



Vistamaxx™ performance polymers

## Improve impact strength and hinge flexibility of food container lids

Ningbo Lisi Houseware Co., Ltd. (Lisi), a leading manufacturer of food containers based in Zhejiang Province, China, has turned to Vistamaxx™ performance polymers from ExxonMobil to improve the impact strength of its food containers made from random copolymer polypropylene (RCP). Vistamaxx performance polymers also provide better lid hinge flexibility and maintain clarity.

	Improved impact strength		Enhanced flexibility		Clarity maintained		Food contact safety		Easy to use
-------------------------------------------------------------------------------------	--------------------------	-------------------------------------------------------------------------------------	----------------------	-------------------------------------------------------------------------------------	--------------------	---------------------------------------------------------------------------------------	---------------------	---------------------------------------------------------------------------------------	-------------

### RCP strength an issue

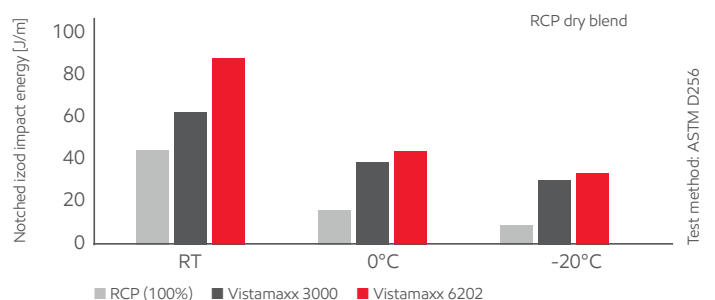
Lisi used RCP to manufacture food containers because it offers good clarity and is odorless. The company discovered, however, that RCP lacked the impact strength, especially at low temperatures, and flexibility required by many of its customers. Also, when RCP is used for the container lid hinge, stress whitening could be an issue. As the company used the industry standard 0.3-0.6 mm thickness for the hinge, it tested strengthening additives to modify the RCP. While impact strength could be increased, clarity could not be maintained and the hinge continued to display stress whitening.

### New possibilities with Vistamaxx™ performance polymers

Lisi turned to Vistamaxx performance polymers from ExxonMobil. Tests, undertaken by or on behalf of

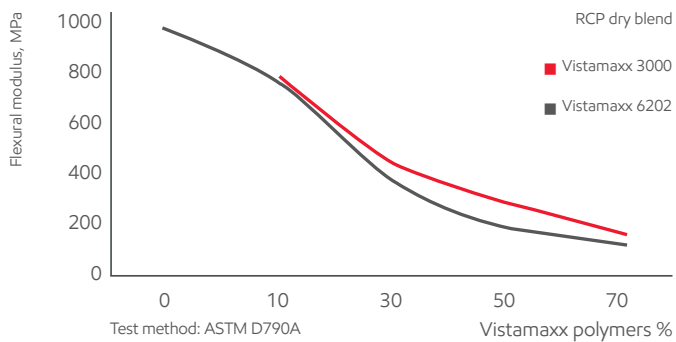
ExxonMobil, indicated that when RCP is dry blended with 10 percent Vistamaxx™ 3000 or Vistamaxx 6202, the impact strength increases within a range from room temperature down to minus 20°C (minus 4°F). The improvement in impact strength is more pronounced at lower temperatures.

**Figure 1: Impact strength - 10% Vistamaxx performance polymers in RCP**



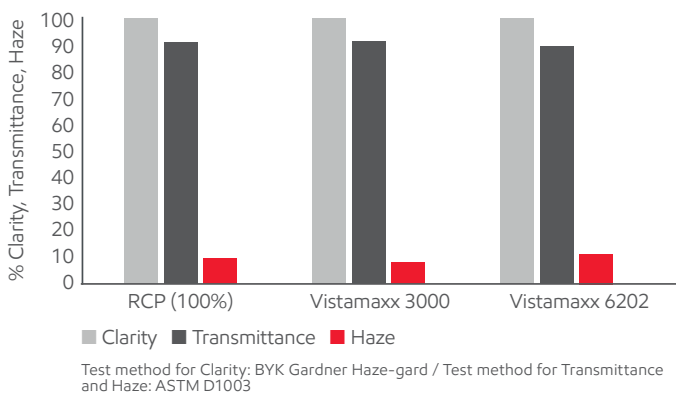
The material also becomes more flexible when RCP is dry blended with Vistamaxx™ 3000 or Vistamaxx 6202. Flexibility increases with the dosage of Vistamaxx performance polymers.

**Figure 2: Flexural modulus**



The clarity, light transmittance and haze of the original material are virtually the same when RCP is dry blended with 30 percent Vistamaxx 3000 or Vistamaxx 6202.

**Figure 3: Optical properties - 30% Vistamaxx performance polymers blended with RCP: 1 mm thick discs**



## Enhanced products

Freezing tests, undertaken by Lisi, indicate that modifying RCP with a small percentage of Vistamaxx polymers improves impact strength of the container lid, even at temperatures between 0°C (32°F) and minus 20°C (minus 4°F).

Meanwhile, Lisi's cornering fatigue tests show that Vistamaxx polymers deliver improved hinge flexibility which contributes to the durability of the lid. Of all the additives tested by Lisi, only Vistamaxx performance polymers increased lid hinge impact strength during

the freezing test, maintained clarity and reduced stress whitening. Easy to use, Vistamaxx performance polymers can be dry blended with the RCP before injection molding. This is done on existing equipment without additional investment in equipment or technology.

Vistamaxx performance polymers can also enhance the elasticity of RCP used in the body of the food container. This can improve the seal structure of the container. Because the body is softer, the harder lid can seal without the use of seal rings. This design simplification can result in a 10 percent manufacturing cost reduction.

Vistamaxx performance polymers are also compliant with many international food contact regulations, such as US FDA, EU and JOSPFA, and is on the Chinese Positive List for resins permitted in food packaging products. This saves time, as no pre-qualification of the material is required and speeds up time to market.

Item	Freezing Test	Cornering Fatigue Test
Conditions	<ul style="list-style-type: none"> <li>Sample lid cooled to -20°C for four hours before the test</li> <li>Sample dropped to the ground from a height of 76 cm</li> </ul>	<ul style="list-style-type: none"> <li>Room temperature</li> <li>Open/close the hinge 100,000 times</li> </ul>
Results	No breakage of the lid	No hinge breakage
References	Samples using other toughening agents are likely to break in this test	Industry standard: no breakage after opening/closing 10,000 times

## Better performance, increased sales

Using Vistamaxx performance polymers to modify RCP has enabled Lisi to offer food container lids with improved durability while remaining transparent. This has increased the company's competitiveness in the food container industry and, as a result, Lisi's food containers have enjoyed a significant growth in sales.

"Due to the balance of physical properties delivered by Vistamaxx performance polymers, the quality and performance of our food container lids have improved significantly. We will use Vistamaxx in other applications," said Mr. Qinghua Zeng, R&D Manager, Ningbo Lisi Houseware Co., Ltd.

## 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 names that change. Grade slate of Vistamaxx™ performance polymers will keep unchanged.

Want to see what's changed in our portfolio? Go to [exxonmobilchemical.com/sptransform](https://exxonmobilchemical.com/sptransform)

Contact us for more information: [exxonmobilchemical.com/vistamaxx](https://exxonmobilchemical.com/vistamaxx)

**ExxonMobil**  
*Signature Polymers*

**Bring your impossible**



©2024 ExxonMobil. ExxonMobil, the ExxonMobil logo, the interlocking "X" device and other product or service names used herein are trademarks of ExxonMobil, unless indicated otherwise. This document may not be distributed, displayed, copied or altered without ExxonMobil's prior written authorization. To the extent ExxonMobil authorizes distributing, displaying and/or copying of this document, the user may do so only if the document is unaltered and complete, including all of its headers, footers, disclaimers and other information. You may not copy this document to or reproduce it in whole or in part on a website. ExxonMobil does not guarantee the typical (or other) values. Any data included herein is based upon analysis of representative samples and not the actual product shipped. The information in this document relates only to the named product or materials when not in combination with any other product or materials. We based the information on data believed to be reliable on the date compiled, but we do not represent, warrant, or otherwise guarantee, expressly or impliedly, the merchantability, fitness for a particular purpose, freedom from patent infringement, suitability, accuracy, reliability, or completeness of this information or the products, materials or processes described. The user is solely responsible for all determinations regarding any use of material or product and any process in its territories of interest. We expressly disclaim liability for any loss, damage or injury directly or indirectly suffered or incurred as a result of or related to anyone using or relying on any of the information in this document. This document is not an endorsement of any non-ExxonMobil product or process, and we expressly disclaim any contrary implication. The terms "we," "our," "ExxonMobil Product Solutions" and "ExxonMobil" are each used for convenience, and may include any one or more of ExxonMobil Product Solutions Company, Exxon Mobil Corporation, or any affiliate either directly or indirectly stewarded. V0719-033E49