



DuPont Packaging

EASY-OPEN LIDDING: MAKING IT WORK EVERY TIME

W H I T E P A P E R

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Introduction

More and more products are going into containers with easy-opening peelable lidding. They're just right for food and other products catering to the on-the-go lifestyle: ready-to-use or heat-and-eat packages for one, a couple or a family. And for older consumers, easy opening is especially important in buying decisions.

The challenge for the maker of consumer packaged goods and for packaging converters is to make sure that easy-open lidding not only peels readily but also seals effectively. Leakers wreak havoc on the cost of operating packaging lines. And when leakers manage to get out the door, the consequences are bad for distributors, retailers and consumer loyalty.

There's quite an array of options for sealing easy-peel lidding. One of them, DuPont™ Appeel® lidding sealant resins, can do just about everything you want a peelable seal to do. Unlike some alternatives, lidding seals using Appeel® work consistently, from one package to the next, day in and day out. They:

- Protect product freshness and fight messy leakers with reliable hermetic seals.
- Please consumers with consistent, tear-free peeling.
- Protect the environment; converters make lidding with Appeel® using solvent-free extrusion processes with dramatically lower VOC emissions than solvent-based lacquer coating.
- Run more efficiently on packaging lines with fewer hang-ups and rejects than alternatives.

Why Appeel® Seals So Consistently

Several key attributes of Appeel® are crucial for consistent hermetic seals.

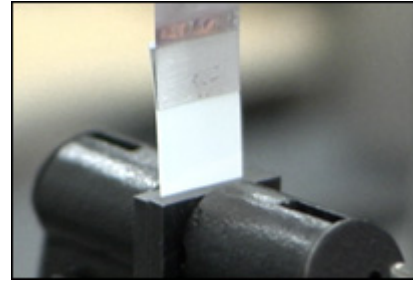
- It flows into and caulks tiny imperfections on the container rim during heat sealing.
- A ready-to use preformulated material, Appeel® avoids potential variations of in-house blends.
- It seals reliably over a broad temperature range.

Just-Right Peeling

Appeel® also delivers the level and type of peel strength required.

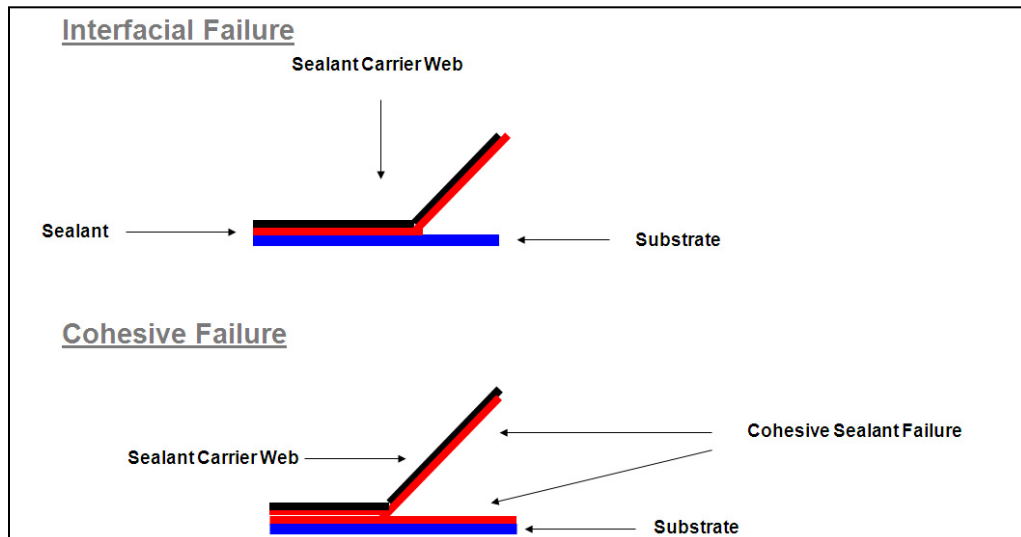
- A wide range of grades with different levels of peel strength on various container materials is available (**Figure 1**).
- Lidding with Appeel® peels easily and consistently, avoiding problems of torn lids that disappoint consumers.
- Our range also lets you choose the peeling mode: interfacial separation for most products or cohesive separation to provide tamper-evident seals for medical supplies and devices (**Figure 2**).

Figure 1 - Instron Test of Peel Strength



Peel strength testing underscores the versatility of the DuPont™ Appeel® range in meeting different requirements for peelability.

Figure 2



DuPont™ Appeel® grades for either interfacial failure or cohesive failure are available.

For real-world examples of how Appeel® reduces leakers and assures easy-open convenience for yogurt and juice packages, please check the sidebar panels on pages 4 and 5.

Meets Most Needs

Appeel® works well with a wide range of product and container types (**Figure 3**).

- It seals to just about all container substrates.
- It's approved for direct food contact under many conditions of use.
- It's suitable for packaging most foodstuffs, including water-based, acidic and fatty products.
- Grades suitable for hot-filled, pasteurized, microwaveable and retortable packages are available.

Figure 3



Food and nonfood products of various kinds benefit from consistent hermetic seals provided with DuPont™ Appeel® lidding sealants.

Appeel® also delivers benefits in your packaging operation.

- It can allow faster line speeds and lengthen the life of heating elements, thanks to its lower seal initiation temperature than some alternatives.
- It minimizes process upsets and leaker rejects with a wide sealing-temperature window.
- It can avoid stringy filament problems occurring with some alternatives during lid die-cutting.
- It may enable a reduction in SKU count because a single grade of Appeel® can often supplant multiple lacquer or hot-melt formulations.
- It can tolerate temperature spikes during process upsets better than heat-sensitive sealants.
- Unlike alternatives that deteriorate with age, it has excellent storage stability.

Last but not least, Appeel® comes from DuPont. The DuPont team of packaging experts can draw on our unmatched knowledge of sealing science and more than 50 years of company experience in meeting the needs of packaged goods manufacturers.

Now is the time for you to take the next step toward reducing leakers and ensuring consistently easy opening of your peelable-seal packages. Please contact a DuPont location in your part of the world. You'll find more information, including contact details at <http://packaging.dupont.com>.

Profile: Solving Seal and Peel Problems for Single-Serving Food Cups



In lidding for yogurt cups, a leading food processor virtually eliminated leakers and torn lids by replacing a laminate of a blown film sealant to aluminum foil with foil extrusion-coated with

DuPont™ Appeel® lidding sealant resin.

The company formerly packed yogurt and other dairy products in single-serve polypropylene (PP) cups with two closures: 1) the heat-sealed foil laminate lid using blown film as a sealant; and 2) a molded plastic overcap.

In order to save cost and reduce packaging waste, the food processor wanted to eliminate the overcap, but two problems arose. One was leaker evidence: the overcap had been providing a secondary seal that concealed and compensated for leaks under the imperfectly sealed blown film laminate lid. The other problem associated with the incumbent lidding structure arose when the packager changed its supplier of PP cup stock: lids began tearing when peeled, failing to come off in one piece.

Switching from the blown sealant film to Appeel® solved both the sealing and the peeling problems. The food processor's converter partner followed up on its success on yogurt cups by extending the use of lidding using Appeel® to additional single-serving food products.

Appeel® enabled the packager to produce reliable hermetic lid seals that easily peeled in one piece from thermoformed and injection molded PP cups. The packager reports zero end-user complaints since the switch to Appeel® and a sharp reduction of leakers and rework. The converter is benefiting in two ways: 1) cost savings, thanks to longer production runs with extrusion-coated Appeel® versus sourcing blown film for lamination from various suppliers; 2) promotion to preferred supplier status at a major manufacturer of consumer packaged goods.

The Appeel® formulation used for this application was originally developed for sealing to PP. It has also proven to make excellent peelable seals for CPET, PET and HIPS.

Profile: Bye-Bye to Leaking Frozen Juice Cups



Switching to DuPont™ Appeel® lidding sealant resin for frozen juice containers made of high-impact polystyrene (HIPS) sharply reduced leaker complaints from the field.

Frozen juice containers experience freeze-thaw cycles as they move along the distribution chain. This produces a partial vacuum inside the container

that can pop a lid seal that does not have sufficient sealant and burst strength. A single leaking container ruins an entire case of product.

Switching from a lacquer sealant to Appeel® enabled the customer to produce packages with the required levels of seal and burst strength, thus solving a leaker problem primarily caused by freeze-thaw cycling.

DuPont™ Appeel® enables low sealing temperatures and can make seals combining high vacuum resistance with excellent peelability on a wide range of container materials. In addition to HIPS, it can be sealed to HDPE, PP, PET, PVC, epoxy, Barex® & Aclar®.

The converters supplying the lidding structures for the juice and yogurt containers described in the article listened to the product packagers' needs and took action to meet them. Each formed a collaboration with DuPont to design an Appeel® lidding sealant enabling the delivery of a lidding structure raising the performance bar to delight and please the consumer with repeatable easy-open performance.

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