

## INNOVATIVE SOLING SOLUTIONS

# DALTOPED® *X-Lite* TECHNOLOGY

### For durable, lightweight shoes

Our DALTOPED® *X-Lite* technology is an innovative polyether material for polyurethane soles that functions as an ultra-lightweight, cost effective and highly versatile alternative to ethyl vinyl acetate (EVA). Ideal for the production of soles for high quality casual and children's footwear, DALTOPED® *X-Lite* technology combines the low density needed to make shoes more comfortable with excellent mechanical properties and improved processing.

Successfully satisfying so many elements, DALTOPED® *X-Lite* technology is a popular choice for the production of unit soles, mid soles and slippers.

DALTOPED® *X-Lite* technology has been certified by independent testing institutes, which have thoroughly assessed its premium abrasion performance properties and its excellent flexural resistance.

### Benefits

#### Excellent mechanical properties

- Lightweight (350 kg/m<sup>3</sup>)
- Potential alternative for EVA
- Good flexural strength and abrasion resistance.

#### Easy to process

- A highly robust material
- Easy to use on conventional machinery
- Compatible with injection molding and casting processes.

#### High productivity

- Can help reduce manufacturing costs
- Lower energy consumption
- Faster cycle times.



## Typical technical properties

	Premium EVA	DALTOPED® X-Lite
Density / Density (kg/m3) DIN ISO 1183-1	300	350
Hardness (Shore A) DIN ISO 7619-1	45	50 - 55
Split tear (N/mm) DIN ISO 34-1	2.8	2.9
Trouser tear (N/mm) DIN ISO 34-1	4.2	5.8
Tensile strength (MPa) DIN 53504	1.8	2.8
Elongation (%) DIN 53504	250	270
Bennewart Flex life (mm cut growth) DIN ISO 17707 After 30,000 cycles	0	0
Bennewart Flex life (mm cut growth) DIN ISO 17707 After 90,000 cycles	< 2	< 2
Resilience (pendulum / %) DIN 53512	30	30
Abrasion (mg loss) DIN ISO 4649	250 - 300	35

\* DALTOPED® X-Lite technology used: SUPRASEC® 2444 / DALTOPED® X-Lite AF 36404

## Committed to sustainable soling solutions

Adding DALTOPED® X-Lite technology to our existing footwear range demonstrates our dedication to creating sustainable innovations for the polyurethane soling materials market, and our ability to deliver solutions in step with industry trends

## Committed to customers

Alongside an extensive range of polyurethane soling materials, our highly skilled, technical footwear team can help optimize customer production processes for success. At our technical development center - where we've installed the very latest injection molding and casting equipment - we can replicate the manufacturing set up of our customers. This investment in our research and development capabilities, means our footwear products are well suited to the needs of manufacturers and can be processed extremely efficiently. It also enables partnerships with footwear customers who have a specific brief or manufacturing challenge to overcome.

- Dedicated to sustainable innovation
- Supporting customers with tailor-made solutions
- Committed to long-term partnerships
- In-house customer prototyping available
- Specialist technical support on offer
- Helping footwear manufacturers stay one step ahead.

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# HUNTSMAN

Enriching lives through innovation

## About Huntsman

Huntsman Corporation is a publicly traded global manufacturer and marketer of differentiated chemicals with 2015 revenues of approximately \$10 billion. Our chemical products number in the thousands and are sold worldwide to manufacturers serving a broad and diverse range of consumer and industrial end markets. We operate more than 100 manufacturing and R&D facilities in approximately 30 countries and employ approximately 15,000 associates within our 5 distinct business divisions. For more information about Huntsman, please visit the company's website at [www.huntsman.com](http://www.huntsman.com).

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## INNOVATIVE SOLING SOLUTIONS: DALTOPED® *PERFORM* TECHNOLOGY High quality shoes

Our DALTOPED® *PERFORM* technology is an innovative, high performance polyether material. This novel solution is the result of years of continuous technology optimization, which began back in 1994 when we pioneered the footwear industry's first fully water-blown polyether solution.

Combining good system flow-ability and a high foam quality, DALTOPED® *PERFORM* materials are an attractive proposition for footwear manufacturers looking to produce unit soles and shoes in line with industry standards.

Free from Sn (tin) catalysis and other components listed as substances of very high concern (SVHC), DALTOPED® *PERFORM* technologies – like all other products in the DALTOPED® range – can help footwear manufacturers eradicate consumer concerns about the use of potentially harmful ingredients in their shoes and boots.

DALTOPED® *PERFORM* solutions are suitable for direct-on and casting unit soles, and are a popular, lightweight choice for the production of high quality casual shoes (mens and ladies); children's shoes; PU clogs and quality slippers.

### Benefits

#### Excellent mechanical properties

- Technology can be based on polyether and / or polyester chemistry
- Good aesthetics (surface definition).

#### Robust and easy to process on conventional machinery

- Injection molding and casting process.

#### High productivity



## DALTOPED® *PERFORM* recommended commercial systems:

DALTOPED® AF 46501 / SUPRASEC® 2444  
DALTOPED® AF 55400 / SUPRASEC® 2445  
DALTOPED® AF 55403 / SUPRASEC® 2445  
DALTOPED® AF 56500 / SUPRASEC® 2445  
DALTOPED® AF 66328 / SUPRASEC® 2445  
DALTOPED® AF 66403 / SUPRASEC® 2445  
DALTOPED® AF 66408 / SUPRASEC® 2445

Additional DALTOPED® systems are available to suit customer needs.

## Typical technical properties

	DALTOPED® <i>PERFORM</i> systems
Density (kg/m <sup>3</sup> )	400 - 600
Hardness (Shore A)	45 - 65
Trouser tear (N/mm)	4.5 - 8.0
Tensile strength (MPa)	2.5 - 3.5
Elongation (%)	350 - 400
Flex life (DEG flex 10 <sup>5</sup> cycle mm cut growth)	< 2
Abrasion (mg loss)	35 - 80

## Committed to sustainable soling solutions

Adding DALTOPED® *PERFORM* products to our existing footwear range demonstrates our dedication to creating sustainable innovations for the polyurethane soling materials market, and our ability to anticipate industry trends. Responding to demands for ever lighter soling solutions – free from harmful substances – we are helping footwear manufacturers deliver on their commitment to customers, without compromising quality.

## Committed to customers

Alongside an extensive range of polyurethane soling materials, our highly skilled, technical footwear team can help optimize customer production processes for success. Working in-house – on the very latest injection molding and casting equipment – we can replicate manufacturing conditions. This considerable investment in our research and development capabilities, means our footwear products are well suited to the needs of our customers and can be processed extremely efficiently. It also enables partnerships with customers who have a specific brief to fulfill or a complicated manufacturing challenge to overcome.

- Dedicated to sustainable innovation
- Supporting customers with tailor-made solutions
- Committed to long-term partnerships
- In-house customer prototyping
- Helping footwear manufacturers stay one step ahead.

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## INNOVATIVE SOLING SOLUTIONS: DALTOPED® *GRIP* TECHNOLOGY Safety and comfort in shoes

Focusing on the relationship between design and functionality within polyurethane soling materials, we have worked intensively to understand and improve slip performance. One of the outcomes is our DALTOPED® *GRIP* technology – a polyether and /or polyester solution that mimics the look and feel of rubber, and provides advanced anti-slip resistance properties for soling safety footwear, winter shoes and boots.

A superior alternative to traditional thermoplastic rubber soling solutions, DALTOPED® *GRIP* materials are easy to process and compatible with standard polyurethane processing machines.

Employing DALTOPED® *GRIP* solutions can also help footwear manufacturers eradicate consumer concerns about the use of potentially harmful ingredients in their shoes and boots. Like all other DALTOPED® polyurethane systems, the DALTOPED® *GRIP* product range is water-blown, without the use of harmful tin catalysts.

### Benefits

#### Excellent mechanical properties

- Highly flexible
- Non-floor marking
- Reduced density
- Good grip and feel
- Technology can be based on polyether and / or polyester chemistry.

#### Robust and easy to process on conventional machinery

- Compatible with standard polyurethane casting and injection machines
- Suitable for stitch on soles
- Possibilities for single and dual density footwear
- Reduced costs for molds.

#### High productivity

- Lower manufacturing costs through reduced energy consumption and a fast production cycle.



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## Typical technical properties

	TR**	DALTOPED® GRIP*		
	1000			
Density (kg/m <sup>3</sup> )	Optional 800-1000	800	700	600
Hardness (Shore A)	50 - 60	46	50	45
Trouser tear (N/mm)	8	10 - 11	7.5	6.1
Tensile strength (MPa)	4 - 5	4.4	3.7	3.0
Elongation (%)	450 - 650	540	470	450
Flex life (DEG flex 10 <sup>5</sup> cycle mm cut )	< 6	0	0	0
Abrasion (mg loss)	170 - 250	50 - 80	50 - 80	50 - 80

\* DALTOPED® GRIP system used: SUPRASEC® 2445 / DALTOPED® GRIP AF 75003

\*\* TR = Thermoplastic rubber

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- Committed to long-term partnerships
- In-house customer prototyping
- Helping footwear manufacturers stay one step ahead.

## For more information

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## INNOVATIVE SOLING SOLUTIONS

# DALTOPED® *Lite* ENERGY TECHNOLOGY

## For lightweight, dynamic comfort shoes

DALTOPED® *Lite* ENERGY technology is a brand new polyurethane soling solution from Huntsman. Providing high rebound cushioning, at a density range of 250-450 kg/m<sup>3</sup>, DALTOPED® *Lite* ENERGY technology is ideal for the production of midsoles for sports footwear and single density soles for athleisure shoes – typically worn during workouts but also as comfortable casual wear.

With major advantages compared to benchmark soling solutions, DALTOPED® *Lite* ENERGY technology is a viable alternative for footwear manufacturers looking to substitute ethyl vinyl acetate (EVA) or upgrade the rebound and elasticity properties achieved by existing polyurethane soling materials.

Like all other DALTOPED® *Lite* polyurethane systems, DALTOPED® *Lite* ENERGY technology is made without the use of tin-based catalysts – enabling footwear manufacturers to reduce customer concerns about the use of potentially harmful ingredients in their shoes and boots.

### Benefits

#### Excellent mechanical properties

- Good dynamic rebound and cushioning
- Lightweight (250-450 kg/m<sup>3</sup>)
- Potential alternative to EVA and eTPU
- Comfort upgrade for conventional PU soles
- Good compression set / deformation.

#### Easy to process

- Can be produced on conventional footwear machinery
- Suitable for direct-on as well as casting unit soles
- Multiple color options available.

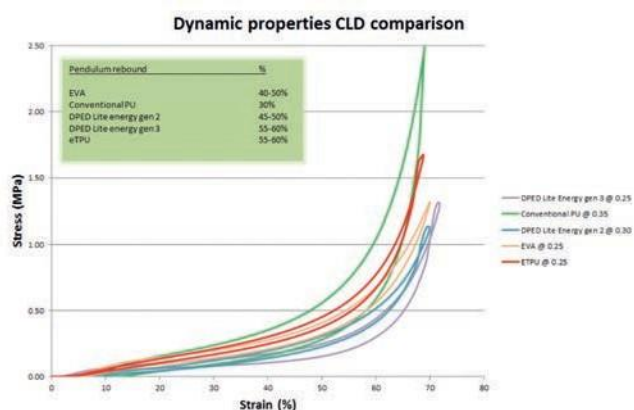
#### High productivity

- Can help reduce manufacturing costs
- Lower energy consumption
- Reduced costs for molds.
- Faster cycle times
- Compatible with automated processes.



## Typical technical properties

	EVA	Conventional PU	DPED <i>Lite</i> Energy gen 2	DPED <i>Lite</i> Energy gen 3	eTPU (Benchmark)
Density (kg/m <sup>3</sup> )	250	350	300 - 450	250	250
Hardness (Shore A)	32	47	30 - 45	30	30
Hardness (AskC)	56	70	55 - 67	55	55
Split tear (N/mm)	3.0	2.5	2.5 - 3.5	1.8	
Trouser tear (N/mm)	3.4	4.9	3.5 - 4.9	3.0	
Tensile strength (MPa)	2.7	2.0	2.5 - 3.5	1.6	1.6
Elongation (%)	270	300	340	300	200
Flex life (Bennewart / 100kCycl / mm cut growth)	1-2-0	1-0-1	2-1-1	NA	NA
Abrasion (mg loss)	150 - 200	70	70	NA	NA



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