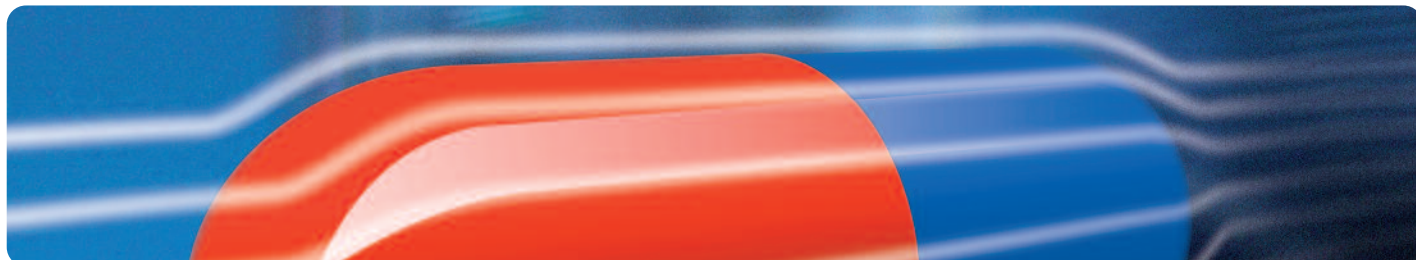


Honeywell Aclar® UltRx 6000 Film

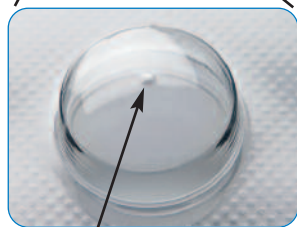
Technical Highlights for Thermoforming and Package Design Considerations



Honeywell Aclar® UltRx 6000 is an ultra-high moisture barrier, clear thermoformable film. It is Honeywell's highest barrier Aclar film grade and is designed for use in pharmaceutical blister packaging applications. Through Honeywell's world-wide converter partner network, this 6 mil (152 μm) film can be laminated to a variety of substrate materials including PVC, PP, PETG, PE and EVOH allowing the flexibility to choose a finished laminate that will meet your packaging needs.



Figure 1



evacuation port

Figure 2

Designing Your Blister Cavities

Aclar UltRx 6000 can be processed on conventional blister machines; no special equipment or tooling is required to successfully thermoform UltRx 6000 laminate. The standard guidelines outlined in our "Aclar® Films Thermoforming Guideline" and "Tooling Design Best Practices for Aclar® Films" apply for UltRx 6000. Extensive testing with the industry's most widely used machines produced high quality blisters and predictable and reproducible weight gain results (i.e. USP 671 or similar methods). Figures 1 and 2 show blisters manufactured with UltRx 6000 laminates. The photos are representative of the quality and detail achievable when thermoforming an UltRx 6000 laminate.

Push-Through Characteristics

When laminated to 10 mil (254 μm) PVC – the typical choice of the pharmaceutical industry – and thermoformed into larger-volume cavities, the formed blisters provide good crush resistance and acceptable push-through force.

Dosages contained in smaller cavities – possibly due to cavity design or inherent cavity shape – may be more difficult to push through a 10 mil (254 μm) PVC-UltRx 6000 forming web combination. Considerations for alternate substrate thicknesses, such as 7.5 mil or 6 mil PVC should be made as they may be more suitable for consumers attempting to push through size 4 and 5 capsules or tablets sized up to 10 mm in diameter.

Optimizing the Thermoforming Process

When forming UltRx 6000 laminates, more weight per unit area of forming web is being indexed through the thermoformer at any given line speed. As a result, the heat to be dissipated (kJ) to warm the web must be increased to get fully formed blisters.

Short heating plates (up to 500mm)

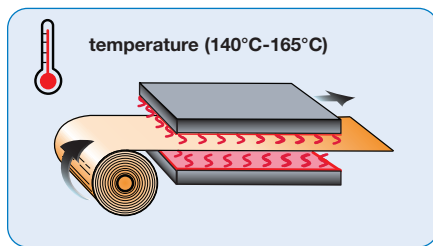


Figure 3a

Long heating plates (up to 900mm)

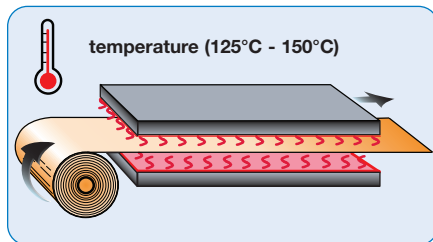


Figure 3b

Comparing Water Vapor Transmission Rates of Aclar® UltRx 4000 and Aclar® UltRx 6000

Conditions	WVTR (g/package/day)	
	UltRx 4000	UltRx 6000
30°C/ 65% RH	0.0004	0.0003
40°C/ 75% RH	0.0011	0.0007

Figure 4

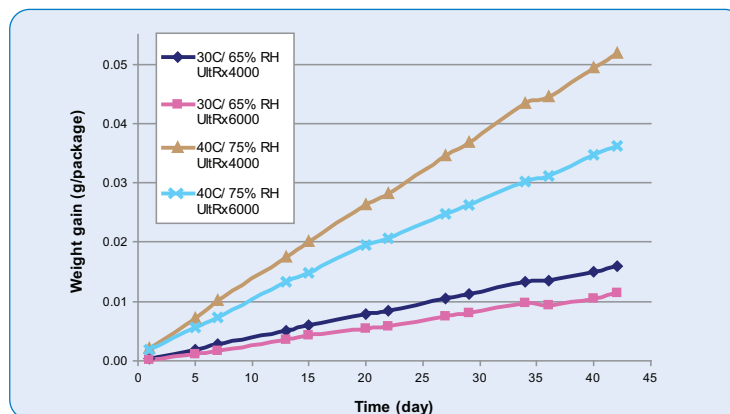
To optimize the forming process for UltRx 6000 laminate versus other laminates containing thinner Aclar film grades, the following guidelines apply:

- Increase temperature in the pre-heating station by approximately 5°C for machines having long heating platens. For shorter pre-heat platens, an increase of up to 20°C may be necessary. (Figures 3a and 3b)
- Reducing line speed is not recommended since slower line speeds may in some cases cause additional cooling of the pre-heated web prior to forming, resulting in under-formed cavities.
- If under-formed cavities or improperly formed reinforcement elements occur even with an increase in pre-heat temperature, the forming air pressure can be raised from 6 bar up to 8 bar.

Achieving Predictable and Reproducible Moisture Barrier Properties

When blisters are designed and thermoformed utilizing the guidelines recommended, uniform thickness distribution can be achieved in the cavities. A decrease in weight gain of 33% is predicted for formed blisters when the thickness of the Aclar film layer is increased from 4 mils (102 µm) to 6 mils (152 µm). This theoretical barrier improvement has been achieved with commercial forming equipment and proven through extensive weight gain testing. (Figures 4 and 5)

Moisture Barrier Performance of UltRx 6000 Laminate in Weight Gain Test



10 cavities per package; Cavity size: L=30mm; W=17.45mm; D=9.5mm

Figure 5

Summary

Aclar® UltRx 6000 film is the latest innovation from Honeywell. Honeywell Aclar pharmaceutical packaging films continue to set the global standard for high-barrier thermoform film for the pharmaceutical industry.

For additional information or to contact us, please visit: www.aclar.com

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