



Exceed™

Exceed™ Tough

Exceed™ Tough performance polymer-based solution for backsheet films with low water vapor transmission rates used in high-performance warm pad

 Low WVTR	 Soft touch feel	 High needle puncture resistance	 Easy processing
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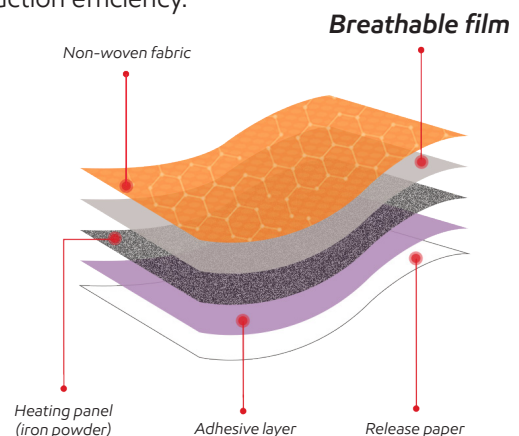
Warm pads are used to provide non-medicated heat relief, with 5-layer structures comprising: a nonwoven fabric, a breathable backsheet film, heating panel (iron powder), adhesive layer, and release paper. When the heating system is air-activated, a chemical reaction continuously releases heat for hours.

The breathable backsheet film plays an integral part in the warm pad by enabling long-term and stable heat transfer. WVTR, which determines the breathability of backsheet

film, has contributed to greater comfort for warm pad users. Films with low WVTR are desired to help control the temperature of chemical reaction within the pad and prevent burns.

ExxonMobil Exceed Tough Performance Polymer offers breathable backsheet films low WVTR values combined with softness and easy processability, which may lead to improved output, energy savings and production efficiency.

Delivered attributes	Derived value
Low water vapor transmission rate	<ul style="list-style-type: none"> Stable heat transfer Long duration
Easy processing - compounding and casting	<ul style="list-style-type: none"> Output improvement Energy savings Production efficiency
Soft touch feel	<ul style="list-style-type: none"> Enhanced comfort
High needle puncture resistance	<ul style="list-style-type: none"> Warm pad integrity



Performance improvement solution

A 40gsm warm pad breathable backsheet film based on Exceed™ Tough and Exceed™ performance polymers grades offers:

Exceed Tough

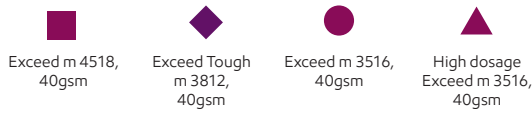
- Easy processing in compounding and cast
- Achieve lower WVTR and softness at high density
- Extremely low WVTR with high dosage

Exceed

- Comparable WVTR versus Exceed Tough
- Higher needle puncture resistance

Potential value

- Enhanced comfort due to soft-touch feel
- Easy processing improved output



Compounding

Component	Exceed m 4518 + CaCO ₃ + LDPE + additive	Exceed Tough m 3812, + CaCO ₃ + LDPE + additive	Exceed m 3516 + CaCO ₃ + LDPE + additive	Exceed m 3516 + CaCO ₃ + LDPE + additive

WVTR

6000g/m²*day 4000g/m²*day 2000g/m²*day 0g/m²*day



Needle puncture Fmax

0mN/μm 10mN/μm 20mN/μm 30mN/μm



1% Secant Modulus MD (Softness)

200MPa 150MPa 100MPa 50MPa 0MPa

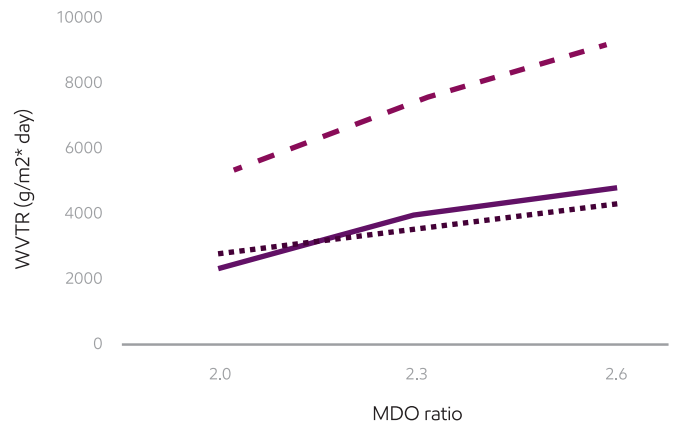


Melt pressure

150bar 100bar 050bar 0bar



MDO ratio 2.0X
Data from tests performed by or on behalf of ExxonMobil

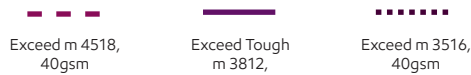


--- m 4518.PA — m 3812.PA m 3516.PA

Data from tests performed by or on behalf of ExxonMobil

Different MDO ratio solution

A 40gsm warm pad breathable backsheet film based on Exceed Tough m 3812 and Exceed m 3516 performance PE grades offers stable WVTR in different metallocene PE ratios.



Compounding

Component	Exceed m 4518 + CaCO ₃ + LDPE + additive	Exceed Tough m 3812 + CaCO ₃ + LDPE + additive	Exceed m 3516 + CaCO ₃ + LDPE + additive

Test item	Unit	Test method
Tensile at Break (MD, TD)	N	ExxonMobil method
WVTR	g/m ² *day	ExxonMobil method
Needle Puncture	mN/μm	ExxonMobil method
MD 1% Secant Modulus	MPa	ExxonMobil method

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

ExxonMobil
Signature Polymers

Bring your impossible



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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 the names that change. Everything else remains the same. We will be making these modifications over the next six months so you will see both old and new grade names highlighted during that time.

Here's a quick overview of brands and grade names that have changed in this document:

Legacy commercial name	New commercial name
Exceed™ 4518	Exceed m 4518
Exceed 3812	Exceed™ Tough m 3812
Exceed™ XP 8346	Exceed m 3516

Some of our existing Exceed, Achieve, Paxon and premium PP/HD grades have moved to Exceed brand; most existing Enable grades have moved to Exceed Flow[+]; most of our existing Exceed XP grades have moved to Exceed Tough[+]; most of our existing Exceed S grades have moved to Exceed Stiff[+]. More details here https://www.exxonmobilchemical.com/en/brands/signature-polymers/exceed_high_performance_polymers or contact your ExxonMobil representative to know more.

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