

New elastomers for the next generation of EVs

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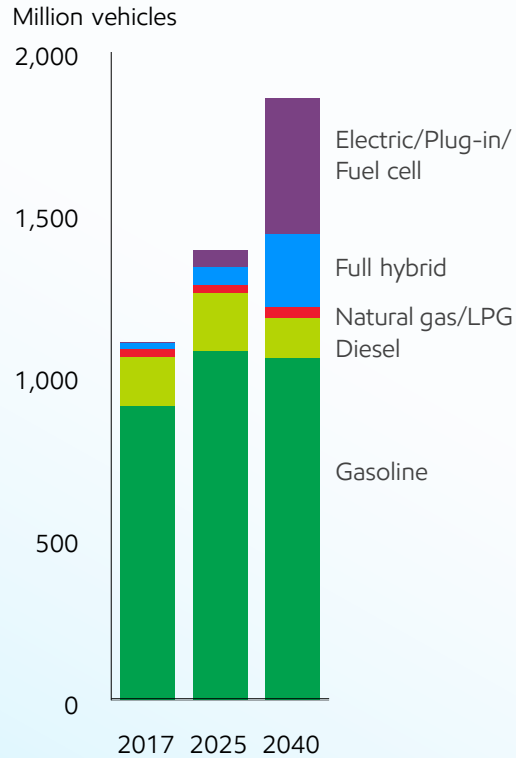
EMEA Market Developer Butyl Polymers
ExxonMobil Chemical

iOM3 Seminar
RIEG – ATDM, July 3rd, 2020



ExxonMobil
Energy lives here™

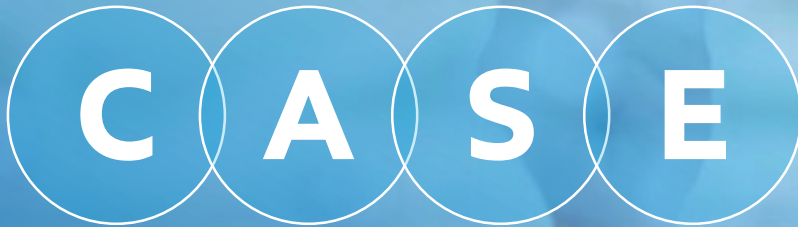
Light-duty fleet by type



Electric vehicle
fleet continues
to grow



Disruptive trends as an
opportunity



Connected

Autonomous

Shared

Electric

Needs

Solutions

Decarbonization



Lower weight
Energy efficiency

Circular
economy



Recycling
Waste reduction

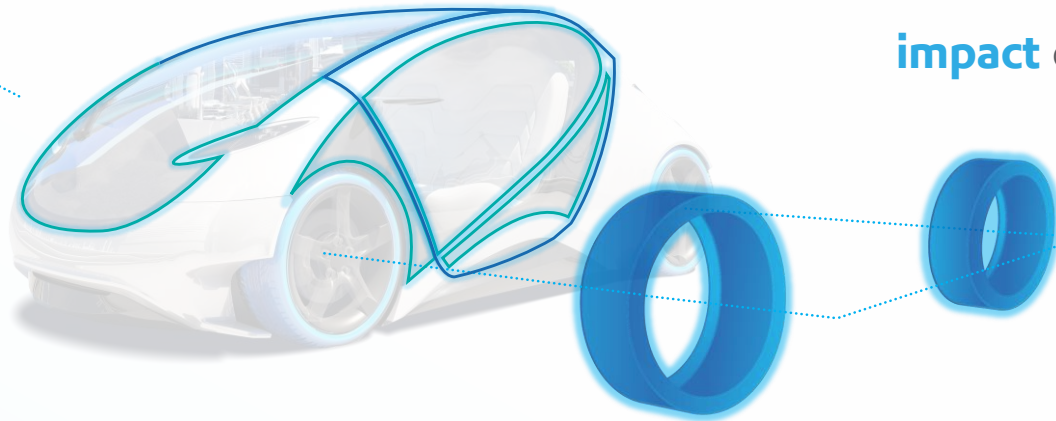
Driver becomes
passenger



Comfort
Durability

Santoprene™ TPV

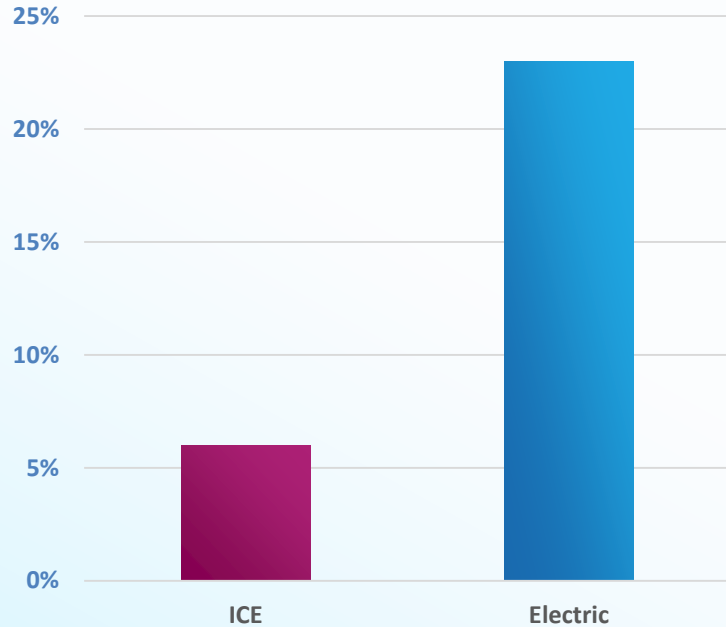
Weight reduction matters
even **more** for EV's



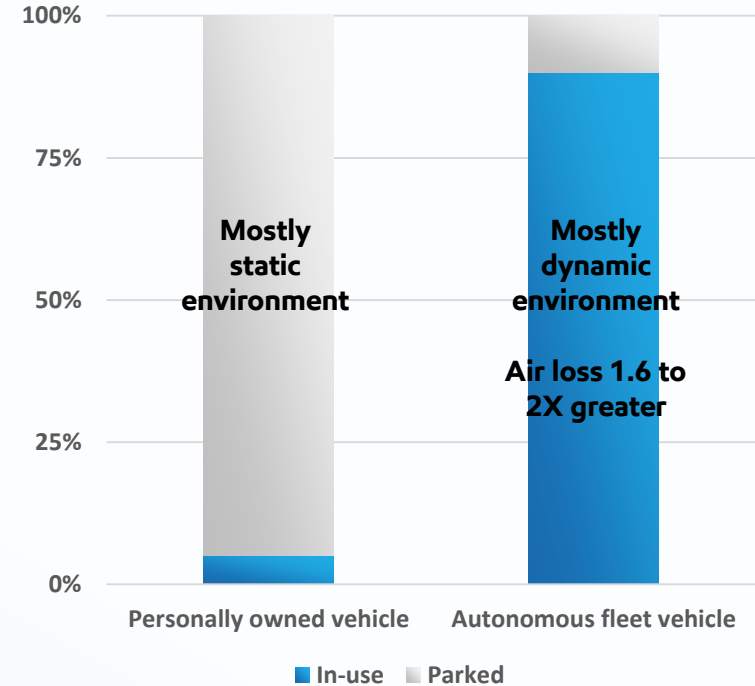
Exxpro™ 3563 SE
Air loss has a **greater**
impact on EVs

Energy loss and in-use environment changes

Dissipated energy due to tires



Estimated % vehicle usage



Innerliner requirements

Material stability

- Good shelf life

Manufacturing

- Consistency
- Good bonding

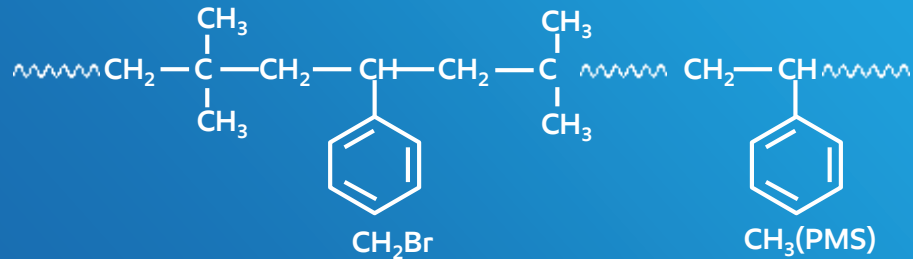
Performance

- Low air loss
- Good crack resistance
- Good heat resistance
- Low heat build up

Innermost layer responsible for keeping air inside the tire



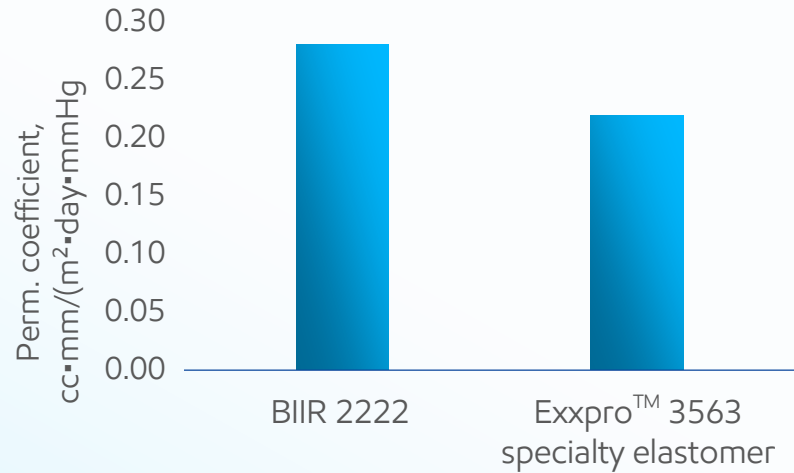
Exxpro™ specialty elastomer
are brominated copolymers of
Isobutylene and para- methylstyrene



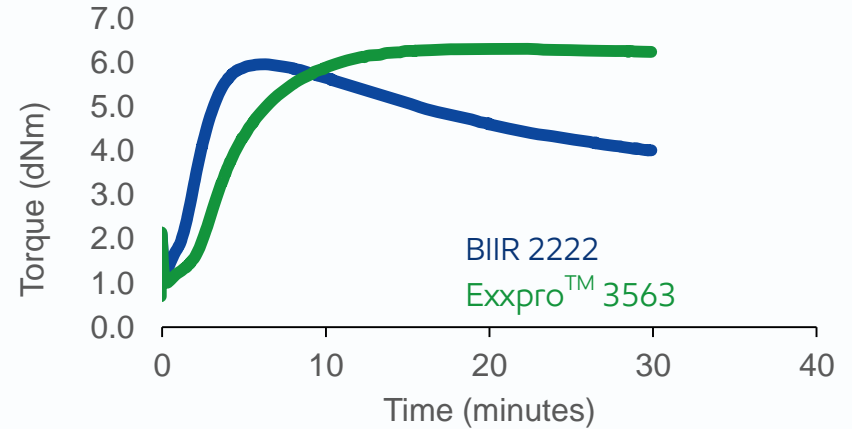
Brominated para-methylstyrene (PMS)

Attribute	Resulting property
Isobutylene backbone	Maintains all Butyl elastomer properties, impermeability, dampening
Pendant pMS ring	Lower permeability
Fully saturated backbone (no double bond)	Better resistance to ozone, heat, chemicals, and weathering Excellent ageing resistance without antioxidant
Highly reactive benzylic bromine	Versatile cure chemistry

Compound performance advantages



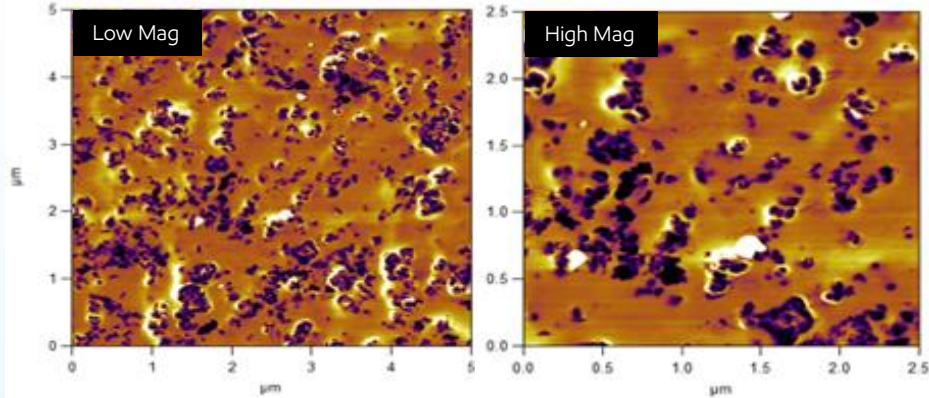
Exxpro™ compounds have more than 20 % lower permeability



Exxpro™ compounds have better reversion resistance

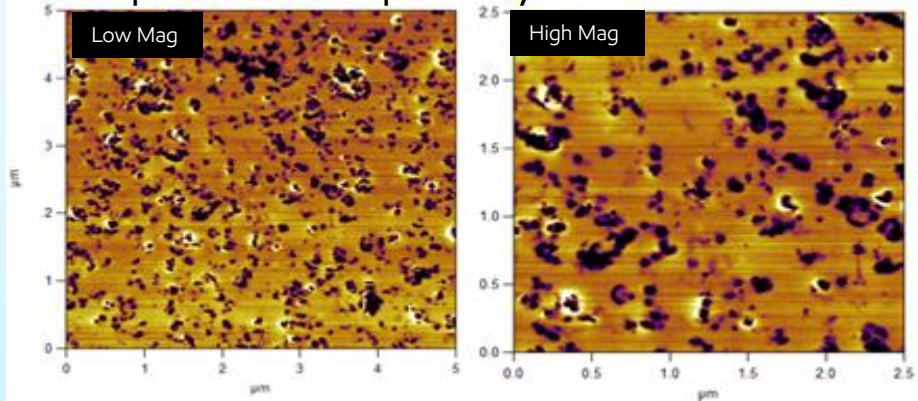
Compound consistency advantages

BIIR 2222



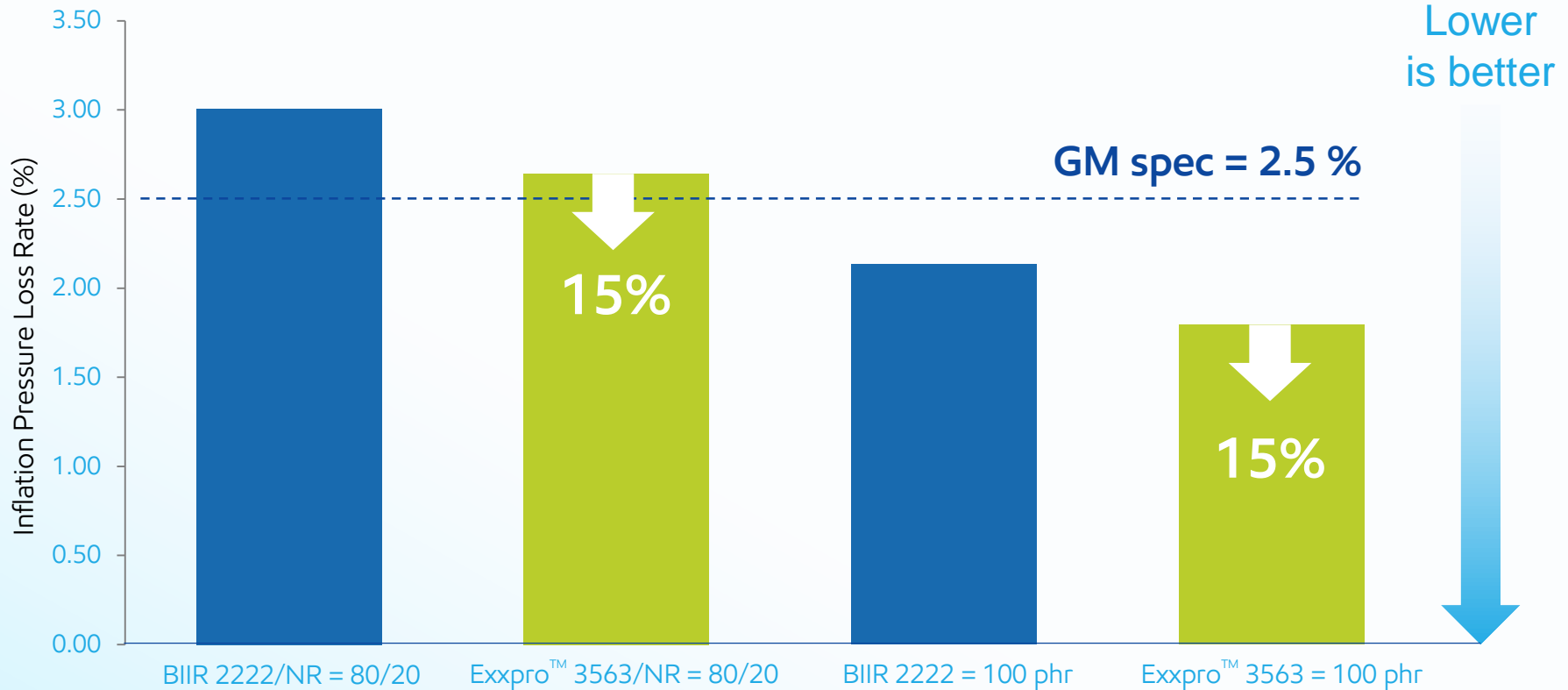
Exxpro™ compounds have better filler dispersion

Exxpro™ 3563 specialty elastomer

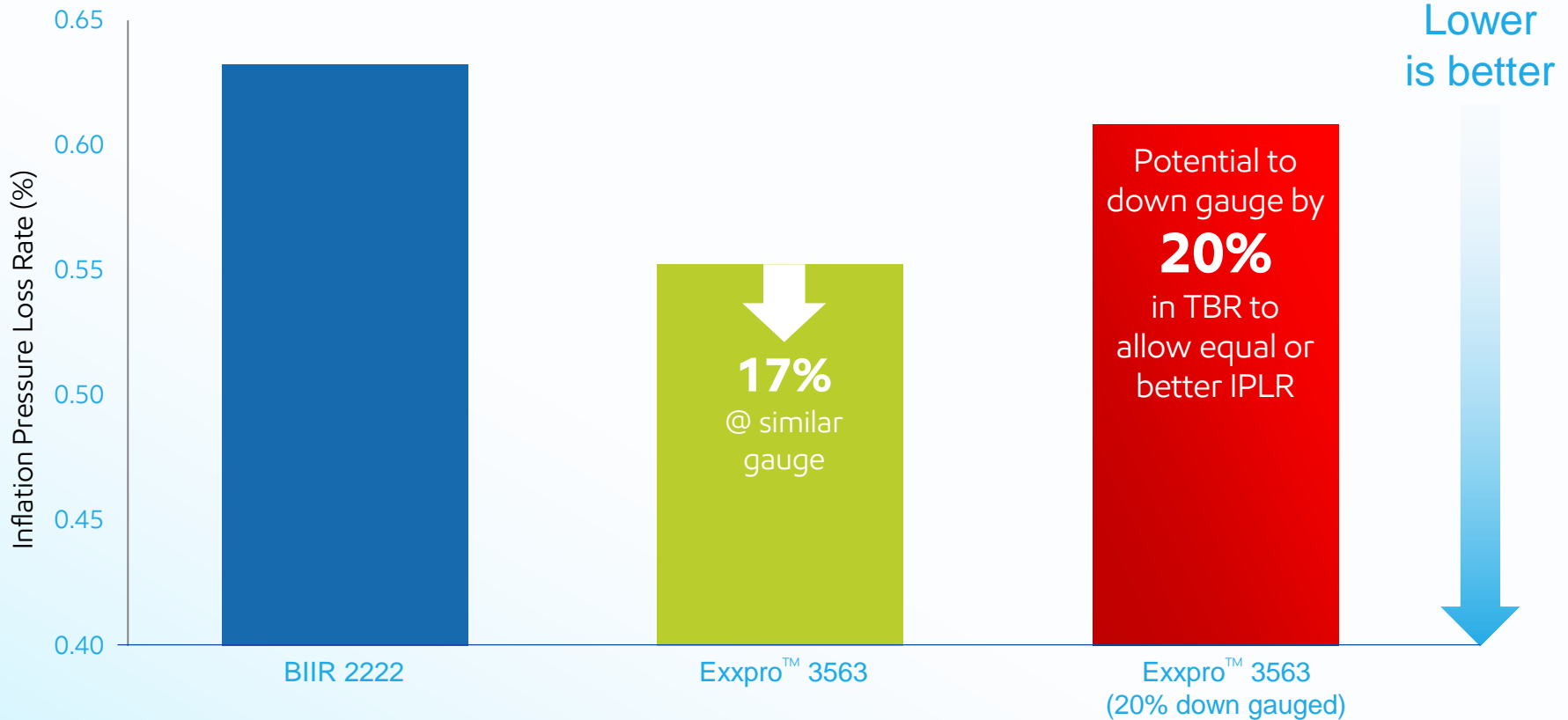


Improved dispersion enhances product consistency

Passenger car tire impermeability improvement (IPLR)



Truck and bus tires impermeability improvement (IPLR)



New **Exxpro™ 3563** specialty elastomer

Impermeability: **+20-30%**

Crack resistance: **+100-300%**

Heat resistance: **+30-50%**

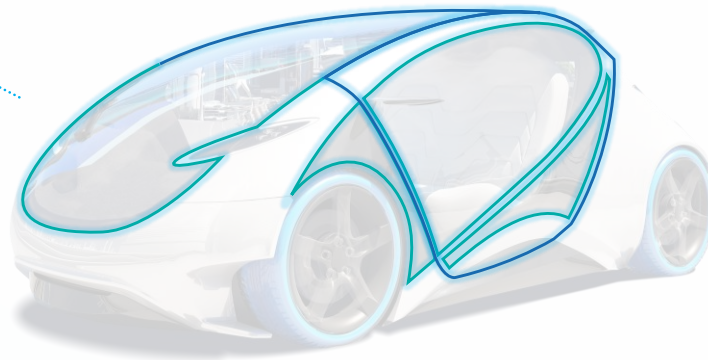
Heat build-up resistance: **+30-40%**

Shelf life **+50%**

**Superior performance
advantages**



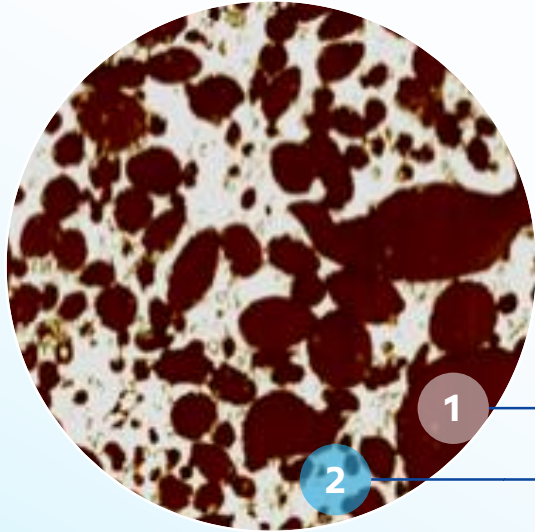
Santoprene™ TPV
Weight reduction matters
even **more** for EV's



Santoprene™ TPV

AFM micrograph

Performs like a rubber,
processed like a plastic



1 Rubber (cross-linked EPDM)

2 Thermoplastic (polypropylene)

20 μ

Santoprene™ TPV



Design flexibility



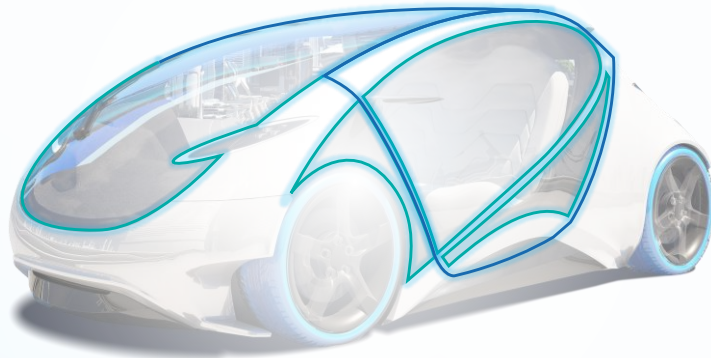
Recycling potential



Aging resistance



Lighter weight



Santoprene™ HR TPV: Expand in-vehicle experience

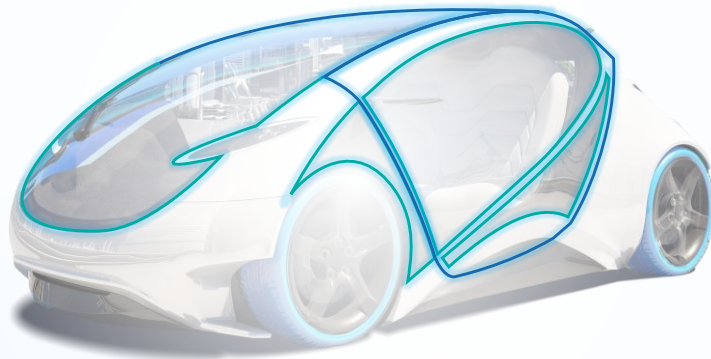
High resilience

Step-out improvement in:

- Elastic recovery
- Force retention
- UV resistance

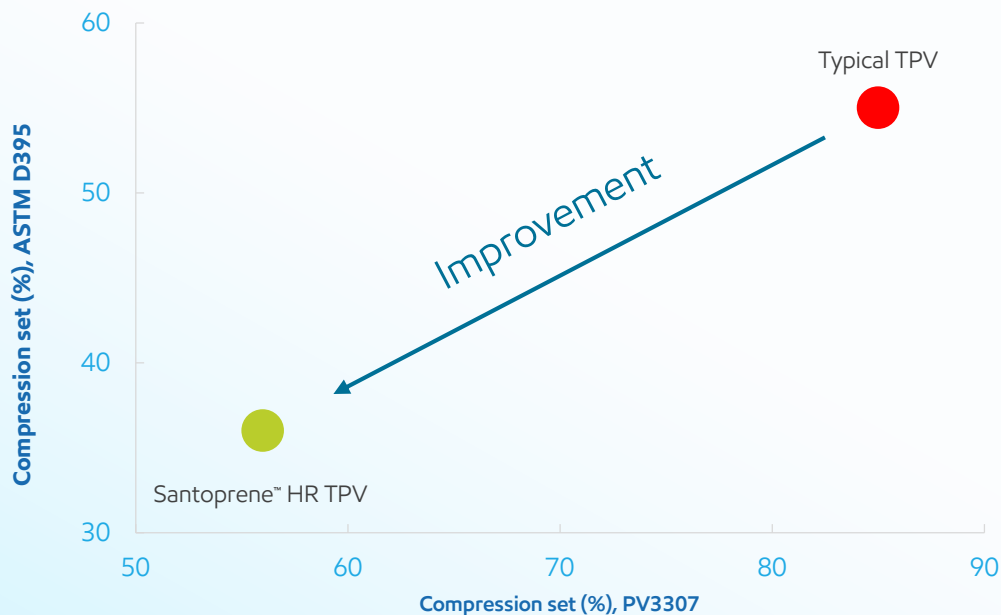
Dynamic seals:
New Santoprene™ HR TPV

Static seals



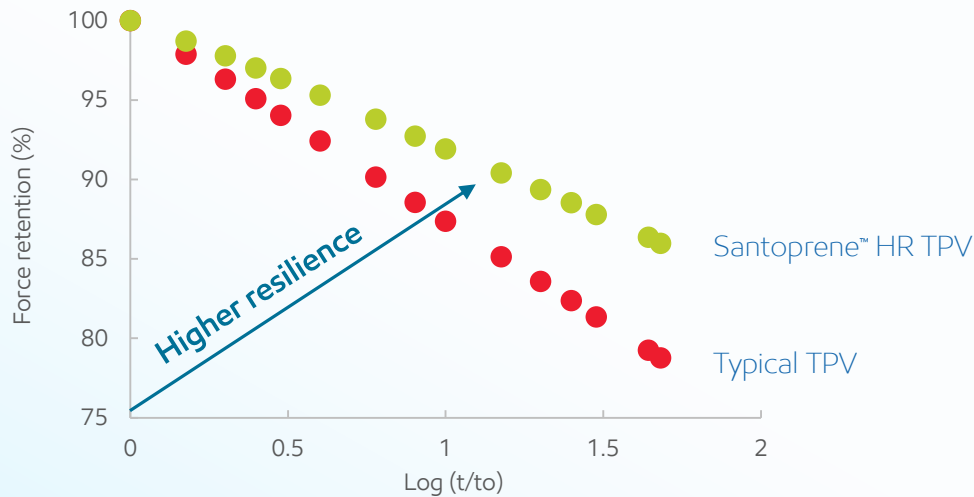
Santoprene™ HR TPV

Exhibits step-out improvement in sealing compression set under demanding conditions



Step-out
improvement
in elastic recovery

Santoprene™ HR TPV exhibits superior stress relaxation / force retention over commercial TPVs



% force retention	Typical TPV	Santoprene™ HR TPV	
30 minutes	58.3	72.3	+24%
24 hours	78.8	86	+9.1%

Step-out
improvement
in force retention

PAST

TODAY

FUTURE



Thank you!

 Link with me!

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Energy lives here™

Exxpro™ 3563 chemistry

