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2017

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EDITION

6

Films multicapa para cubrir las
demandas de la industria del packaging
Multilayer films to cover demanding
requirements in the packaging industry

Marisa Gómez (REPSOL)

Multilayer films to cover demanding requirements in the packaging industry

Marisa Gómez - REPSOL

May 30 - 31



Contents



About us

- Repsol. Chemical Division
- Repsol Technology Center

Barrier systems

- General considerations
- Barrier packaging systems
- Structures

Key drivers for the future

- Performance
- Environment
- Safety





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Repsol Chemicals Division



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Refining

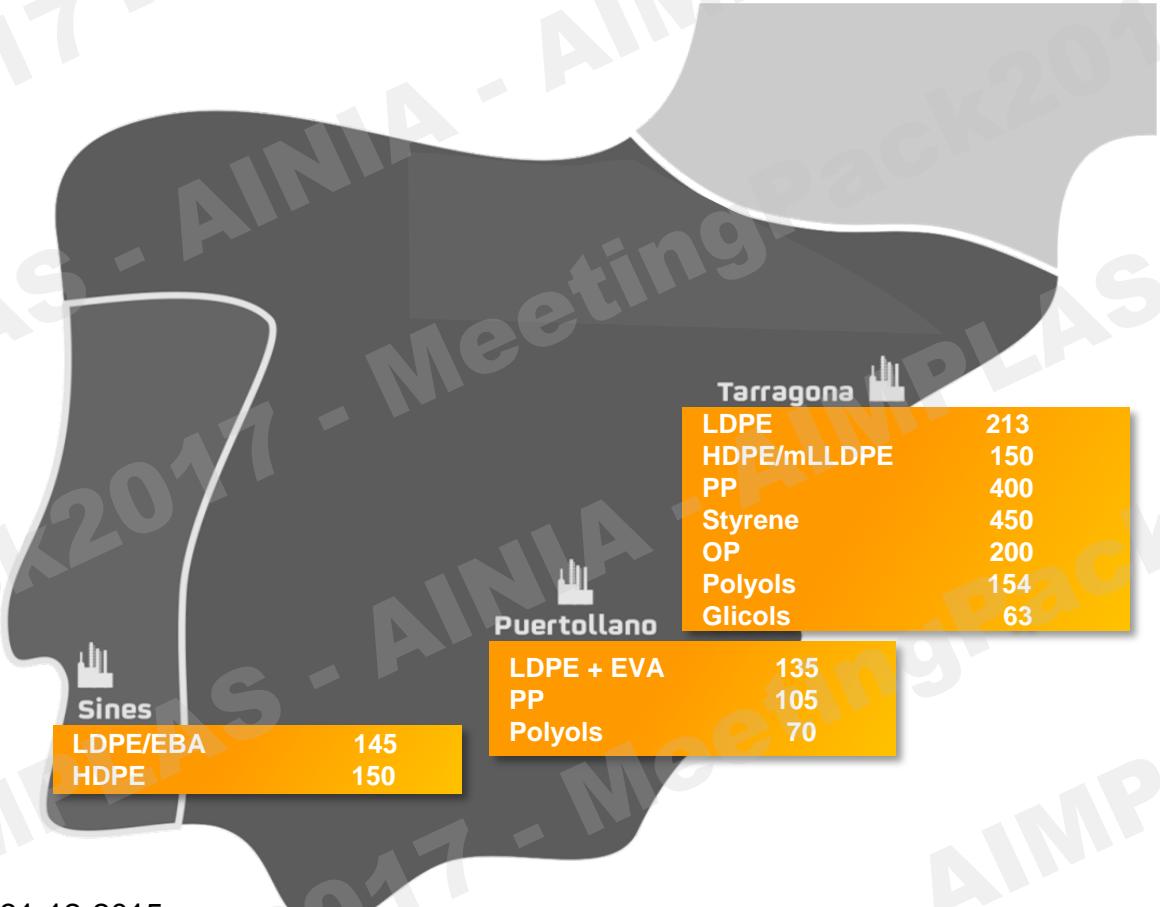
Leadership position

Petrochemicals

Regional focus and integration

Marketing and Trading

Highly efficient and integrated



Total 2.235

POLYOLEFINS	1.298
LDPE + EVBA	493
HDPE/mLLDPE	300
PP	505
INTERMEDIATES	937
Styrene	450
OP	200
Polyols	224
Glicols	63

Repsol Technology Centre



- We detect and answer the demands and needs of the market
- Development of new products and improvement of the existing ones.
- We provide technical advice to our customers.

Oriented to create value and satisfying our customer's needs, from a technical and sustainability point of view.





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General considerations in Barrier systems



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Packaging



Barrier packaging protects contents from spoilage by controlling exposure to gases, moisture or UV.

- Extending product shelf life keeping food fresh for much longer, preserving taste and quality.
- Offering an optimum balance between performance and cost.
- Providing advantages versus metal or glass packaging: clear, transparent, lightweight, shatter resistant...
- The U.S. barrier film market is forecast to grow 4.2% in 2021
- In 2016, 71% of barrier film demand was food packaging*

Building & Infraestructure



Healthcare



Agriculture





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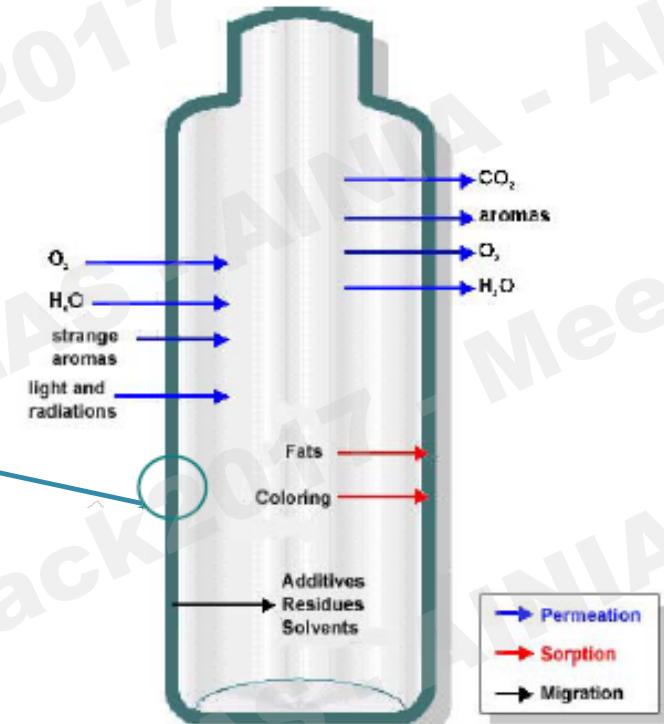
Barrier Packaging systems



Monolayer

Multilayer :
Coextrusions, laminations

Coating



Multilayer packaging systems



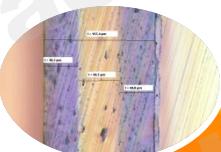
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Why multilayers?

The combination of different materials has resulted in the development of high performance barrier packaging

Why Polyolefins?



Cost reduction
Lighter packaging



Processability



Barrier Properties



Consumer appeal



Printability
Sealing



Mechanical
properties



Multilayer Barrier packaging systems



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Multilayer made of 3, 5,
7... layers

- LDPE/PP/PET
- PE/EVOH/PP
- PE/EVOH/PVC
- PE/EVOH/PS
- PE/EVOH/PET
- ...

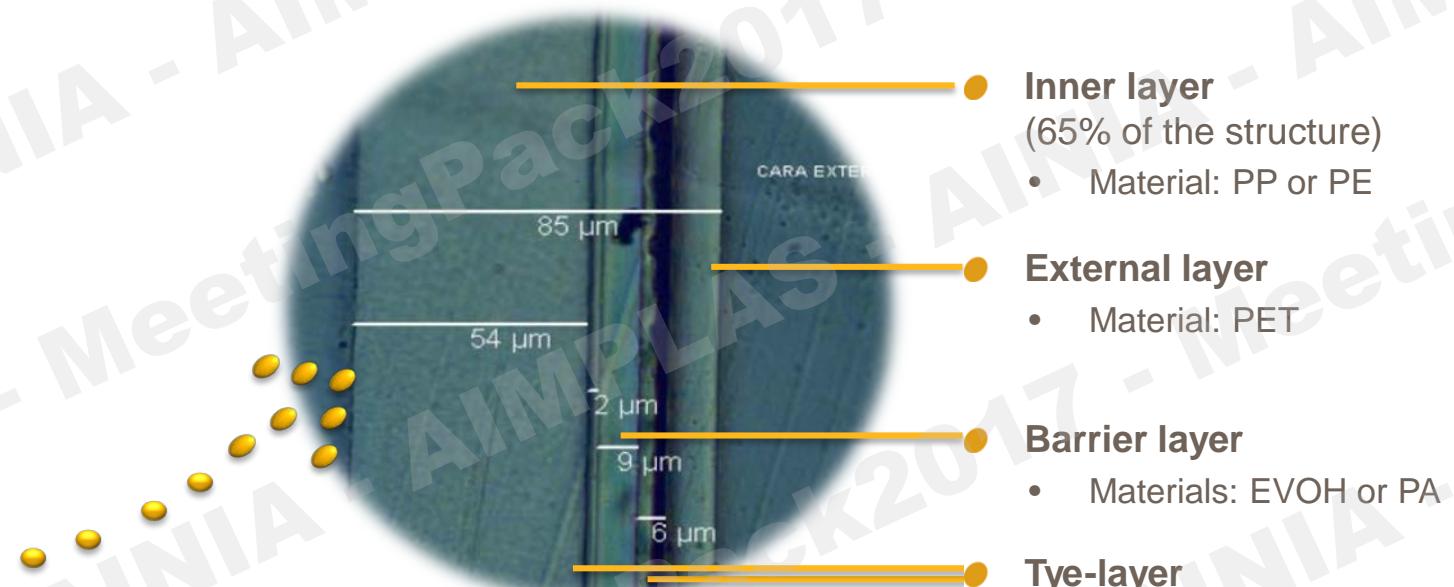
Flexible Barrier Packaging: Stand up pouches



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Common structure identified at microtomy test



*Resistex® mLLDPE - Non retort
Repsol Isplen Heterophasic PP - retort*

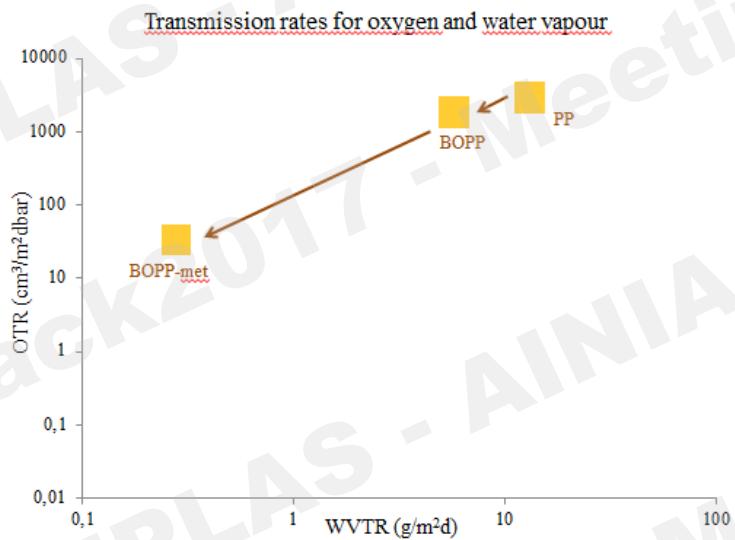
Flexible Barrier Packaging Metallized

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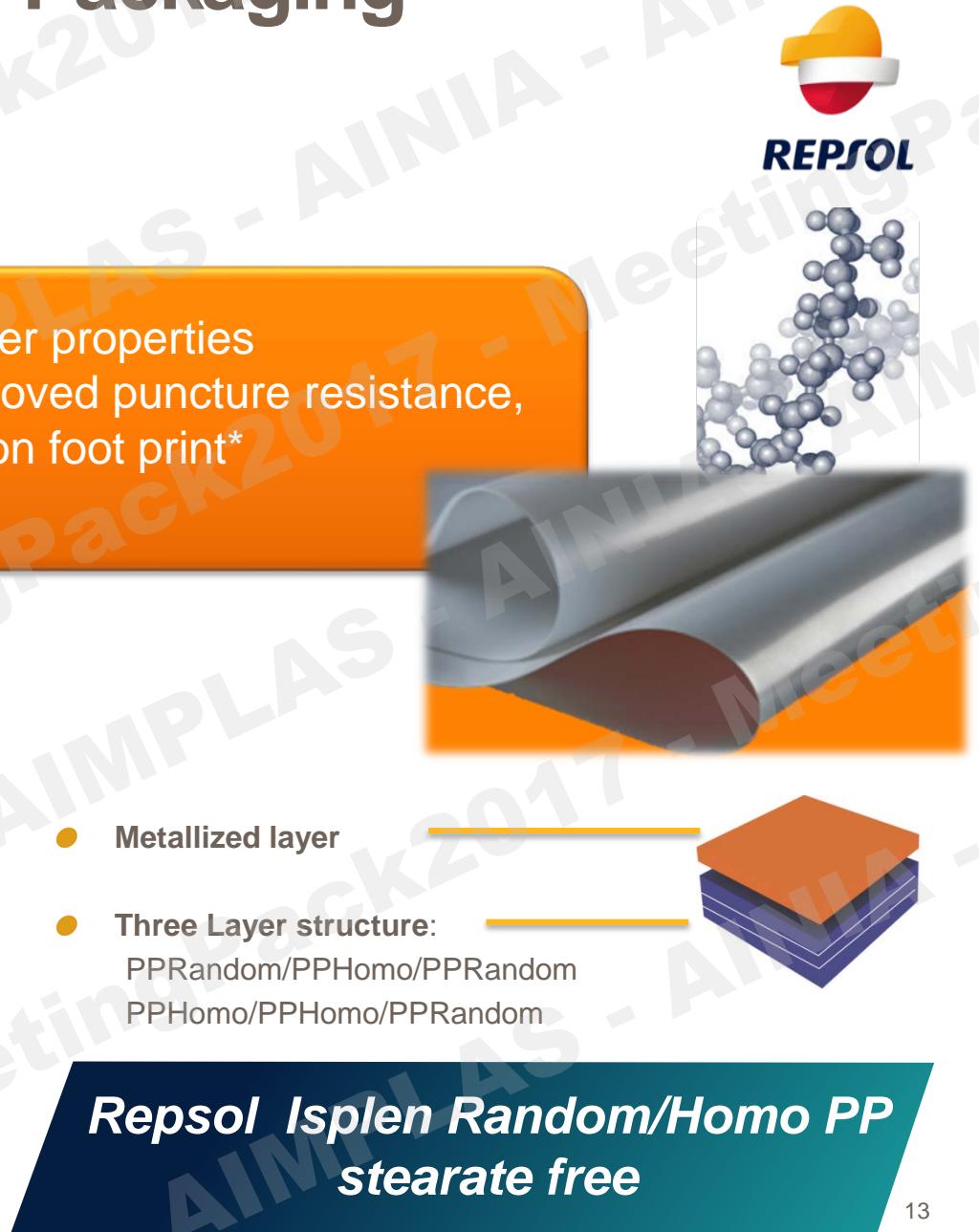
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- Metallization: higher barrier properties
- Alternative to alufoil, improved puncture resistance, lower cost, reduced carbon foot print*
- Shelf appeal



Source: Ebnesajjad, S., 2013. *Plastic Films in Food Packaging*. Elsevier.



*Source: PlasticsEurope. Study on Plastic packaging: the wisest choice for our environment (Denkstatt)

Rigid Barrier Packaging: Blow moulded containers



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- Outer container

Material: HDPE or PP. High impact resistance, handleware container.



- Inner container

Material: PET, which could incorporate active O₂ scavenging compound to absorb residual O₂ after filling.



*Repsol Isplen PP
Repsol Alcudia HDPE*

- Three layer structure (moisture/UV barrier)
Material: HDPE/ black comp / HDPE
- Six layer structure (moisture/O₂/UV barrier)
Material: HDPE/HDPE/adhesive (regrain)/EVOH/adhesive/ HDPE

Rigid Barrier Packaging

Retortable thermoformed



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Maintaining barrier properties



Avoiding delamination process

PP protects EVOH from moisture

- Retortable.
Stored at ambient temperature for up to 6 months
- O₂ scavenger
- Microwaveable



Resistex® mLLDPE
Primeva® Repsol EVA Copolymers
Repsol Isplen PP
Repsol Alcudia LDPE

- Multilayer: EVA, LDPE, mLLDPE and EVOH
LDPE, mLLDPE, PA
- Five layer structure coextruded and thermoformed:
PP/adh/EVOH/adh/PP



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Key Drivers for the future

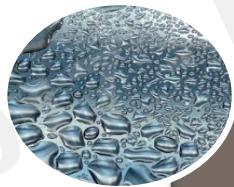


Performance



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Higher barrier properties
to increase shelf life



Downgauging and
lightweighting



Good balance
performance - cost



Active packaging



Heat stability,
microwavability, good
performance at low temp



Environmental issues

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Substituting traditional packaging materials with plastic **decreases greenhouse gas emissions**

X 2.7



To improve
To develop



Safety: Repsol's response to new food contact requirements



We steadily work to ensure that we manufacture Polyolefins in compliance with the most demanding regulations



Repsol's Product Stewardship Department

Focus on continuous changes: Product alerts, regulatory modifications, communication of changes from most relevant associations (EFSA, ECHA, FDA....), proactive support and guidance.

- **N**ew additives for food contact
- **M**odifying Additives with Specific Migration Limits
- **A**dditives incorporated to the lists of SVHC





Thank You!

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