ExxonMobil
Signature Polymers

Case Study


Exceed™ Tough+

# Food packaging films that can reduce material use while maintaining performance

**Application benefits:**

- Use less materials
- Excellent needle puncture resistance
- Prevents air leakage
- Cost savings

## Challenge

### Develop packaging solutions that can help reduce rice waste while using less plastic

Society in general is embracing the concept of sustainability, helping to drive actions in food packaging innovation that can contribute to the reducing of food waste by improving package integrity while requiring less plastic for the production of the packaging. Responding to value chain demand, Yihai Kerry Arawana Holdings Co., Ltd., a leading agricultural and food products' processing enterprise in China, wanted to develop packaging solutions that help reduce rice waste by improving the integrity of its traditional vacuum bags, while using less plastic with thinner films.

## Solution

### Exceed™ Tough+ m 0814 metallocene polyethylene-based packaging films

YiHai Kerry collaborated with ExxonMobil to solve air leakage issues in its vacuum bags. Incorporating ExxonMobil's Exceed Tough+ m 0814 metallocene polyethylene (PE) resins into vacuum bags led to thinner yet stronger packaging, while reducing material use to help meet YiHai Kerry's sustainability goals of downgauging plastic packaging.

"Combining ExxonMobil's innovative performance polymer and application expertise with Kerry's industry insights led to the successful development of a new generation of vacuum rice bags," said Shang Peilei, Technical Director of Packaging, YiHai Kerry.

Exceed Tough+ m 0814 metallocene PE resins are used in the film formulation to deliver step out mechanical properties, especially for toughness requirements like needle puncture, dart impact, and flex crack resistance. Exceed Tough+ performance PE also provides easy extrudability and good bubble stability.

益海嘉里 金龙鱼

# Results

### Tougher and thinner bags using Exceed™ Tough+ m 0814 metallocene PE enhance protection of rice and flour

Using Exceed Tough+ m 0814 delivers thinner and tougher vacuum bags. Compared to the existing rice bags, the PE thickness of the new solution is reduced by 11% to 120-micron, while needle puncture and flex crack resistance are significantly enhanced.

The new generation rice bag greatly reinforces the vacuum retention rate throughout the supply chain to meet Kerry's high quality standards.

In addition, a 110-micron solution has also been developed that provides further downgauging opportunities, potential cost savings and lightweighting.

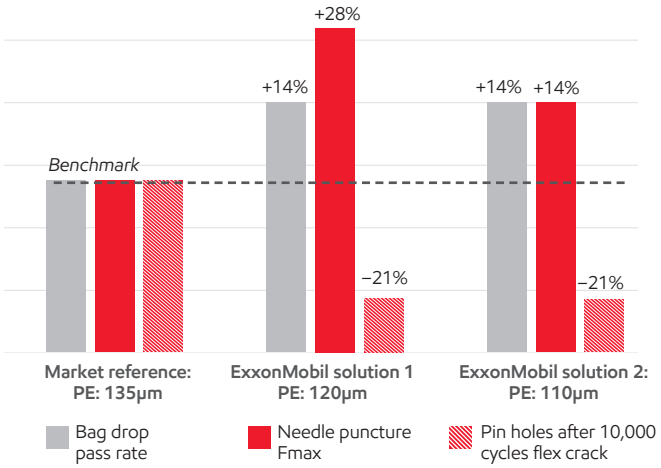
"Value chain collaboration has been key in the development of new packaging solutions which have enabled YiHai Kerry to realize sustainability benefits from the new packaging such as downgauging/less material, energy and water use, which all help the company meet its environmental and social responsibilities," said Shang Peilei.

New 5kg and 10kg JinLongYu (a brand owned by YiHai Kerry) rice bags were introduced commercially in the second half of 2020. According to YiHai Kerry, the new downgauged solution used 340 tons less PE in 2021 than the existing bags used in 2020, and saved an estimated 11 x $10^9$ kJ of energy and 39K tons of water*.

The downgauged rice bag solution has been so successful in the market that Kerry will transfer the learnings to other packaging applications. The next step is to launch Exceed Tough+ m 0814-based flour packaging with excellent bag drop performance. New flour packaging could save up to 200 tons of PE per year based on downgauging the PE layer by at least 20% without affecting the bag integrity.

* YiHai Kerry estimates are based on public sources that to produce 1 ton of polyethylene, 32.3 x $10^6$ kJ of energy and 114 tons of water are needed.

### Rice bag performance comparison




• Test based on ExxonMobil typical formulation, PA//PE lamination structure.
• Data from tests performed by or on behalf of ExxonMobil.

### Flour bag performance comparison


* Test based on ExxonMobil typical formulation; PE thickness comparison based on designed thickness.
** Bag drop was performed by YiHai Kerry based on PA//PE lamination structure.

| Testing items | Test methods |
|---|---|
| Needle puncture Fmax | ExxonMobil test method |
| Pin holes after 10,000 cycles flex crack | ExxonMobil test method |
| Bag drop (rice bag) | ExxonMobil test method |
| Bag drop (flour bag) | Kerry test method |

Contact us for more information: **exxonmobilchemical.com/pe**

ExxonMobil Signature Polymers

**Bring your impossible**

# What's new: ExxonMobil Signature Polymers

All our polymers are now positioned under a single portfolio brand: Signature Polymers. The aim is to simplify our product architecture and naming to improve portfolio navigation for you. We would like to stress that our commitment to high quality products remains the same, it is the names that change. Everything else remains the same. We will be making these modifications over the next six months so you will see both old and new grade names highlighted during that time.

Here's a quick overview of brands and grade names that have changed in this document:

| Legacy commercial name | New commercial name |
| --- | --- |
| Exceed™ XP 8784 | Exceed™ Tough+ m 0814 |

Some of our existing Exceed, Achieve, Paxon and premium PP/HD grades have moved to Exceed brand; most existing Enable grades have moved to Exceed Flow[+]; most of our existing Exceed XP grades have moved to Exceed Tough[+]; most of our existing Exceed S grades have moved to Exceed Stiff[+]. More details here **https://www.exxonmobilchemical.com/en/brands/signature-polymers/exceed_high_performance_polymers** or contact your ExxonMobil representative to know more.

**Want to see what's changed in our portfolio?** Go to **exxonmobilchemical.com/sptransform**