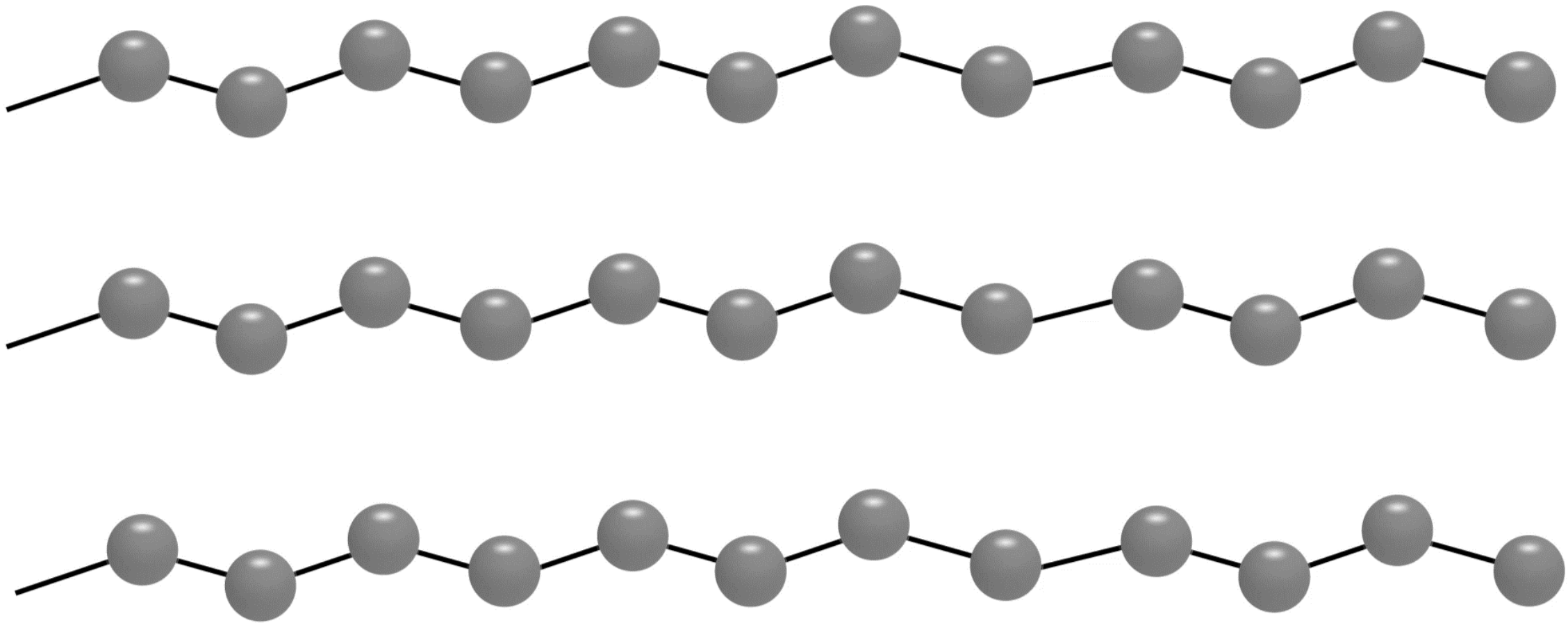


טכנולוגיה פורצת דרך Crosslinking

מייק קופר

טכנולוג, כפרית ישראל



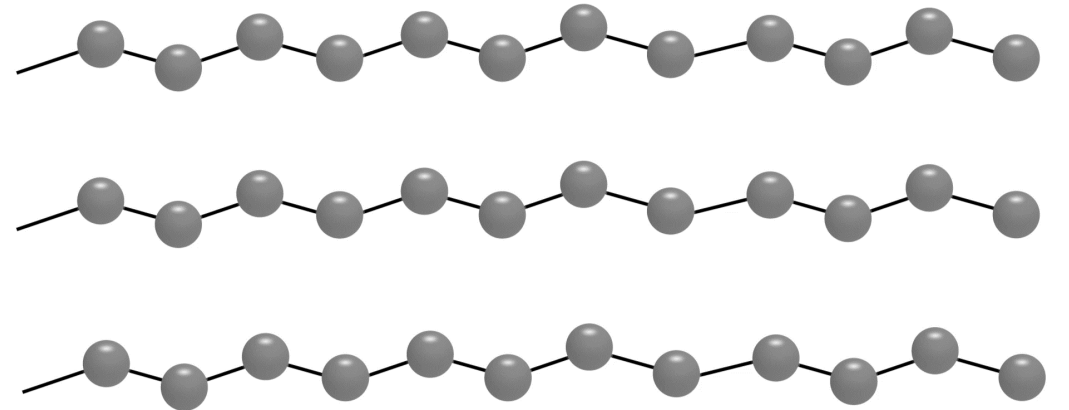


CROSSITOL®

INNOVATIVE APPROACH TO POLYETHYLENE CROSSLINKING

UV CROSS-LINKING – WHY & HOW?

- Polyethylene Crosslinking is well established in double bubble systems and a fast-growing several applications
- From shrink packaging of fresh meat and bulk overwrap and flexible pouch packaging
- UV Crosslinking enables **innovative** packaging design with **sustainability recyclability** in mind.



CROSS-LINKING TECHNOLOGY

- A patented additive and a family of master batches
- UV energy source – Online and offline

XL 04470 LD
CROSSITOL®

Our Patented Photo-initiator (PI) for
Polyethene crosslinking

XL 01160 LL
Crosslink Promoter

Promote the occurrence of the
crosslinking reactions



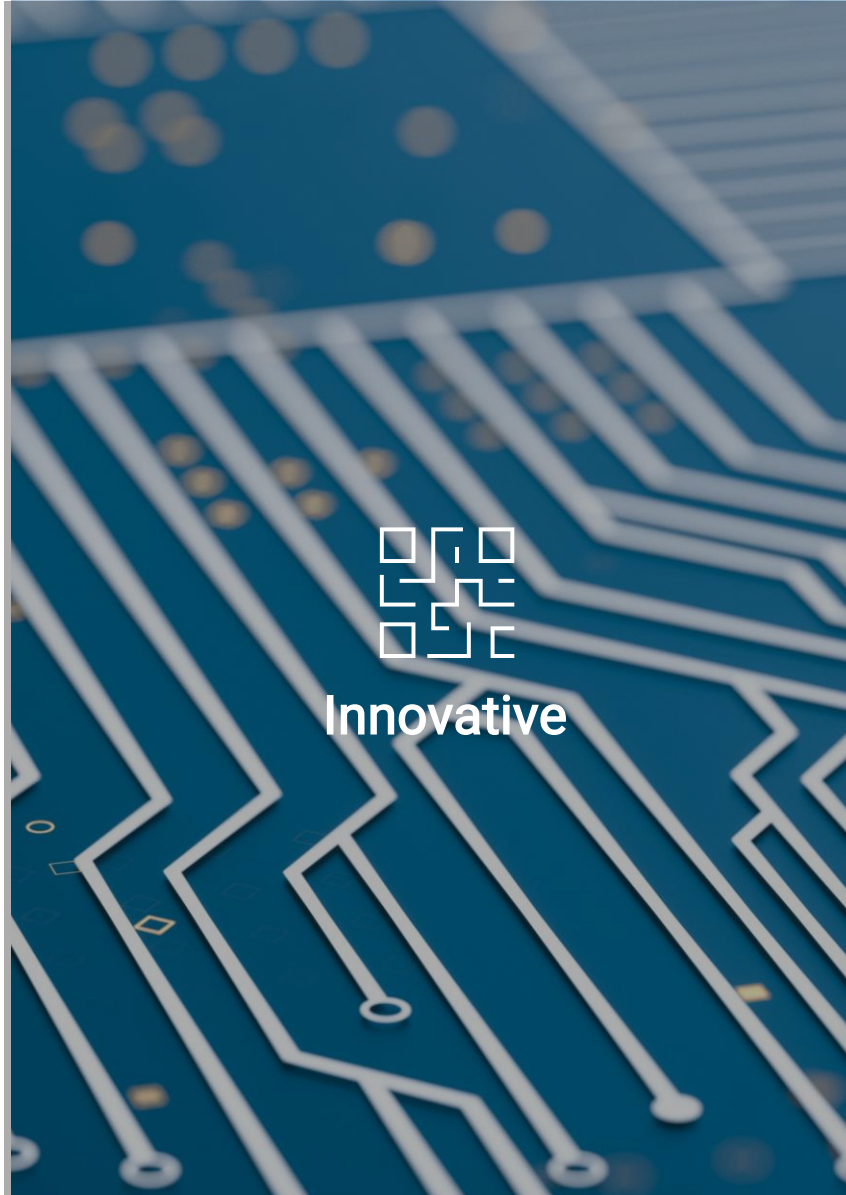
Less scraps and product defects
Replacing expensive high-end materials



Economical



Innovative



Superior packaging properties
(Sealing & Shrinkage, Impact & Puncture)
Selective layer crosslinking
for split and "Nano" layer structures

Smoothing the move to
Mono-material
ALL-PE PACKAGING



Sustainable



"CROSSLINKED" MARKETS

SHRINK PACKAGING FOR BARRIER AND NON BARRIER APPLICATION

- Improved **heat** resistance
- Enhanced Puncture, Tear & Impact resistance
- Better Process-stability during second bubble stretching
- Fully recyclable



VACUUM SKIN PACKAGING (VSP)

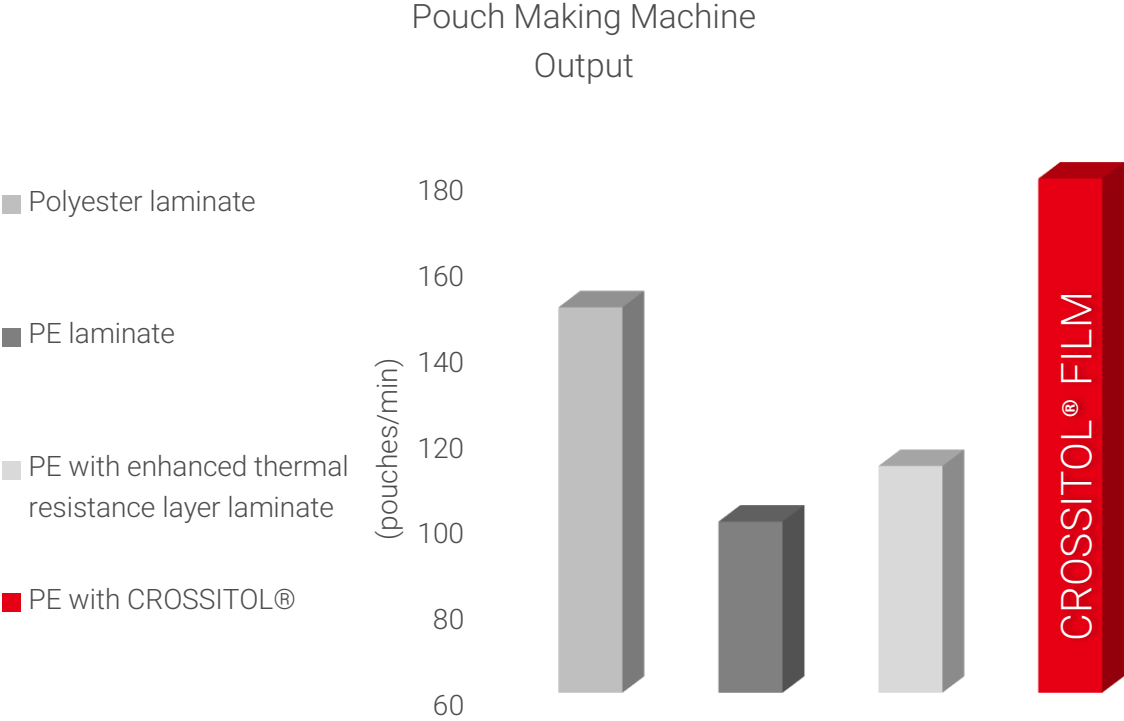
- One of the most fast growing applications
- Improved heat resistance
- Keep film integrity and **appeal** during sealing process
- Improved puncture resistance to extend shelf life
- Enhanced Tear & Impact resistance
- Recyclable



The Economical benefits of crosslinking

BETTER WORKABILITY ON VFFS LINES

- Improved heat resistance
- Faster filling and processing
- Keep pouch integrity and appeal
- Enhanced Tear
- Enhanced Impact & puncture resistance
- Recyclable
- Less cost

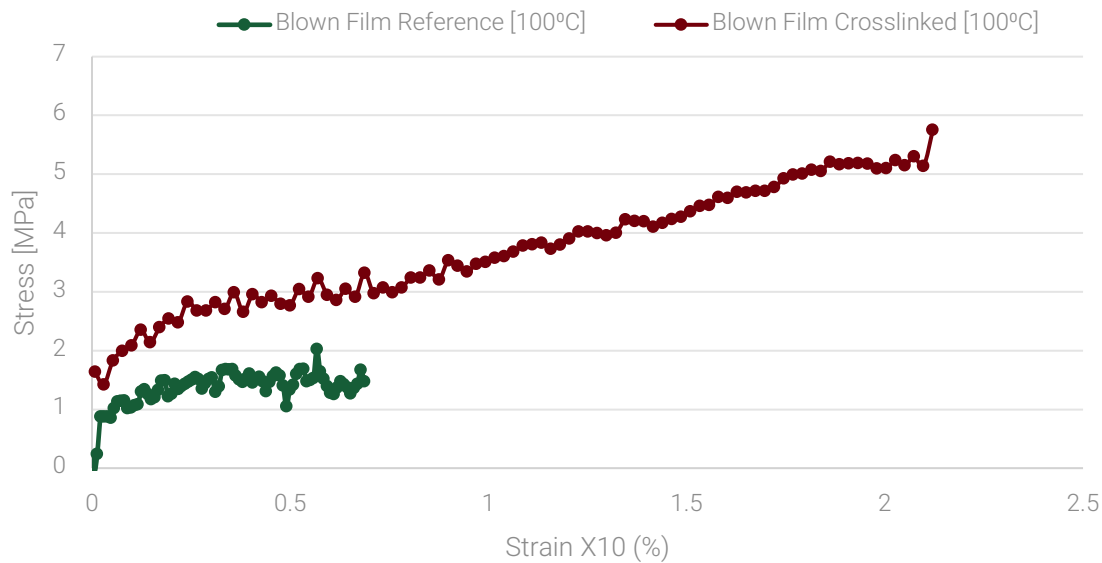


Technical innovation

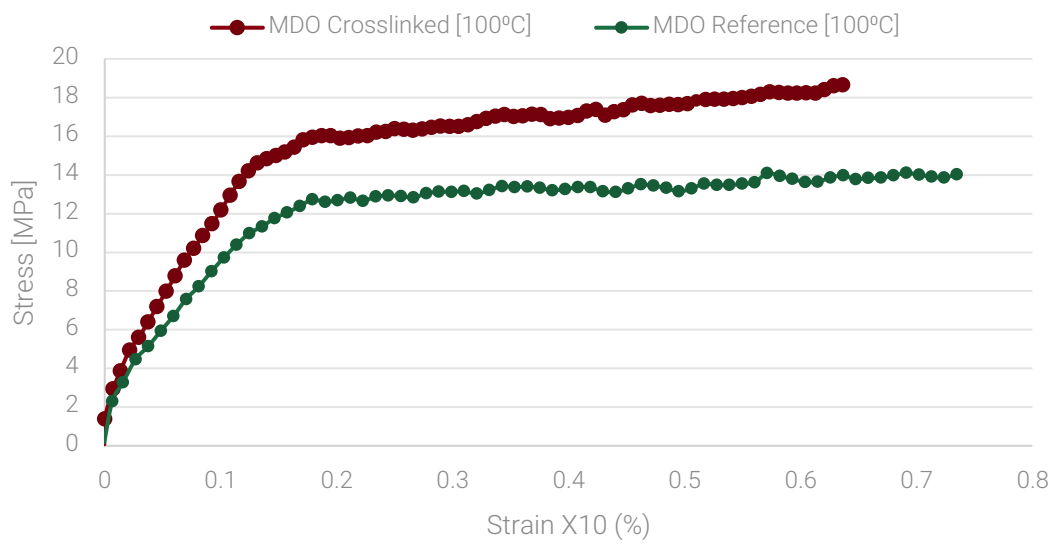
TEMPERATURE RESISTANCE

TENSILE PROPERTIES @ 100°C

Tensile @100°C / LDPE Blown film / 40μ



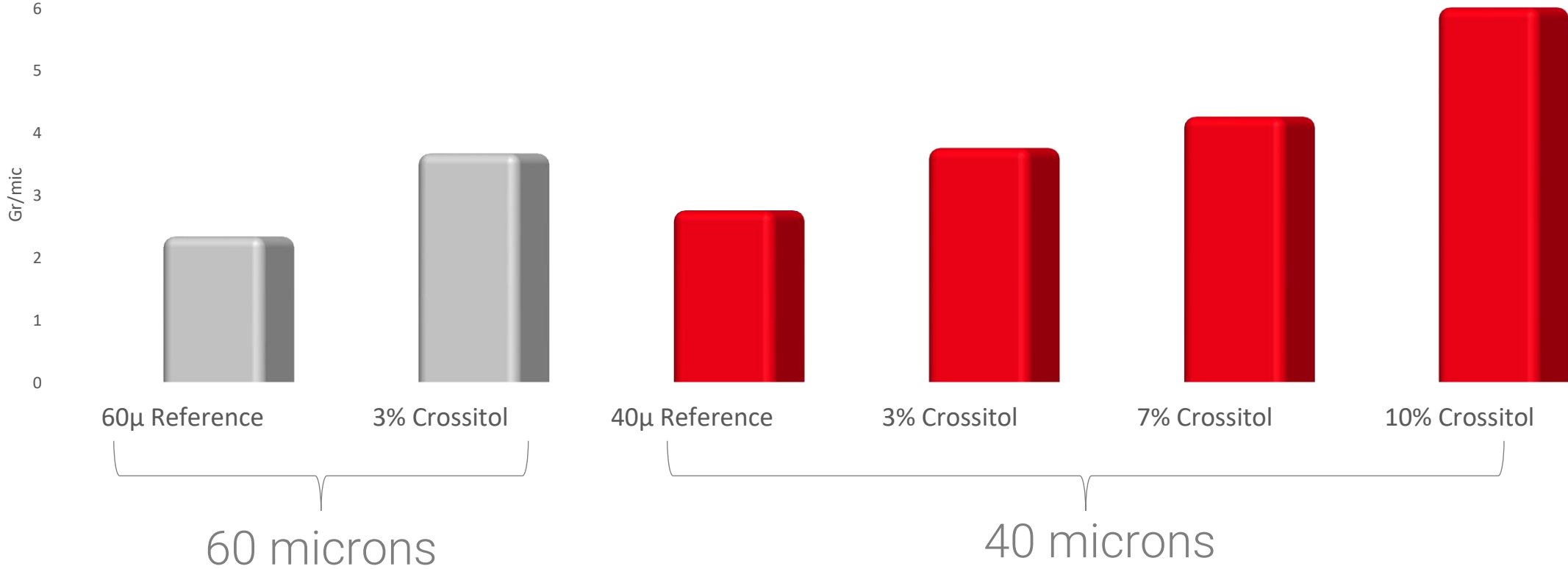
Tensile @ 100°C / LD/HD MDO Films / 1:5 / 30μ



CROSS-LINKING BENEFITS

Increased Impact resistance

Impact (gr/mic)
ASTM-D1709

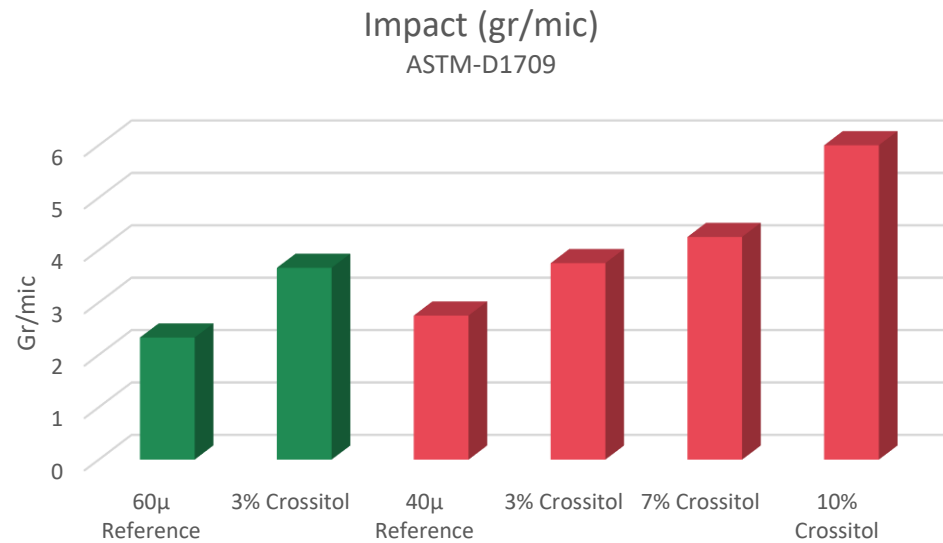


Technical innovation

IMPACT & PUNCTURE

Increased Impact resistance

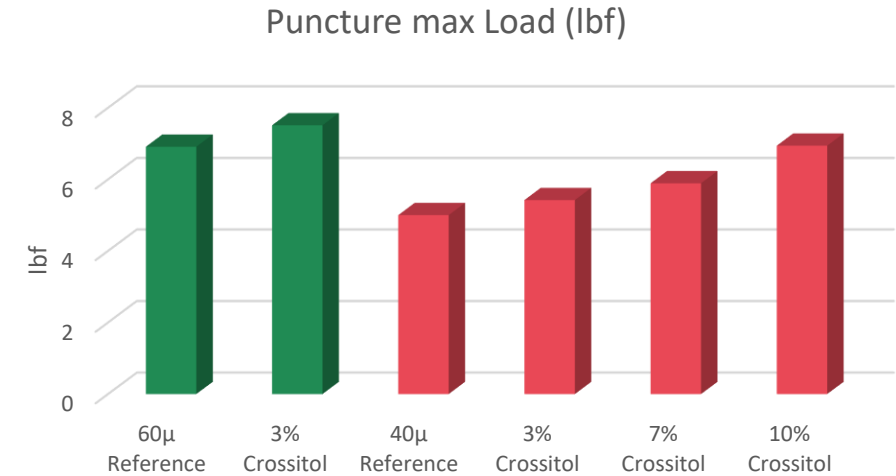
Keeping product intact during transportation and handling



- 60µ LDPE "Mono-layer"
- 40µ LDPE "Mono-layer"

Increased Puncture resistance

Better resistance to internal piercing loads without being damaged (Sharp Edges)

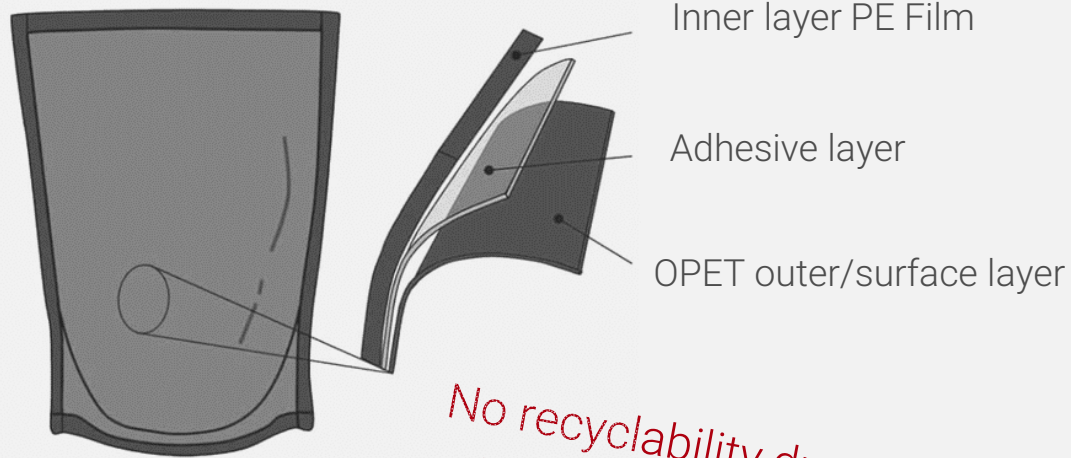


Crosslinking sustainability

ENABLING THE MOVE TO MONO-MATERIAL PACKAGING

Current packaging

Multi Material

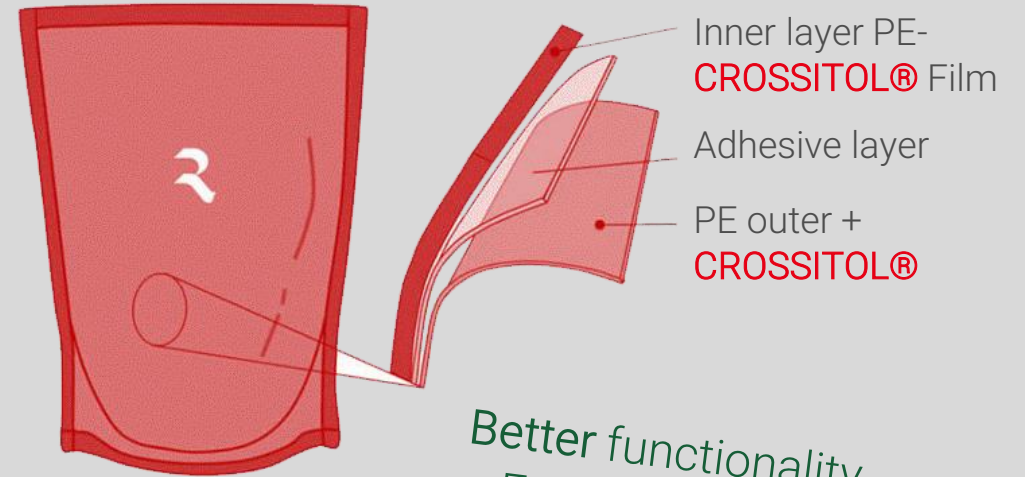


No recyclability due to multi material mix



Tomorrow's packaging

Mono Material



*Better functionality
Fully recyclable*

Crosslinking – case study

BOPE – BRIDGING THE GAP TO THERMAL STABILITY

- Crosslinking BOPE films enhances the thermal stability of the BOPE and can bridge the gap to other BO materials.
- Below presented some of the main points from a study case on HDPE and LLDPE based BOPE films

Main results:

- Crosslinked LLDPE Based films have better **thermal stability** compared to NON-crosslinked HDPE
- LLDPE based BOPE films exhibit major **transparency** and **cost advantage**
- Potentially removing the HDPE for even better **processability**



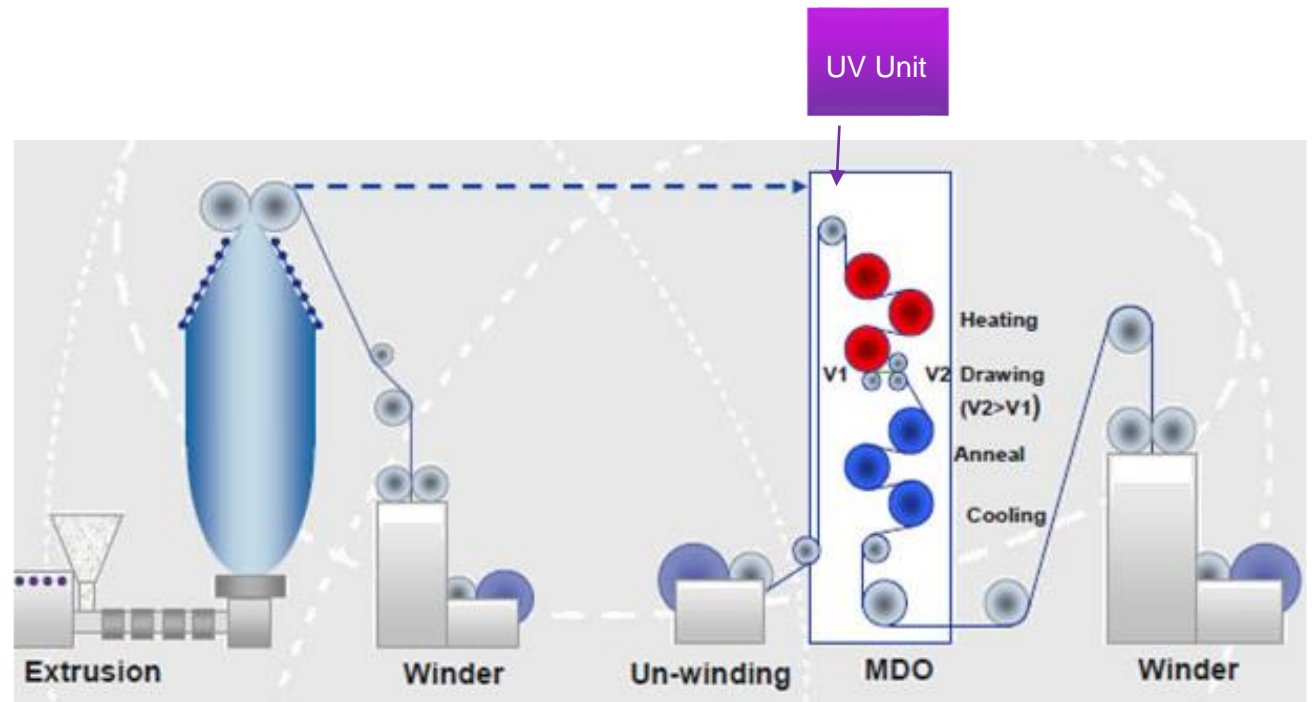
Crosslinking new concepts

ENHANCED MDO FILMS

- Recent developments proved the concept of crosslinking MOPE (Mono-oriented PE) films.
- Utilization of the crosslinking technology may have major impact on both process and product.

Advantages:

- Higher stretching
- Better process stability
- Better heat resistant film





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