

when
technology
matters

Elevast™ Polymer Modifiers

New Plasticizers for Polyolefin Elastomers

ExxonMobil
Chemical

ELEVAST™

elevate your expectations



Polymer modifiers
for increased

Durability
Elasticity
Permanence

www.elevast.com

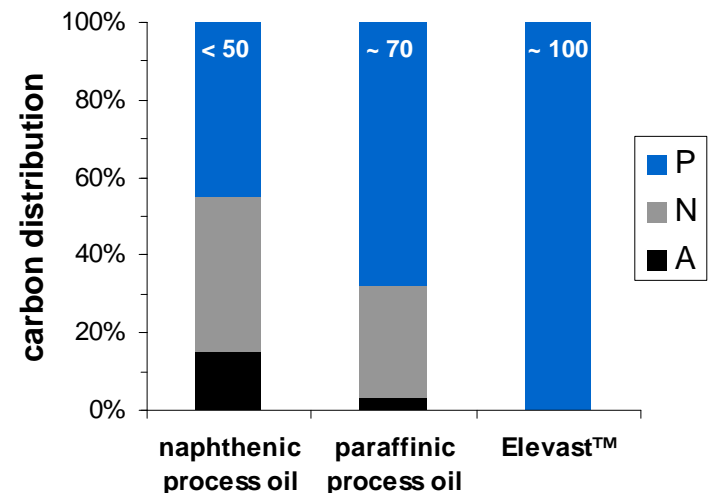
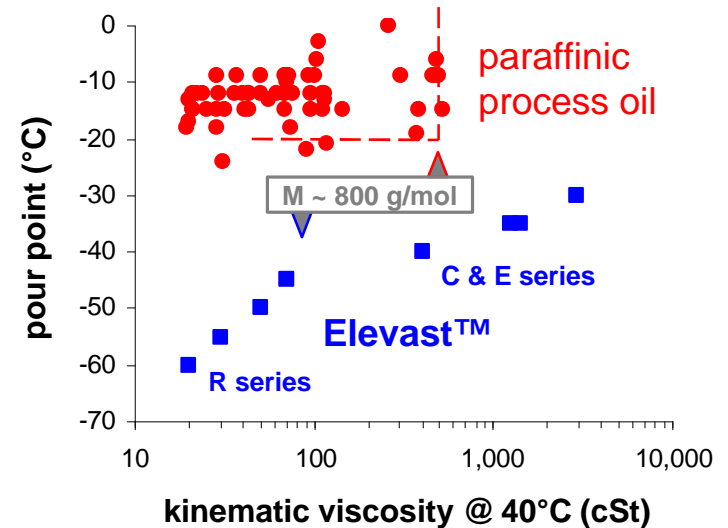
Elevast™ Polymer Modifiers – Technology Platform

- **Specialty hydrocarbon fluids for tailoring polyolefin performance**
 - Innovation based on proprietary technology platform
 - Applicable to a broad range of polyolefins and applications
 - Provides a novel balance of properties, ability to extend property ranges
 - Improves processing efficiency

- **Focus of this presentation**
 - Use of Elevast™ as a plasticizer for polyolefin elastomers
 - Advantages over conventional process oils
 - synergistic with curing agents
 - processing improvements
 - property improvements
 - Demonstrated for peroxide-cured EP(D)M formulations

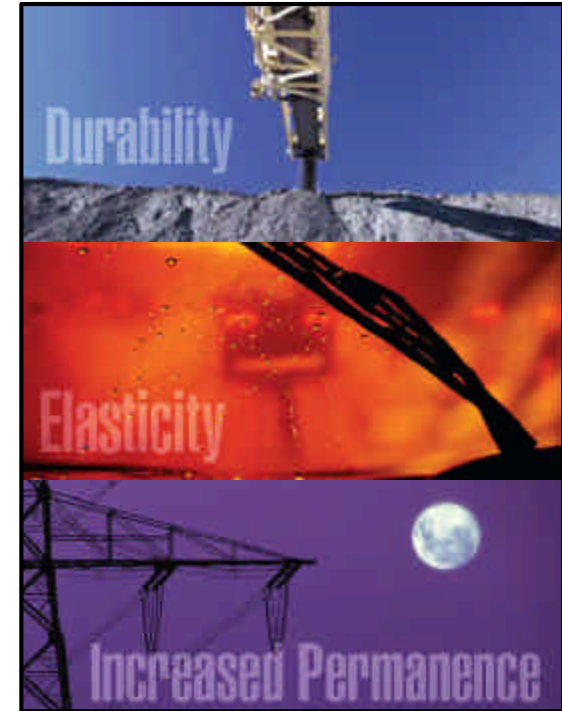
Elevast™ – A Premier Plasticizer for Polyolefin Elastomers

- **Ideal plasticizer should be ...**
 - Efficient, permanent, no “side effects”
- **Paraffinic process oils have limitations**
 - Pour point / viscosity “box”
 - Non-paraffinic content
- **Elevast™ Technology**
 - Exceptionally low pour point
 - efficient plasticization to very low temperatures
 - High permanence
 - high compatibility, low volatility
 - Fully paraffinic
 - negligible interference with other ingredients
 - High purity
 - water-white color, low odor



Potential Competitive Advantages with Elevast™

- **Faster processing, for increased productivity**
 - Higher rate of cure
 - Lower compound Mooney viscosity
- **More effective use of cure agents**
- **Superior properties, especially at temperature extremes**
 - Higher state of cure
 - lower compression / tension set
 - increased modulus, tensile strength
 - increased tear resistance
 - reduced oil swell
 - Lower glass transition temperature
 - improved low-temperature flexibility and toughness
 - Superior permanence
 - longer retention of properties upon heat aging
 - reduction or elimination of exudation problems (fogging, bleeding, blooming, iridescence)

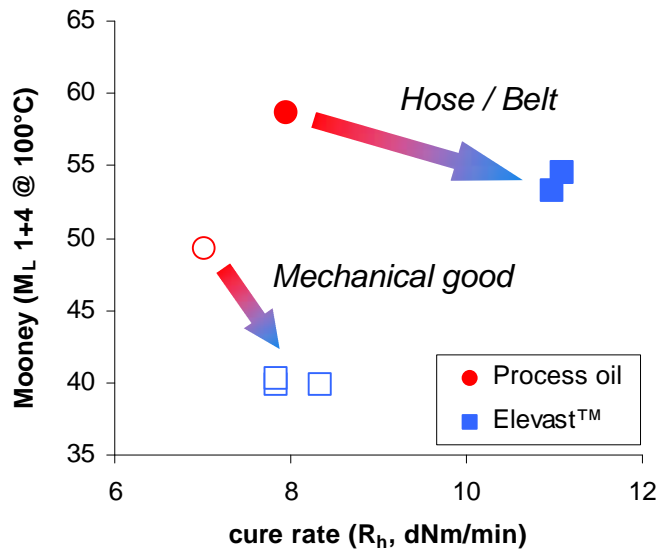


Elevast™ in Example EP(D)M Formulations

Formulation (parts by weight) :	Hose / Belt		Mechanical good
	1	2	3
EPM / EPDM			
Vistalon™ 706 / Vistalon™ 7500 (70/30)	100	100	
Vistalon™ 785 / Vistalon™ 8800 (50/50)			100
Carbon black + mineral filler	140	125	130
Plasticizer (Elevast™ or paraffinic process oil)	50	50	50
Peroxide	9	9	10
Antioxidants and other ingredients	9	6	9
	308	290	299

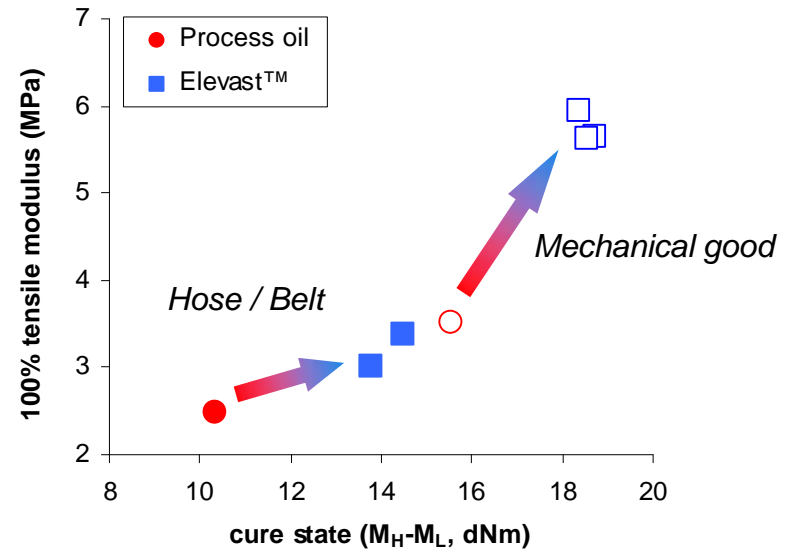
Improved processibility

Cure rate ↑ Mooney ↓



Improved properties

Cure state ↑ Modulus, elasticity ↑



Superior Heat Aging Performance

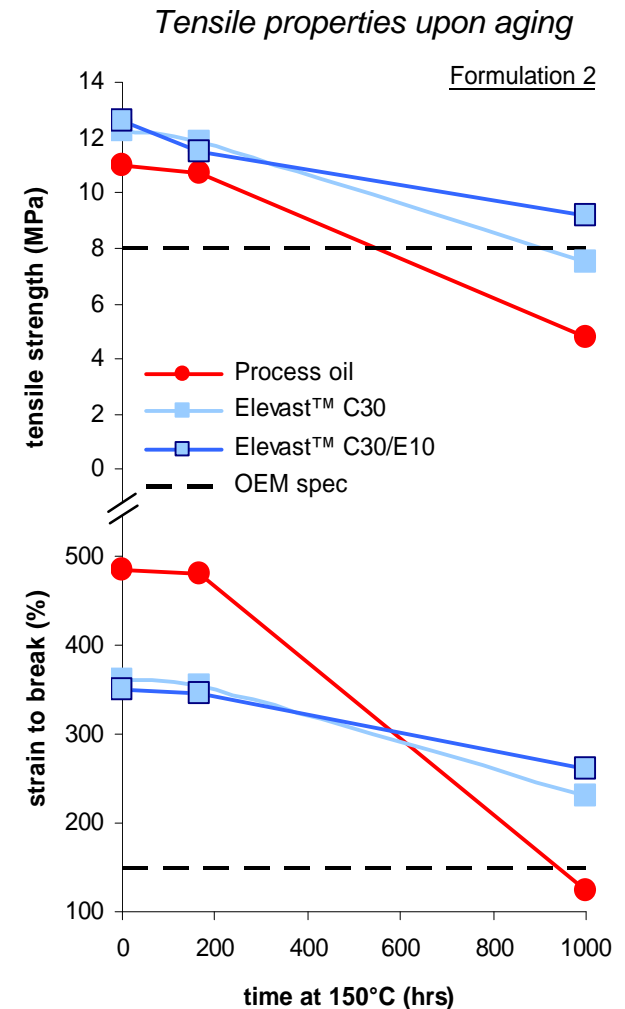
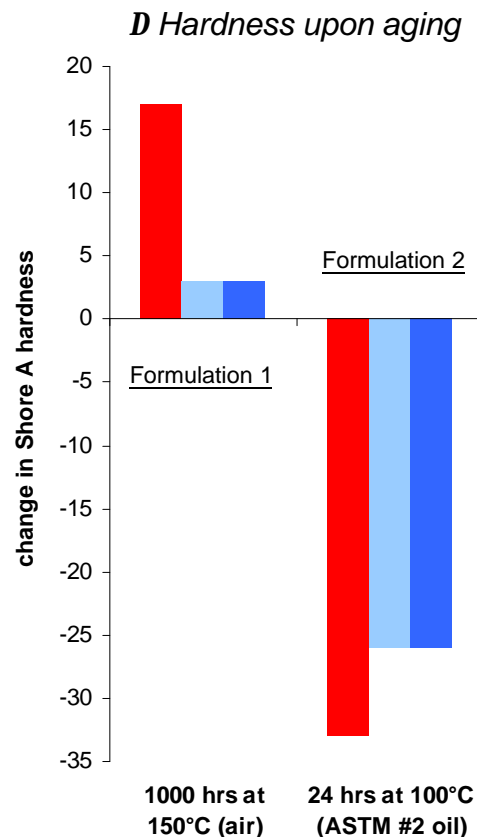
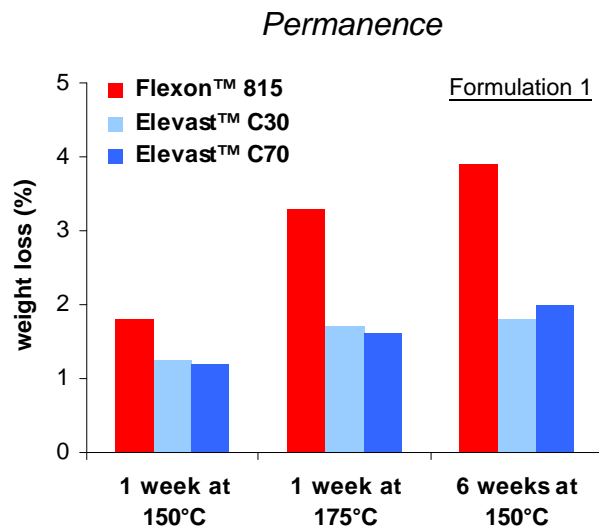
- Superior permanence of Elevast™
- Better retention of properties at high temperature

— Tensile
 — Hardness
 — Elasticity

Extend service life of parts

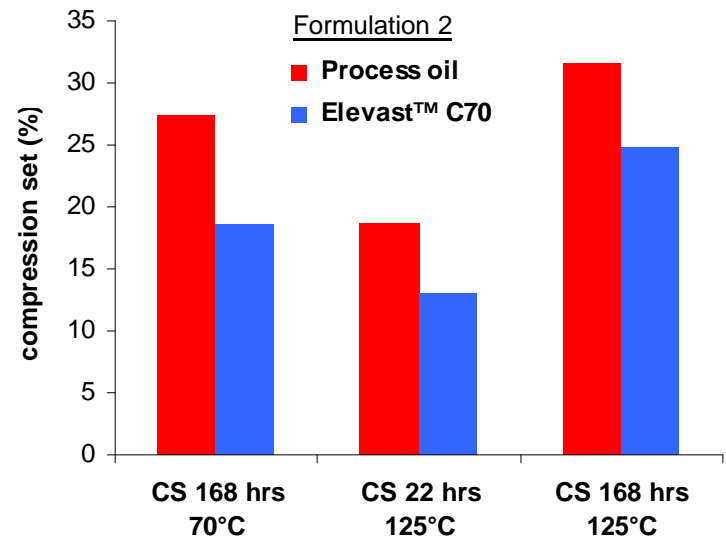
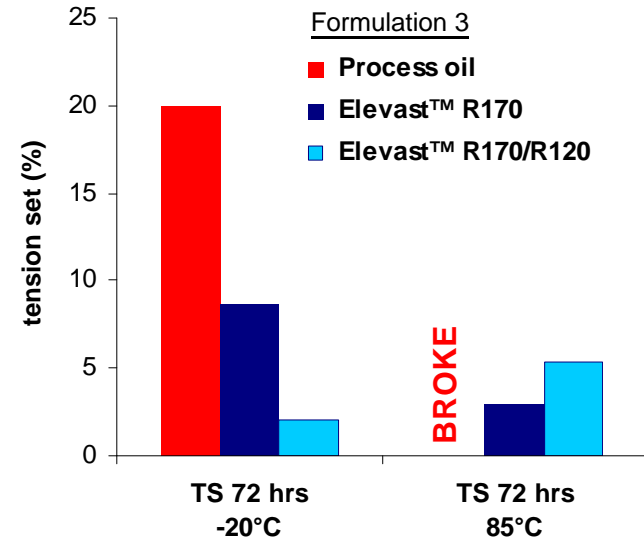
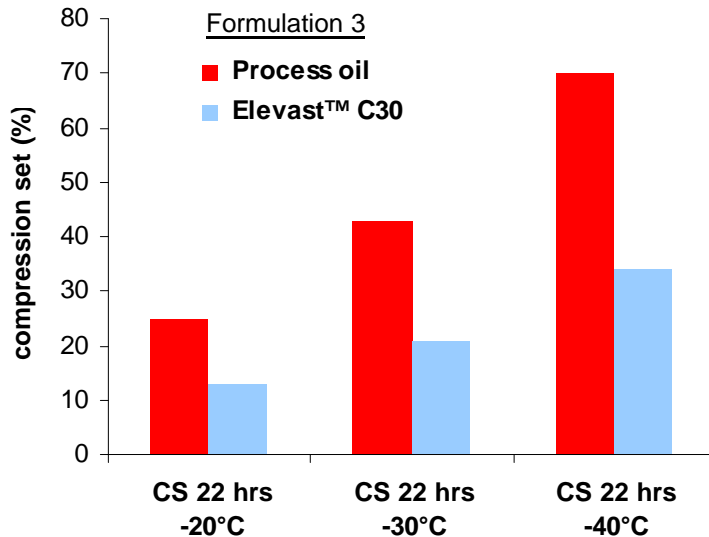
- Reduced exudation

— Fogging, bleeding, ...



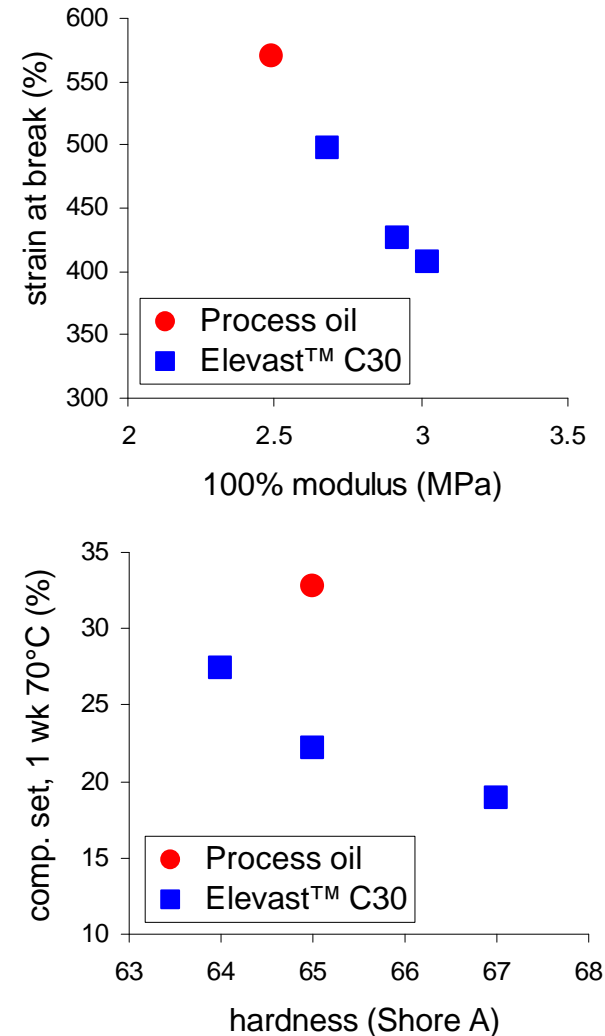
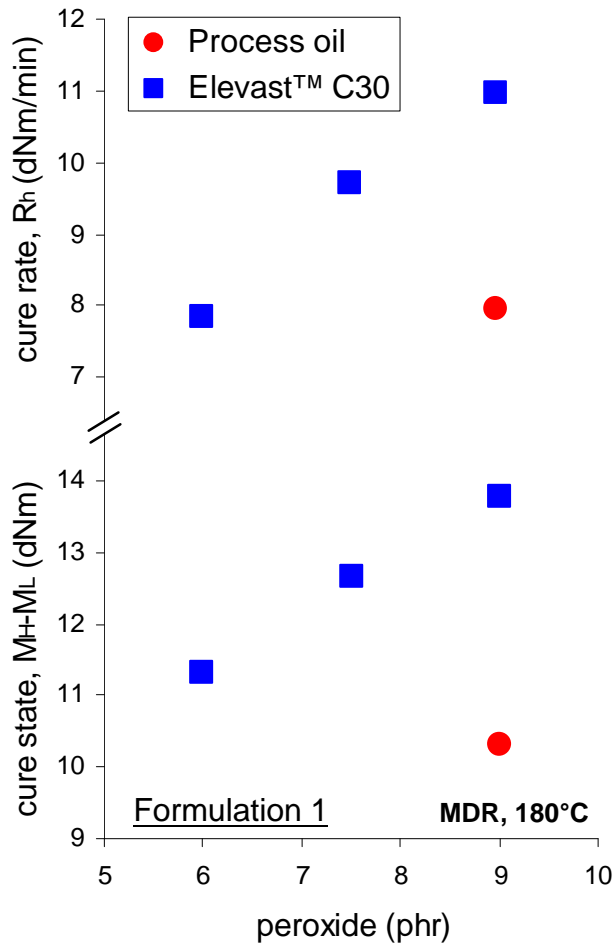
Superior Elasticity, Especially at Low Temperature

- **Lower compression and tension set**
 - High temperature → superior permanence
 - Low temperature → superior plasticization
- **Reduced oil swell**
 - Tighter cure
- **Enhanced low temperature flexibility**



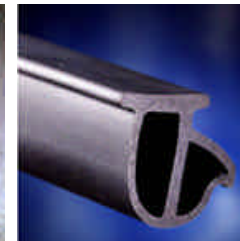
Balance Cost and Properties

- Adjust cure agent(s) to achieve same cure rate/state ... or, to tune properties
 - More effective use of cure agents



Elevast™ Polymer Modifiers for Polyolefin Elastomers

- **New family of specialty plasticizers for polyolefin elastomers**
 - Exceptionally low pour points across grade slate
 - Available in a wide range of viscosities
 - Negligible interaction with peroxide cure packages
- **Step-out performance over paraffinic process oils**
 - Simultaneous processing and property improvements
 - lower Mooney, faster and tighter cure
 - improved property retention at high and low temperatures
 - Novel balance of properties
- **Applicable to a variety of systems and demanding applications**
 - EP(D)M, butyl, natural rubber, polybutadiene
 - Peroxide cure, radiation cure, sulfur cure
 - Extruded and molded goods
 - belts, hoses
 - seals, gaskets
 - weatherstrip
 - wire & cable



Elevast™ Technology from ExxonMobil Chemical

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All charts included in this presentation are based on ExxonMobil data.



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