

Enhancing the environmental stress crack resistance of HDPE

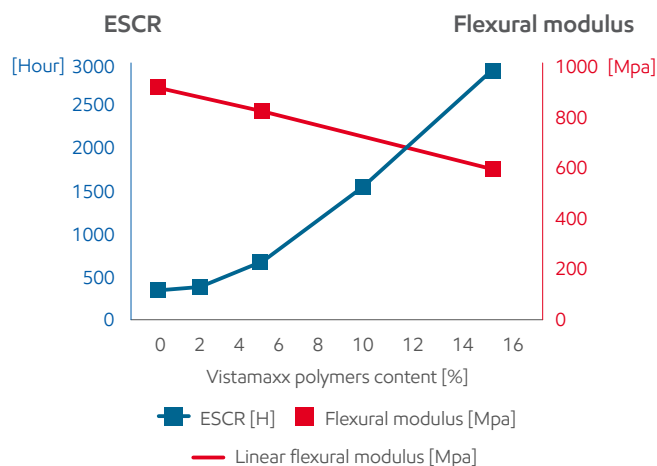


Vistamaxx™ performance polymers can be used to improve the Environmental Stress Crack Resistance (ESCR) of high density polyethylene (HDPE). Because parts made with Vistamaxx enhanced HDPE are tougher than those made with pure HDPE, they are less likely to fail through environmental stress cracking.

Environmental Stress Cracking is a physical phenomenon that is initiated as a slow surface crack. It can lead to a catastrophic breakdown or failure of a plastic material or part. Environmental Stress Cracking can be accelerated in the presence of surface-active substances such as alcohols, soaps and wetting agents. Each substance can have a varying degree of impact on the material or part. ESCR improves with increasing molecular weight, a broad molecular weight distribution and lower MFR/MI (melt flow rate/melt index).

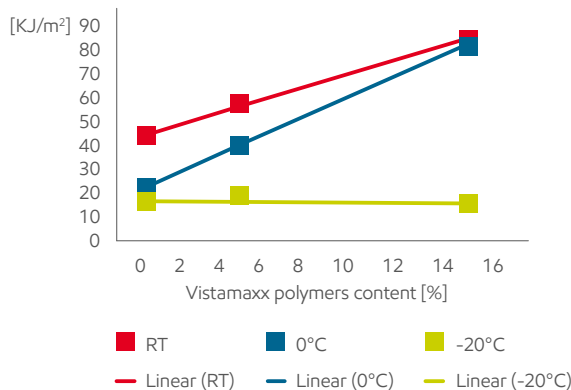
Vistamaxx performance polymers provide new possibilities to improve and extend the properties of HDPE. Easy to disperse and highly compatible, Vistamaxx polymers are particularly effective in enhancing ESCR in HDPE, as well as improving impact resistance. Depending on the environment, the addition of 10% Vistamaxx polymers can increase the ESCR by up to 500%.

ExxonMobil™ HPA 020 HDPE resin blended with Vistamaxx 6102



ESCR F₁₀₀ experiments carried out in 10% Igepal solution at 50°C.

Izod Notched



Key advantages of adding Vistamaxx™ performance polymers to HDPE:

- **Improved Environmental Stress Cracking Resistance**
 - Longer material/part life
 - Enhanced reusability of containers
 - Enables use of less expensive substitute

Applicable applications that can benefit:

- **Extrusion blow molded parts requiring ESCR performance**
 - Consumer and industrial bottles
 - IBC and storage tanks designed to contain detergents, solvents or other chemical
- **Pipes and tubing**

To ensure effective data when implementing ESCR testing, consider side by side testing taking into account test conditions like temperature, surfactant, container type and weight as well as resin used.



Test Methods / Description:

Izod Impact – internal method OMP: TP-03-21 (based on ISO180/1A), notched (Samples: 80 x 10 x 4mm, with notch: V-type, 2mm depth. (Type: A))

Flexural Modulus – internal method OMP: TP-03-12 (based on ISO 178) (Sample: 80 x 10 x 4mm, Testspeed: 1,71mm/min, Span: 64mm, radius: 5mm.

Environmental Stress Cracking Resistance– internal method MEZ068 (ASTM D-1693)

All testing was conducted at room temperature unless otherwise stated.

About Vistamaxx™ performance polymers

Vistamaxx polymers are unique metallocene copolymers of propylene and ethylene. They allow specific properties of polypropylene (PP) and polyethylene (PE) compounds to be tailored to meet different application needs. These properties include elasticity, toughness, flexibility, adhesion, clarity, and stress whitening.



Contact us for more information:

exxonmobilchemical.com/vistamaxx-compounding

©2014 Exxon Mobil Corporation. To the extent the user is entitled to disclose and distribute this document, the user may forward, distribute, and/or photocopy this copyrighted document only if unaltered and complete, including all of its headers, footers, disclaimers, and other information. You may not copy this document to a Web site. ExxonMobil does not guarantee the typical (or other) values. Analysis may be performed on 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, 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. There is no endorsement of any product or process, and we expressly disclaim any contrary implication. The terms, “we”, “our”, “ExxonMobil Chemical”, or “ExxonMobil” are used for convenience, and may include any one or more of ExxonMobil Chemical Company, Exxon Mobil Corporation, or any affiliates they directly or indirectly steward. ExxonMobil, the ExxonMobil Logo, the Interlocking “X” Device, and all other product names used herein are trademarks of ExxonMobil unless indicated otherwise. Images are demonstrative of typical applications for ExxonMobil Chemical products and are taken from commercially available products.