



 **VISTA**SAFE™

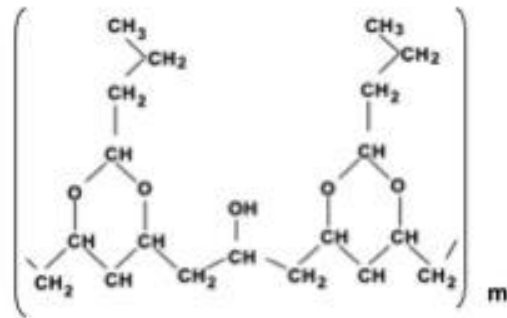
High Performance EVA Film for Laminated & Safety Glass



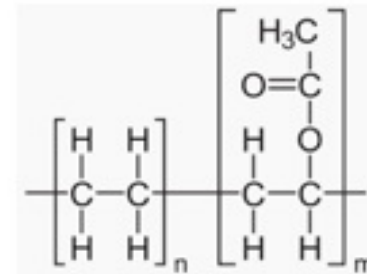
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Comparison between EVA and PVB

Comparison - Chemical Structure



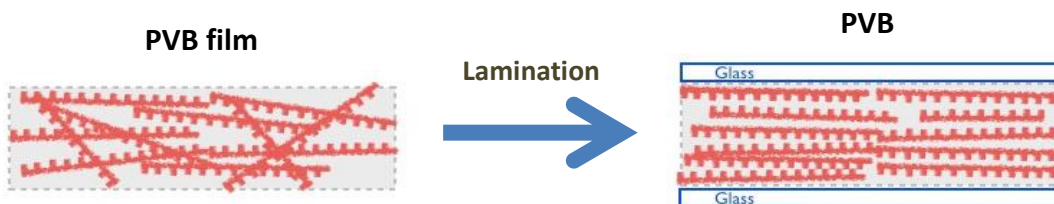
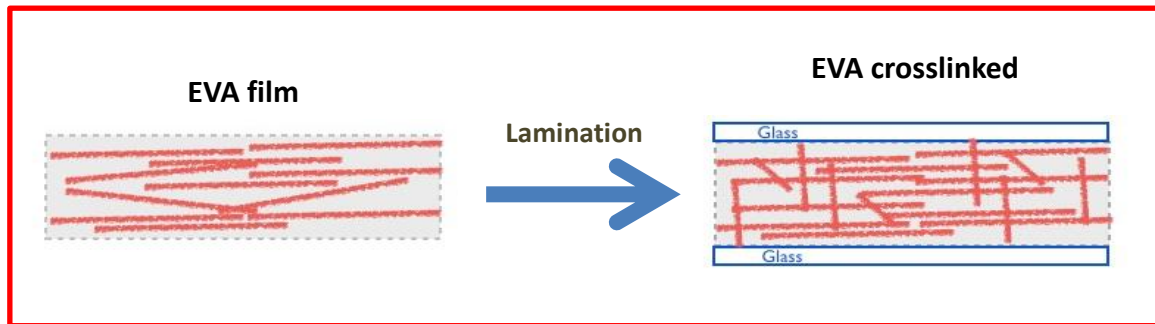
PVB structure



EVA structure

- Only one molecular structure
- Two different repetitive units
- Different properties and performance depend on its structure
- Can be used in an extended range applications

Comparison - Molecular Structure after Lamination Process

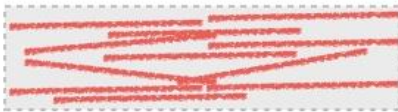


Processed EVA interlayer

- Is converted into chemically cross-linked EVA molecule (a thermoset product).
- Maintains its physical and chemical properties through time, withstanding changes from outside environment.
- Possesses high UV-stability, high adhesion to glass, high transparency and high elasticity.

Comparison - Molecular Structure after Lamination Process

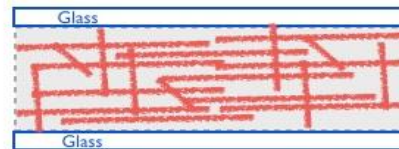
EVA film



Lamination



EVA crosslinked



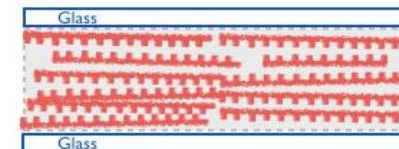
PVB film



Lamination



PVB



Processed PVB

- Unlike EVA, undergoes no chemical cross-linking reaction.
- Realigns its molecules and may change its form with changes in environment through time.

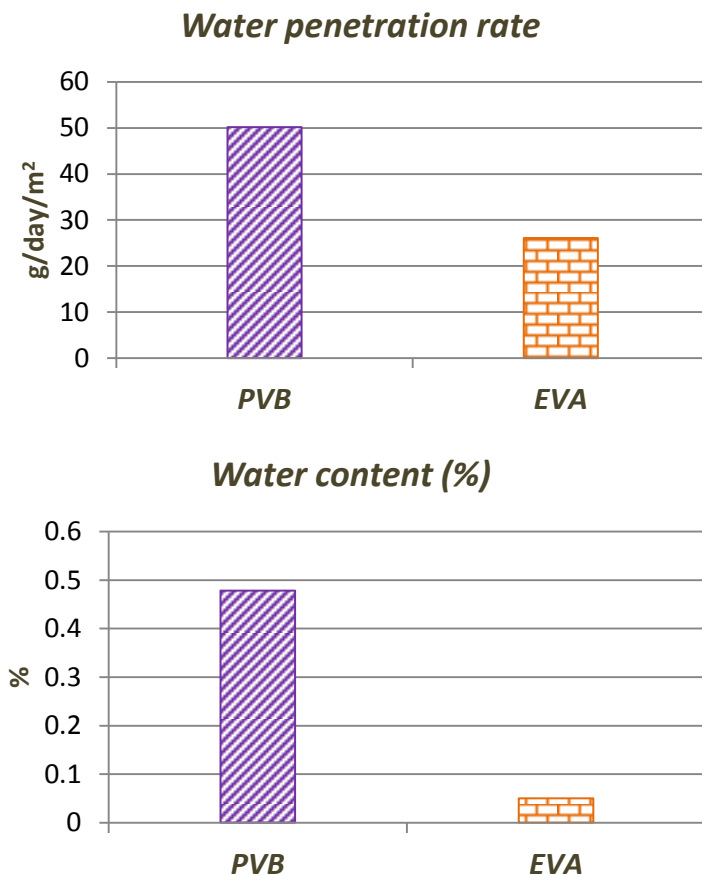
Comparison - Machine



EVA vs PVB

- The cost of the equipment needed for processing EVA is much lower than the one used to process PVB.
- To process EVA, heat and vacuum are needed. To process PVB, high pressure and heat are needed.

Comparison - Water Absorption Ability



EVA has an average of 2 times less tendency to permeate and absorb water than **PVB**.

This benefit allows ease in transportation and storage. Unlike PVB, EVA can be transported, stored, and processed without the needs to precondition the moisture content in the material.

Comparison - Water Absorption Ability

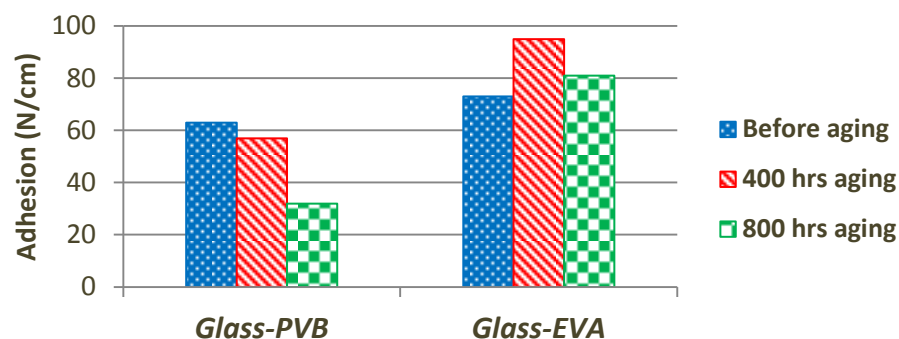


The following picture shows how delamination might happen in a floor glass with **PVB** laminated structure that is subjected to periodical cleaning jobs.

EVA, with lower moisture permeability rate, allows for better durability.

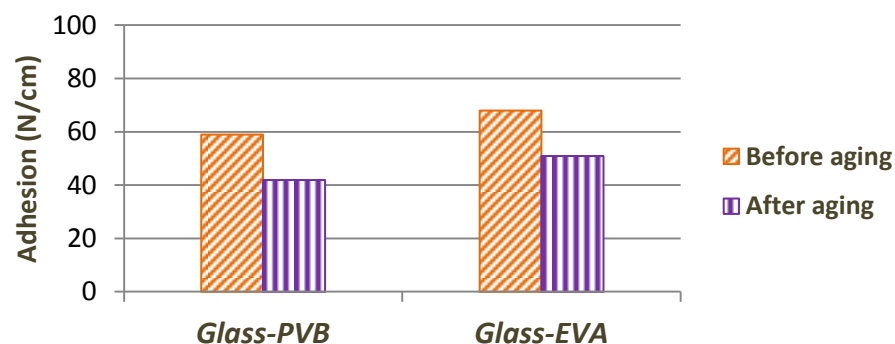
Comparison - Adhesive Strength

Adhesive strength of before and after UV aging

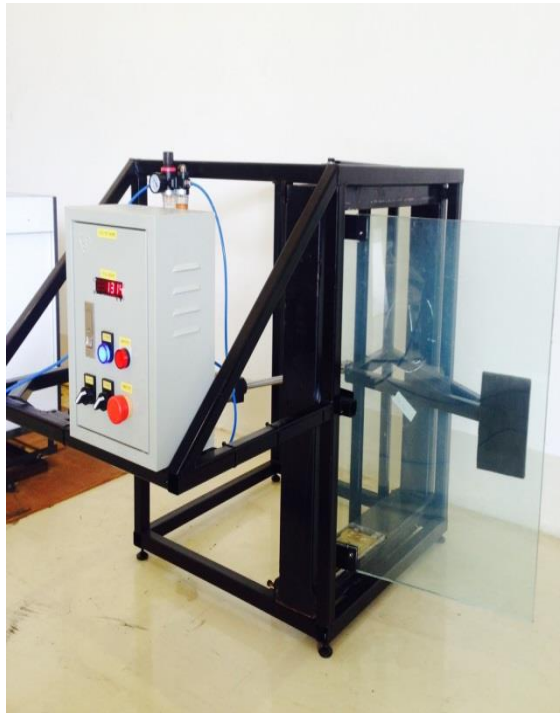


In both initial and long term tests, **EVA** has higher adhesion to glass than **PVB**.

Adhesive strength of before and after 1000 hrs damp heat



Comparison - Adhesive Strength



Door Opening/Closing Test

- Laminated glass using **PVB** film delaminates at fixing points after **50,000 times***.
- Laminated glass using **EVA** film shows good appearance after **100,000 times**.

* 1 time represents 1 cycle of opening and closing door.

EVA > PVB

Conclusion

Topic	EVA	PVB*
Cost	✓	✗
Investment	✓	✗
Operation	✓	✗
Transparency	✓	✓
Long term durability	✓	✗
Less sensitivity to moisture	✓	✗

* High quality PVB materials

 **VISTASAFE**™



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