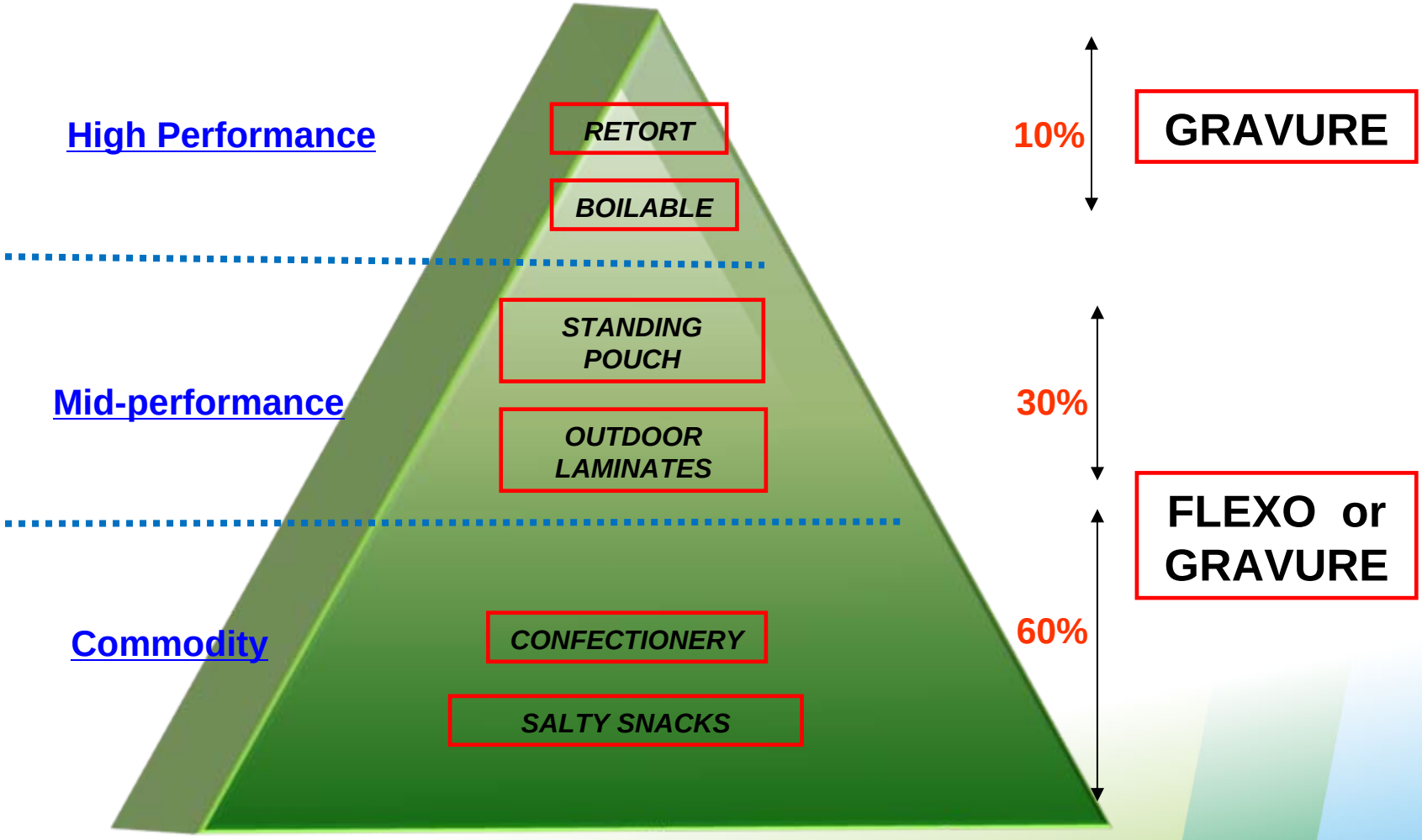
-To cover the wide range of property (for Ink)

-Can get the delicate gradation image (good for Picture design)

-Can get Endless design

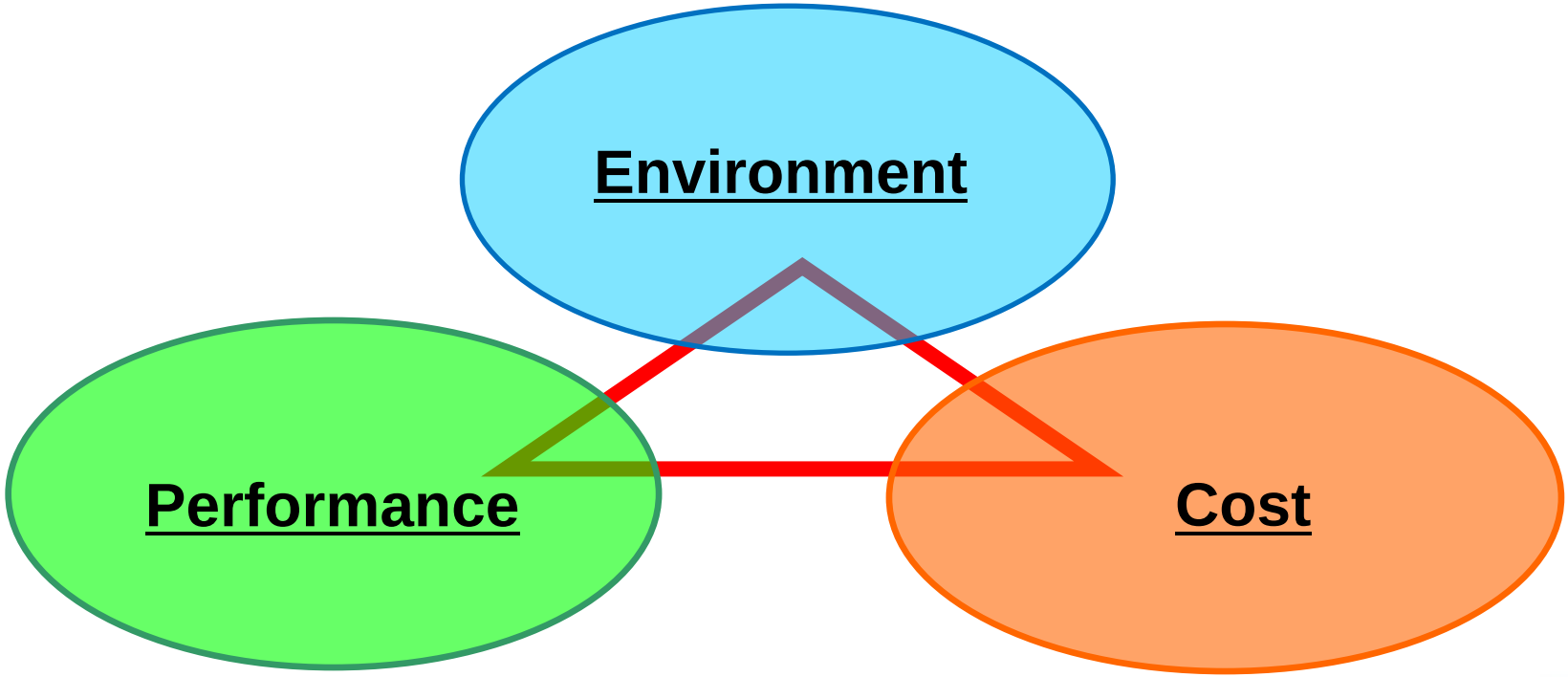
-Suitable for Long Run Job (Good resistance of cylinder)

Lamination Product Portfolio By Segment



Segmentation by Volume

What is requirement for Lamination Gravure Ink



Lamination Gravure Ink & Adhesive

Consider for Environment, Performance and Cost

Environment :

Health, Environmental issue, Response for VOC Reduction, Lower Carbon Emission

Cost :

Lower RMC, Running Cost, Decrement of Waste (High Printability), Treatment of Liquid Waste

Performance :

Ability to use for Each Usage (Snack, Standing Pouch Boil, Retort)

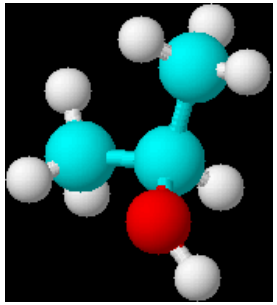
→How to Keep the Performance with considering Environment and Cost

Environmental Issue --- Solvent Issue

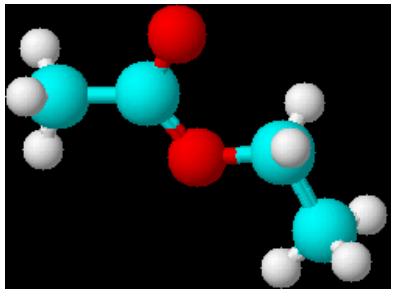
Why toluene/MEK free lamination ink?

→ Global Environmental Issue

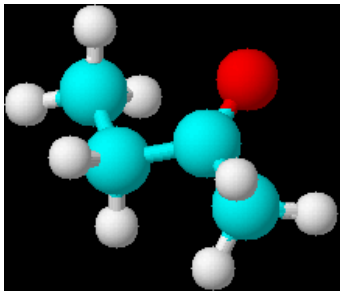
- Toluene will be terminated to use for food packaging for some End user and China
- MEK (ketone solvents) should be minimized to use by direction from end-users
- Very low retention solvent and low odor are required recently



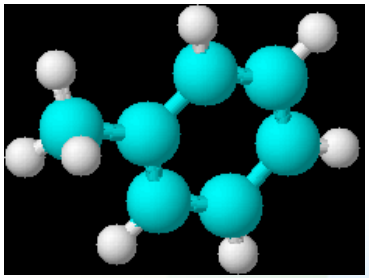
Alcohol



Ester



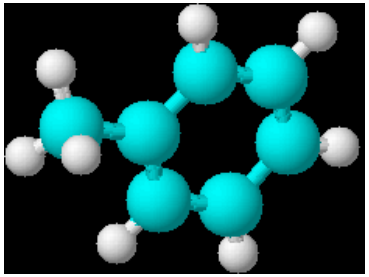
Ketone



Aromatic Hydrocarbon

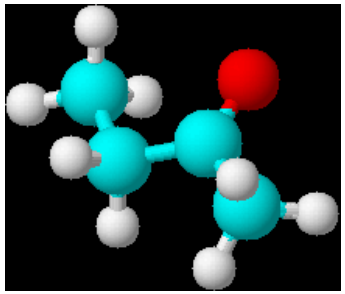
Environmental Friendly

Feature of Toluene and MEK for Property and Cost



Toluene :
- Good Drying speed
- Suitable Solubility
- Cost???

→ Printability (-Cost-) is Important for NT type Ink



MEK :
- Best Solubility for PU Resin

→ Property and Printability (Cost) is Important for NT NMEK type

Univure NT (Non Toluene type)

UNIVURE NT

- Non toluene lamination ink suitable for food packaging
- Developed by recent DIC's PU technology
- Multipurpose application- Snack to Boil & Retort packaging
- Low solvent retention & Low odor making exclusively for food Packaging
- High lamination Bond strength in Polyester, BOPP and Nylon films
- Suitable for Adhesive and PE Extrusion lamination.
- Excellent Printability and tonal reproduction mainly at high printing speed >200 m/m.

Universal 21 (NT NMEK, Development)

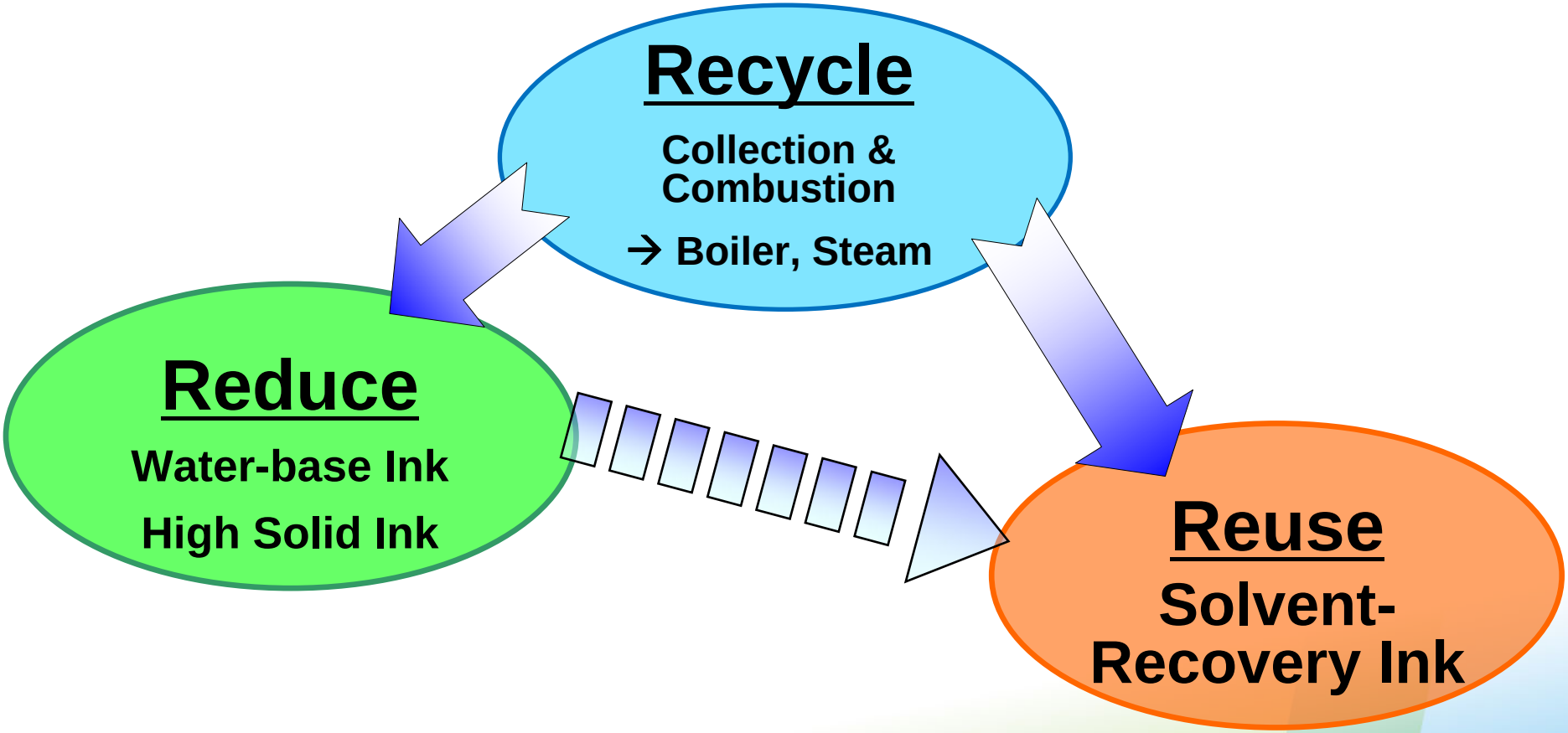
-Non Toluene and Non Ketone type suitable for Food Packaging

- Target application is for Lower and Middle product range

-White is now on sale

-Color is developing (2012 target)

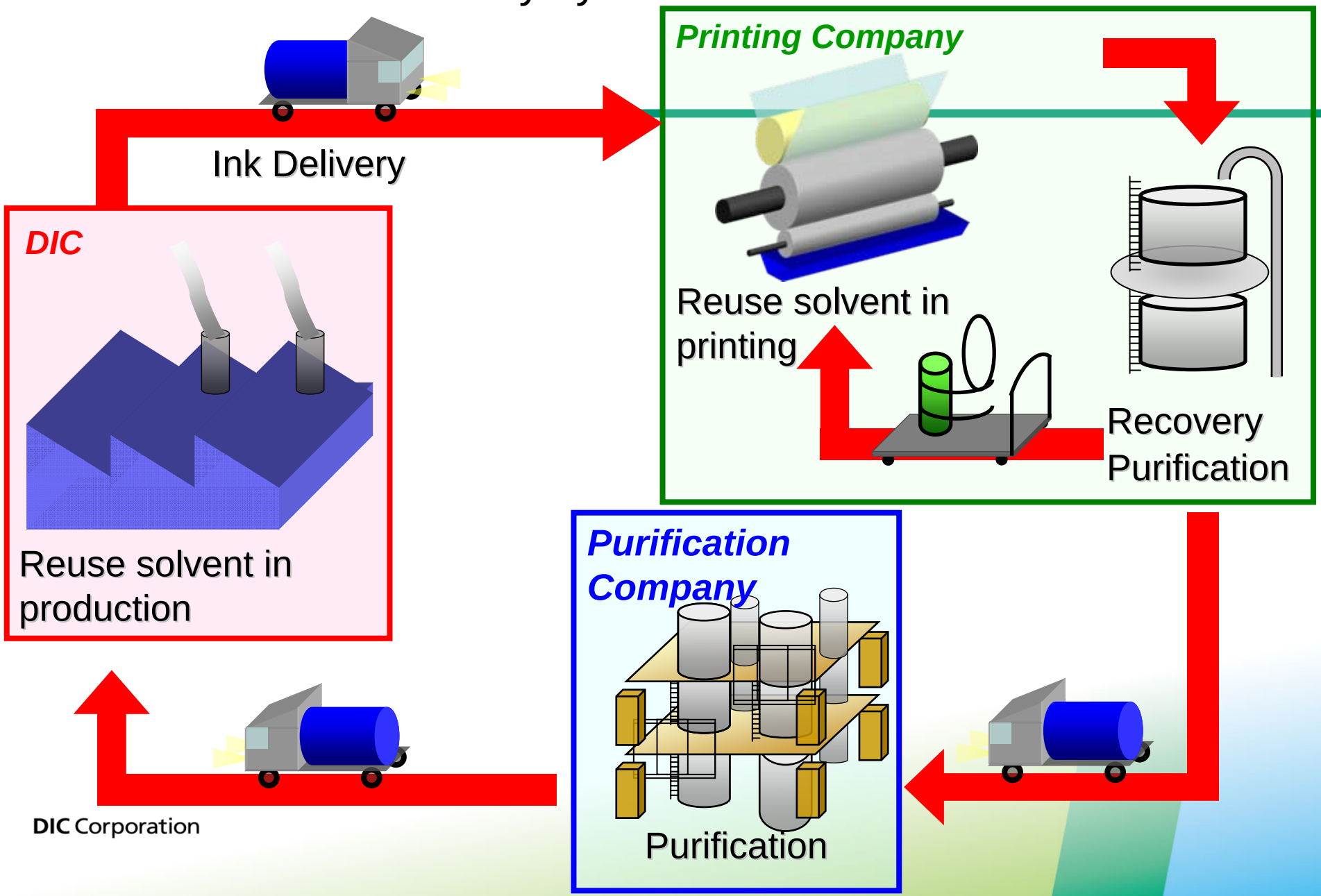
“3R” in Gravure Printing



Comparison of W/B and S/R

Water Base Reduce		Solvent Recovery Reuse
◎	Reduction of VOC	○
◎	working environment	○
×	cost advantage by solvent-recovery	◎
×	raw material cost	○ - △
×	cost of waste liquid treatment	△
×	performance	○

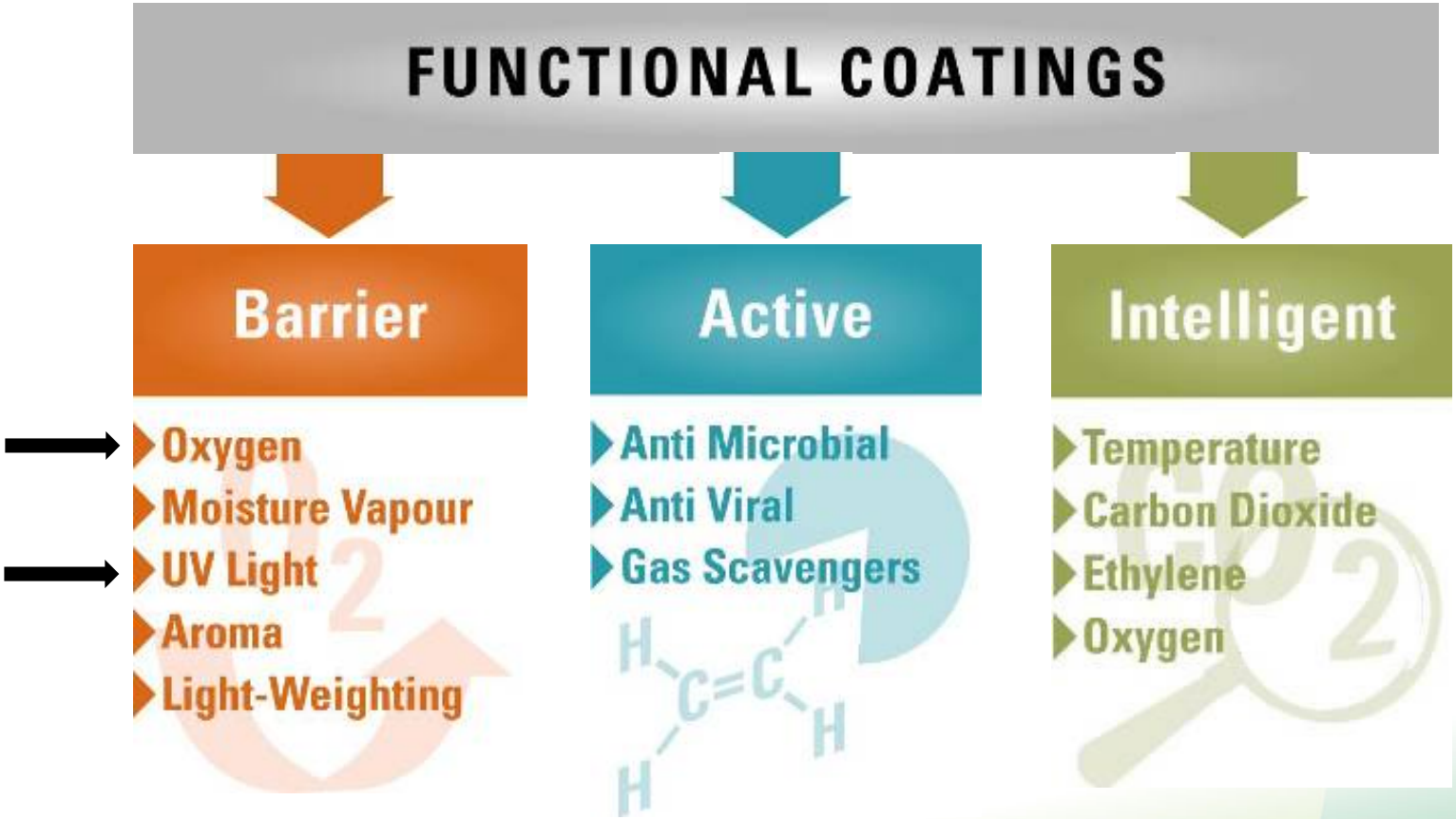
Solvent Recovery system



Global situation on Solvent Recovery System

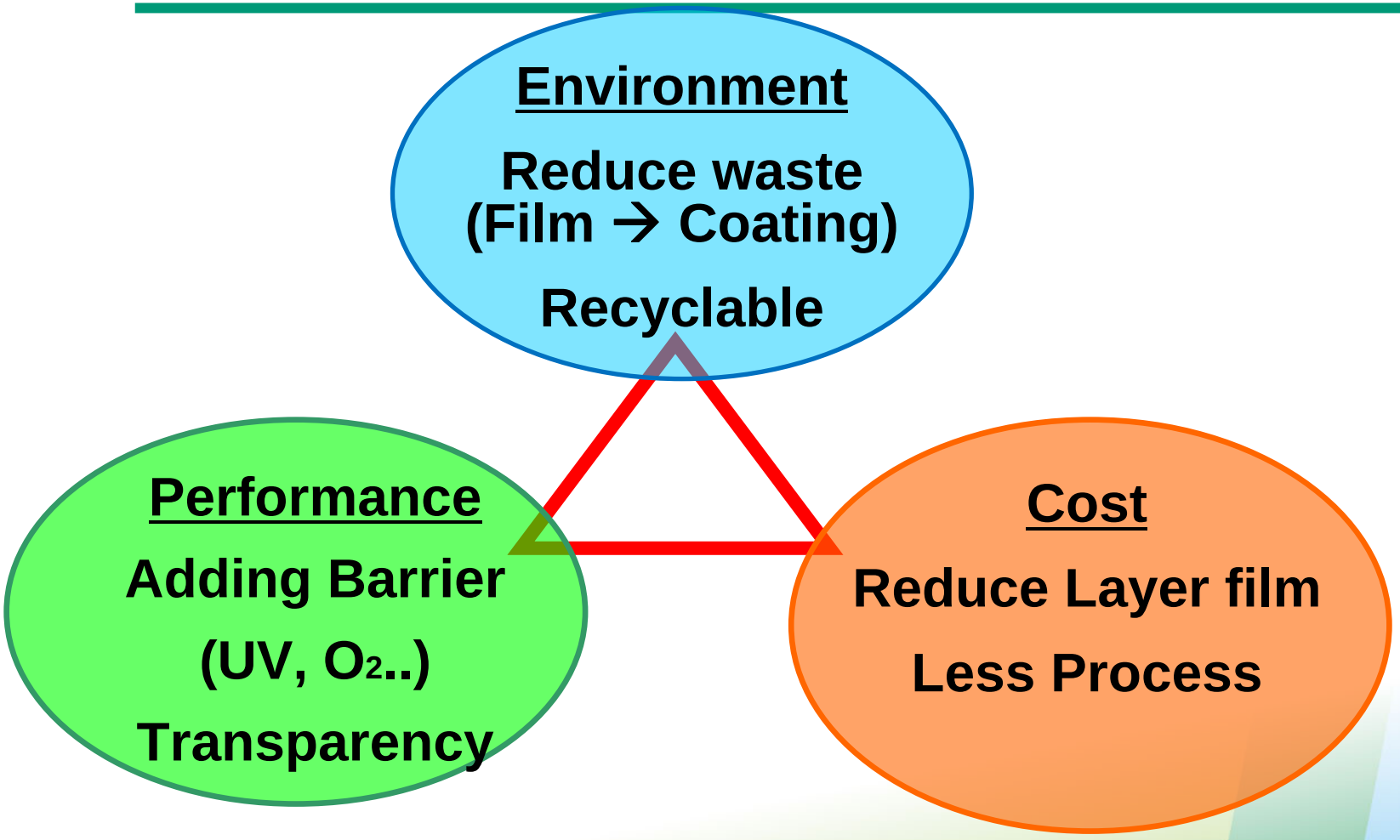
Ink	Country	Solvent	Technology	Market	Issue
Mono-solvent system	Italy	Ester	Nitro Cellose	Snack	Printability, Laminaiton quality
Mono-solvent system	Germany, France, UK, Japan	Toluene	Rosinate	Publication	
Two-solvent system	Spain	Ester / Alcohole	NC / Poly Urethane	Snack, Retort	Lamination quality

Functional coatings – Definition & Focus



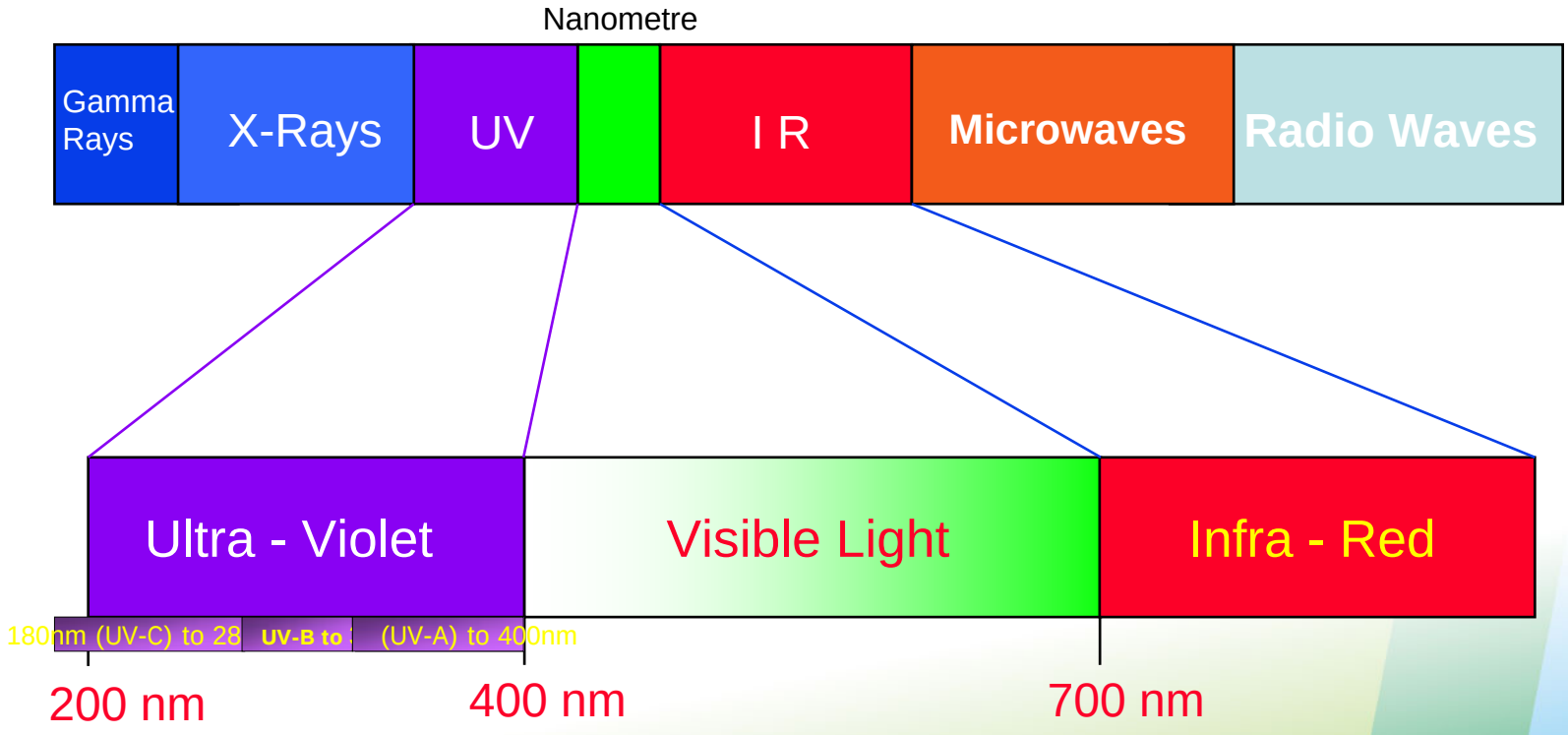
focus on barrier coatings

Barrier transparent coating



UV barrier ink
Why do we need a transparent UV coating/ink?

UV light --- High activity
(compare with another wavelength in sunlight or fluorescent light)
→Decomposition or oxidation of contents in packaging



Why do we need a transparent UV coating/ink?

Sensitive contents against UV light source

Content	Absorption Wavelength (nm)
Vitamin A	325
Beta-Carotene	450
Vitamin B2	444
Vitamin E	292
Flavonoid	340-370
Folate	365
Chlorophyl	430,660
Fat and Oil	below 500
Beer	350-500
Citral	320

For these products, Al foil or Metalized are commonly used.

→Recycle issue, Limitation of Design, Cost

Transparent UV Ink

Transparent UV barrier ink

Product features(Compare with Al or Metalizing)

-Wider design (Transparent window design, Performance)

-Reduce cost (Decrease Adhesive (or AC), Process cost)

-Easier for Recycle (Environment)

Transparent UV barrier ink

UNIVURE NT UV Barrier Ink

- Solvent based gravure ink containing UV barrier dispersed nano particule.

- Developed for lamination flexible packages to protect from Ultra Violet light sources.

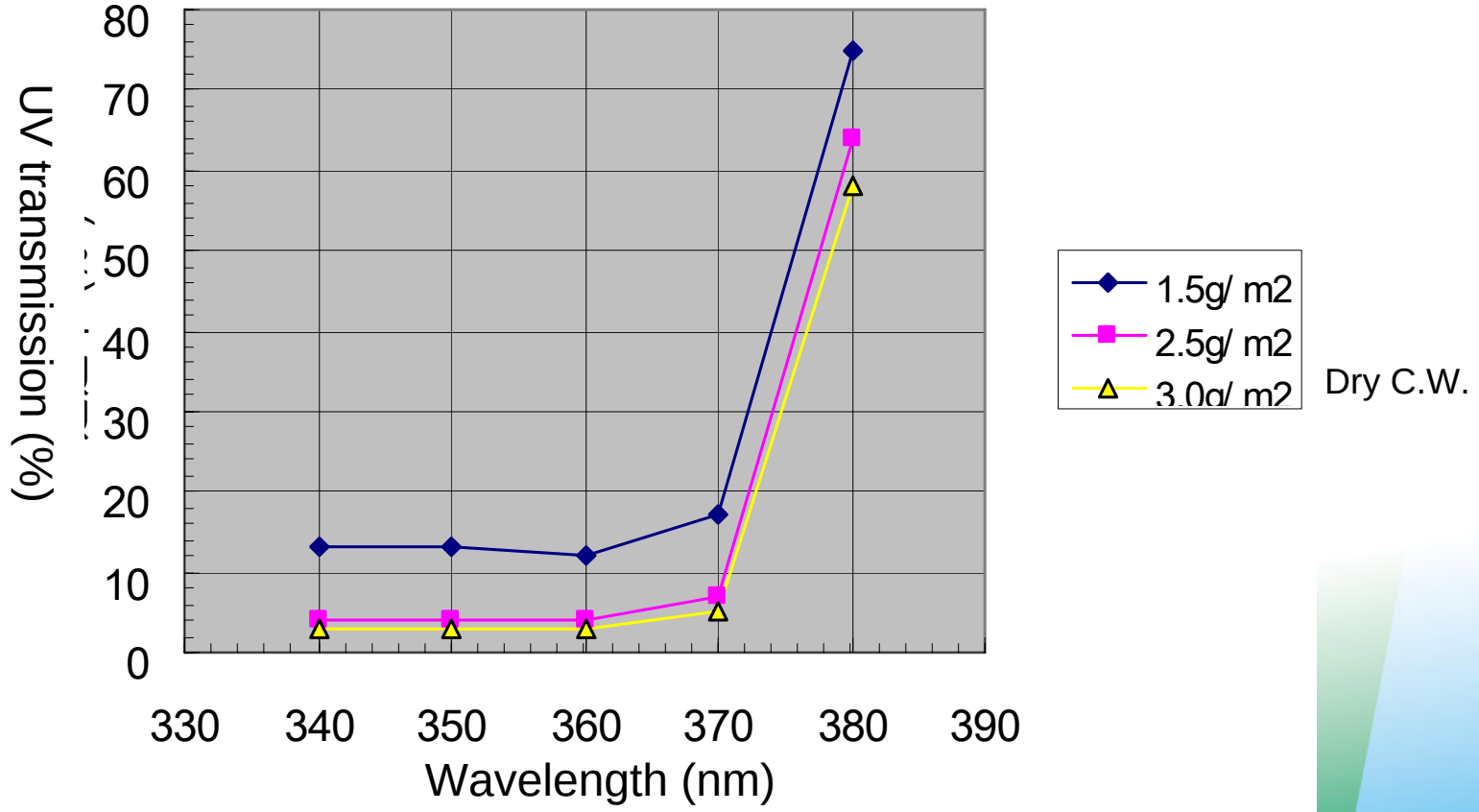
Usage & Applications

Lamination pouch such as refill and food packages

-Treated Polyester films
-Polyamide films
-Treated OPP
with various lamination structure, inc. retort, resistance job

Univure NT UV barrier ink – Barrier performance

Relationship between coating weight and UV transmission



UV barrier pouches - Example

Structure: OPP/Ink/UV barrier ink/VMCPP
PET/Ink/UV barrier ink/PE
Requirement: UV Barrier, Easy Open

Green Tea package

Frozen food package

Product overview - O2 Barrier coatings

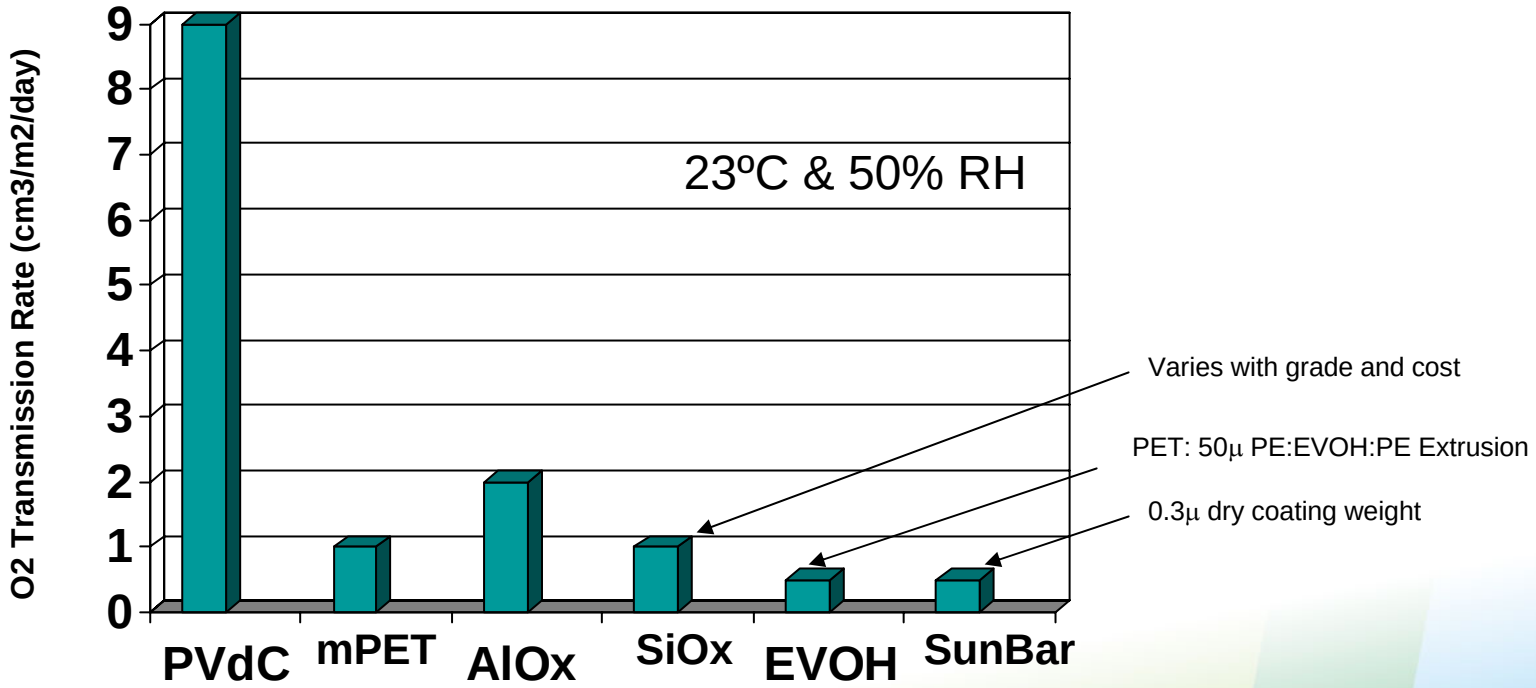
Markets & Applications	Barrier Film	Package Structure
▪ Perishable Food - Fresh meat - Prepared food - Processed meat & cheese ▪ Dry Food - Confections & snack bars - Pet food - Snacks & baked snacks	▪ PVdC ▪ EVOH ▪ Nylon ▪ Metallized ▪ Specialty oxides ▪ CoEx. & laminates	▪ Bags ▪ Lid stock ▪ Stand-up pouches ▪ Forming web ▪ Wraps

O2 Barrier Coating

SunBar O2 Barrier coating performances

Untreated polyester film OTR 100-110 cm3/m2

PVDC major disadvantage contains chlorine & poorer O2 barrier
AlOx/SiOx major disadvantage brittle & poorer O2 barrier
EVOH deteriorates on long term humid storage

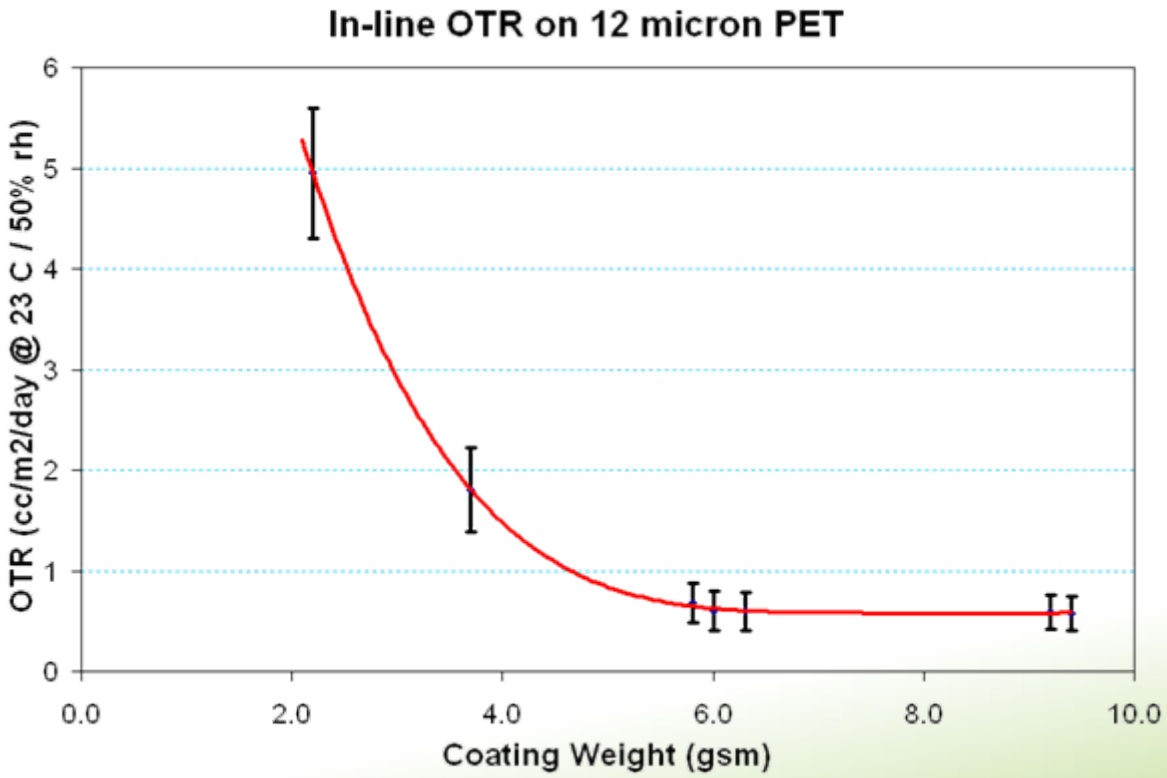


SunBar Oxygen Barrier coatings outperform PVDC, EVOH, AlOx and SiOx for O2 barrier

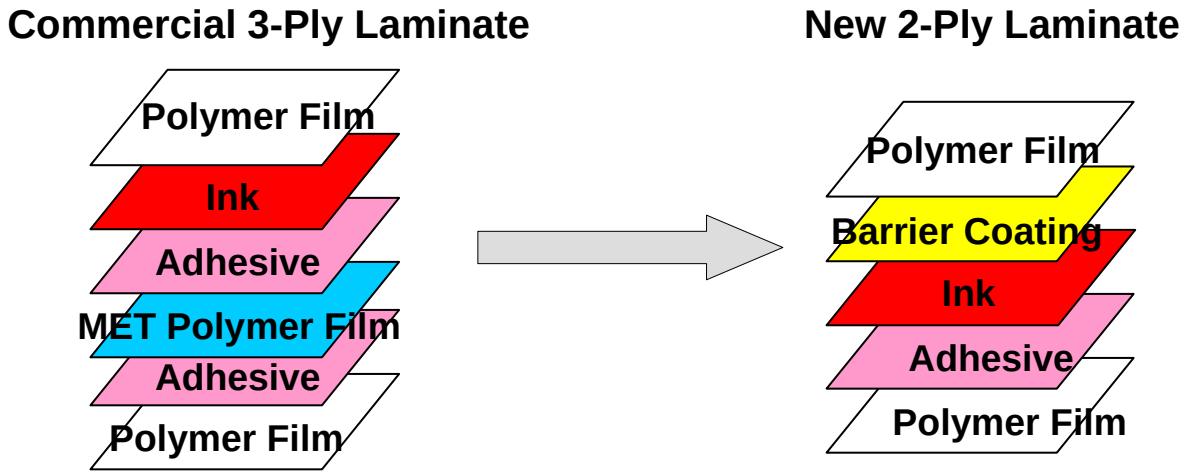
[Oxygen transmission rate measured using a MOCON OX-TRAN® 221 within 24 hours of coating]

Coating weight & Applicaton process

- Oxygen barrier on PET is dependent on coating film-weight. The graph includes 95% confidence interval error bars. (Coating weight is wet)



Barrier coating – Value propotion overview

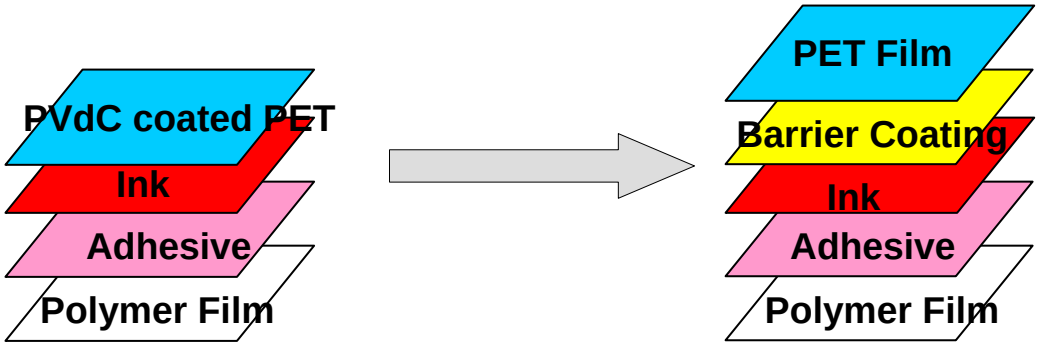


- Less laminate structure (Adhesive, Al foil...) → Cost
- Less process → Cost
- Lighter weight packaging (30% reduction) → Performance
- Improved recycling → Environment

Barrier coating – Value propotion overview

Commercial 2-Ply Laminate

New 2-Ply Laminate plus printable barrier coating

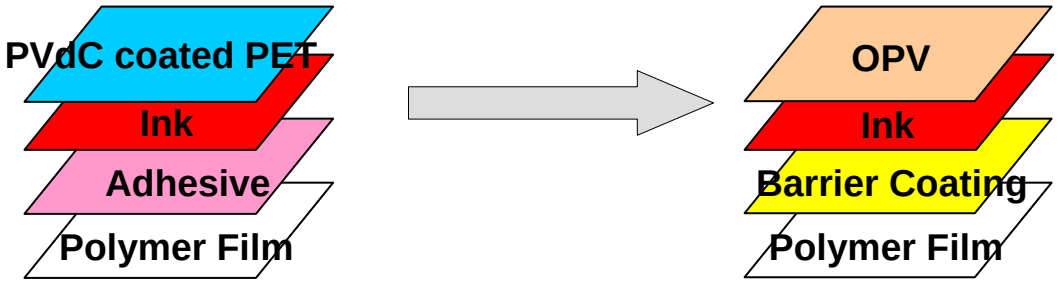


- No chlorine
- Improved O2 barrier
- Improved shelf life

Barrier coating – Value propotion overview

Commercial 2-Ply Laminate

New 1-Ply Laminate plus printable barrier coating



Monoweb proposition

***will depend on specification required**

- No chlorine
- No adhesive
- Improved O2 barrier

→sales opportunity for converter-monoweb

Conclusion
toluene, ketone free ink system + Functional coatings

- Making products greener
- Coatings with low enviromental impact
- Waste reduction
- Improved recycling
- Conservaiton of energey, less processing
- Give new packaging structure and design

Yes Now!

Just let us work for your prosperous future!

DIC will certainly benefit you!!