Enhancing the environmental stress crack resistance of HDPE

Vistamакс™ performance polymers can be used to improve the Environmental Stress Crack Resistance (ESCR) of high density polyethylene (HDPE). Because parts made with Vistamакс 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).

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

**ExxonMobil™ HPA 020 HDPE resin blended with Vistamаксx 6102**

**Izod Notched**

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

- **ESCR [H]**
- **Flexural modulus [Mpa]**
- **Linear flexural modulus [Mpa]**

**Linear (RT)**
- **Linear (0°C)**
- **Linear (-20°C)**
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:

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