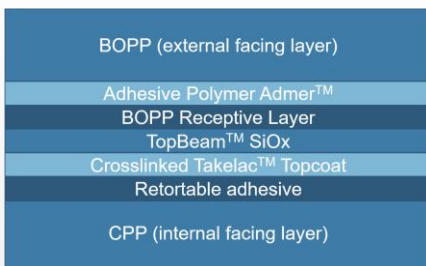


Retortable High-Barrier PP-based Packaging Laminates fit for the Circular Economy

Retort is a fast-growing food packaging application, driven by convenience and long shelf life, even when stored in ambient conditions.

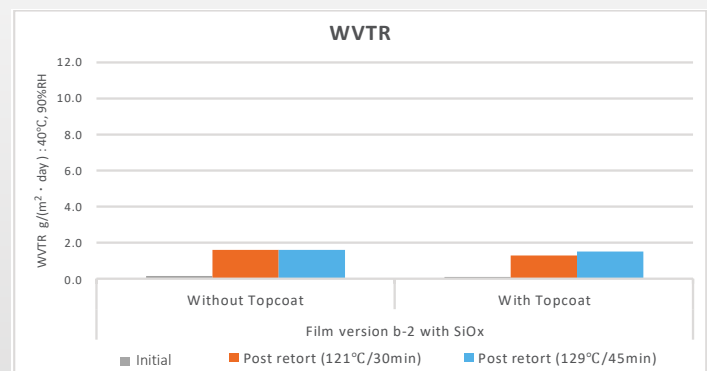
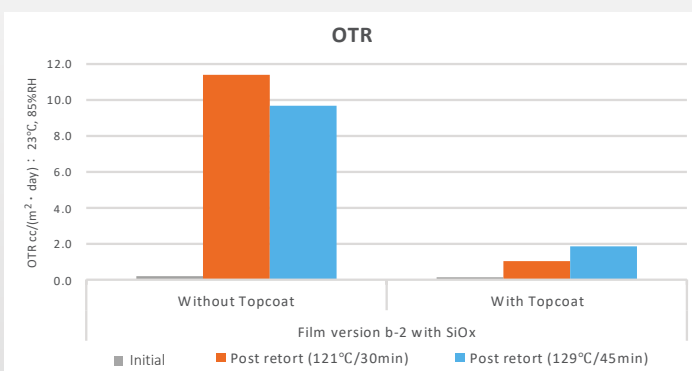
Brückner Maschinenbau, Mitsui Chemicals and Applied Materials have worked to develop a retort, high barrier, PP based packaging laminate that could help achieve a circular economy for flexible packaging.

Retort is a demanding application, with the exposure of the flexible packaging to high temperatures (typically >121°C) for protracted periods of time. Consequently, the film, barrier and coating must remain stable at elevated temperatures and not shrink, crack or degrade so the shelf life can be maximised. To achieve this, the three partners worked together to develop an optimised solution, with Brückner looking at the film, Applied Materials at the high barrier oxide coating and Mitsui Chemicals at the adhesive and topcoat chemistry and taking responsibility for making the laminate.



The key elements of the optimal solution are:

- 1) 20m, thermally stable, balanced BOPP film with high surface energy for improved bonding
- 2) An SiOx coating via EB evaporation on TopBeam™ equipment, optimized plasma pre-treatment and a post treatment
- 3) The application of a special cross-linked, high barrier, heat and humidity resistant coating



Results

Variants of film design, vacuum coatings and topcoats were tested for initial barrier and barrier after retort at 121°C for 30 mins and retort at 129°C for 45 mins. SiOx and a crosslinked topcoat on film version b-2 showed the most promising results, both before and after retort.

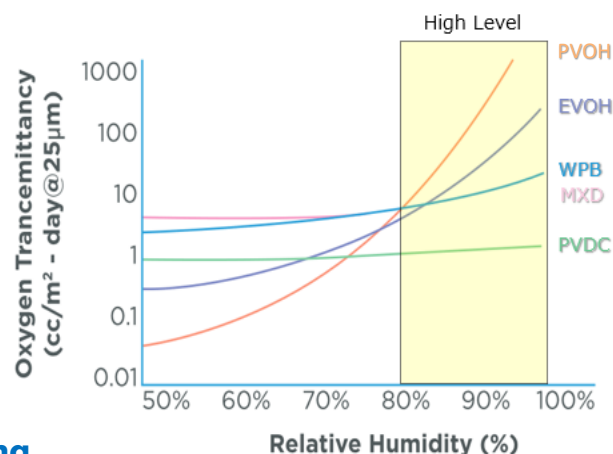
Conclusion

It is felt by the partners that with customer optimization and further trials, this solution could be further improved and commercialized quite quickly. We are open to discussion.

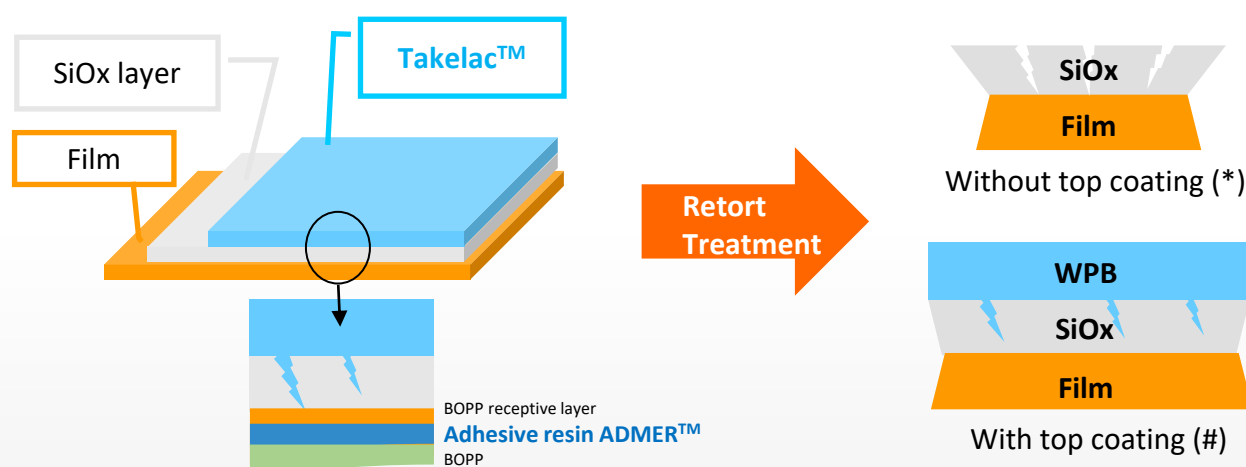
High humidity dependent barrier coating influence on the quality of retortable packaging, may damage the functional barrier such as metal layer / AlOx / SiOx. Current solutions (EVOH / ALU) are decreasing mono-material ratio. TAKELAC™ is a sustainable barrier coating Solution which can enhance heat resistance of packaging under high retort condition, gives superior gas barrier property on packaging application.

CUSTOMER BENEFITS

- ✓ Non-chlorine based polymer
- ✓ The humidity dependence on O₂ barrier property is excellent compared with PVOH and EVOH
- ✓ High flexibility and good adhesion with PO films
- ✓ Good printability (Dyne 55-58)



Takelac™ WPB series – Retortable barrier top coating ADMER™ – Adhesive resin



Schematic depiction of vacuum glass-coated (*) compared to a coating with Takelac™ WPB top protection coating (#).

ADMER helps to integrate BOPP receptive layer to SiOx layer. SiOx layer and our coating are making synergy effect on high barrier property before and after sterilization process; on high humidity and high heat condition. ADMER and Takelac WPB add real value to your products by Mitsui Chemicals's innovative polymer technology.

ADMER™ resins are modified polyolefins with functional groups, designed to bond to a variety of polyolefins, ionomers, PA, EVOH, BVOH, PVOH, polyester (e.g. PET), coatings, inorganics and metals. They serve as tie layer in multilayer applications and, thus, help to combine the excellent properties of incompatible materials, as, for example, gas barrier resins and moisture barrier resins.

KEY FACTS of ADMER™

- ✓ Maleic anhydride grafted PP to meet sustainable request
- ✓ Extrudable and stretchable
- ✓ Adhering to functional materials after sterilization process

-Contact detail-

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