TRELLEBORG APPLIED TECHNOLOGIES

TRELLEBORG

Unitex® Squeegees
Printing for the long run

A history of excellence

Trelleborg is a world leader in engineered polymer solutions that seal, damp and protect critical applications in demanding environments. Its innovative engineered solutions accelerate performance for customers in a sustainable way. The Trelleborg Group has local presence in over 40 countries around the world.

Trelleborg Applied Technologies is part of the Trelleborg Group. At our manufacturing facility in the UK we produce high quality engineering polymers within polyurethanes and synthetic rubbers, as well as a range of innovative energy control materials. We have over 55 years manufacturing experience and are certified to ISO 9001 and ISO 14001.

We supply our products worldwide, through our experienced sales team and distributor partners. Our success comes from us providing technical solutions, being flexible, offering free technical advice as well as first class after-sales support.

Unitex® screen printing squeegees is an established brand within Trelleborg Applied Technologies product portfolio. It has earned a deserved reputation for providing industry leading performance and exceptional quality. As part of an ongoing development programme, Unitex® remains at the forefront in squeegee technology. The Unitex® squeegee range covers the full breadth of screen printing applications. Unitex®, Ulon® and Marathon® are all trademarks of Trelleborg.

Member of:

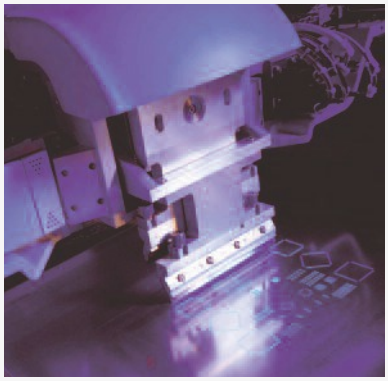
FESPA Federation of European Screen Printers Associations

SGIA Speciality Graphic Imaging Association

CSGIA China Speciality Graphic Imaging Association

nqa. ISO 9001 Registered Quality Management

nqa. ISO 14001 Registered Environmental Management



Market leading screen printing squeegee

What makes Unitex® screen printing squeegees the best:

Execellent print quality and accuracy

- Ultra sharp printing edge that provides exceptional print quality and accuracy
- Consistently sharp printing edge which is capable of depositing printed layers accurately between 70µm and 10µm (microns)
- Reduce ink usage and screen breakages

Extended print runs

- Extremely low chemical absorption from modern ink systems
- Eliminates/significantly slows down the risk of squeegee deformation
- Longer print runs and less downtime

Longer Squeegee life

- Exceptional abrasion resistance
- Significantly reduces high squeegee usage and additional downtime that can result from low cost squeegees
- Very cost effective - long predictable squeegee life/significant reduction in scrap

Cost
Versus
Benefit

Quicker set up timeset

- Unrivalled quality and industry leading tight dimensional tolerances - every squeegee is physically and mechanically tested
- Consistent quality ensures the squeegees are fit for purpose every time
- Drastically reduces additional printing set-up time that can result from poor quality squeegees

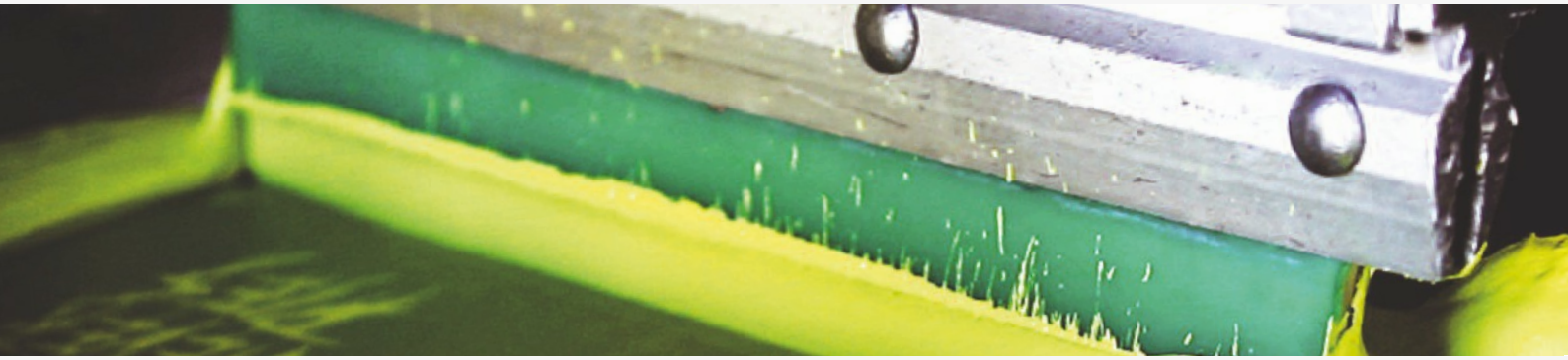
All applications covered

- The Unitex® squeegee range covers the full breadth of screen printing applications including:

- **Electronics**
- **Graphics**
- **Textiles**
- **Glass**
- **Bottles/Containers**
- **Solar Cells**

Unitex® Squeegees can offer up to a 47% cost saving on your ink usage

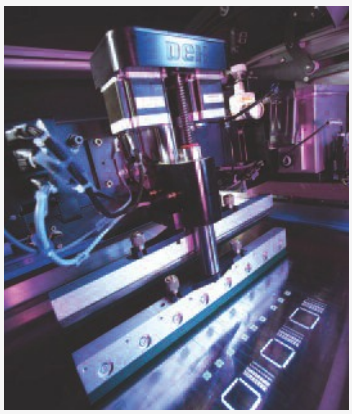
Independent tests carried out – report available on request



Specialist squeegees for screen printing professionals

As one of the original squeegee polyurethane manufacturers, we have a wealth of experience and expertise in processing squeegee materials. In addition to making standard squeegees we are also experts in making composite squeegees. We only use the best virgin raw materials and we do not use fillers or plasticisers.

Unitex® Ulon HP



Unitex® Ulon HP squeegee range provides optimum performance for the most demanding screen print application.

It is made from NDI (Naphthalene Diisocyanate) technology, which provides the highest level of chemical and abrasion resistance. Widely recognised as the best squeegee in solvent based, plastisol and water based inks. Offers exceptional wear and tear resistance.

* **Ideal for high precision/value printing applications such as electronics, solar cells and glass**

Advantages

- Maintains the printing edge and durometer under harsh conditions
- Sharper printing edge
- Long squeegee life – optimum abrasion resistance
- Does not wear screens
- Consistent product quality and tight dimensional tolerances

Shore A° - Durometer - Colour Coding

PU500/1	PU500/3	PU500/3-4	PU500/4	PU500/8	PU500/9	PU101/9°	PU500/15
55-60°	60-65°	65-70°	70-75°	75-80°	80-85°	85-90°	90-95°
YELLOW	RED	RED	GREEN	BLUE	BROWN	FAWN	PINK

More ink ⟵⟶ Less ink

Unitex® Marathon

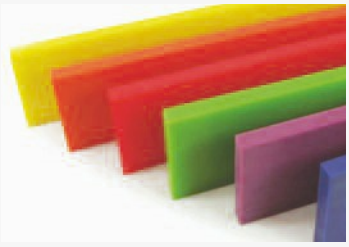
Unitex® Marathon provides premium screen printing performance and quality at a competitive price.

It is made from MDI (Diphenylmethane Diisocyanate) technology. Designed to give superior resistance to degradation by commonly used inks, solvents and monomers used in modern printing processes.

* **Ideal for decorative/personalised printing applications such as textiles, graphics, bottles and containers**

Advantages

- Low swelling characteristics to solvent cleaners and inks
- Ideal for UV ink systems
- Long squeegee life – good abrasion resistance
- Does not wear screens
- Consistent product quality and tight dimensional tolerances

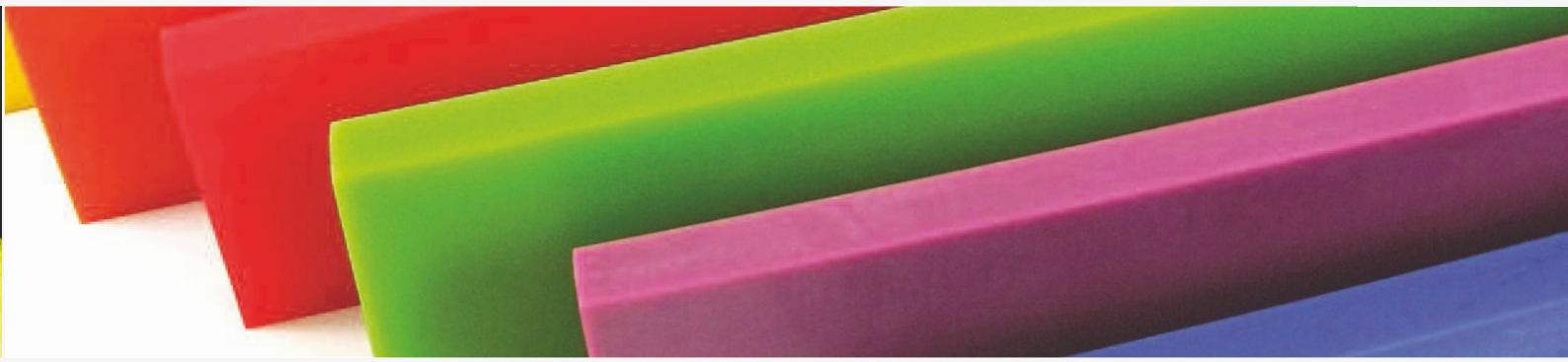


Shore A° - Durometer - Colour Coding

60°	65°	70°	75°	80°	85°	90°
YELLOW	ORANGE	RED	GREEN	BLUE	PURPLE	WHITE

More ink ⟵⟶ Less ink

* **There is cross over between the ranges depending on the application, please contact us directly if you need help specifying the best Unitex® Squeegee for your application.**



Technical data

Unitex® Ulon HP

Dimensions	Plain Section	Tolerance
Length	Up to 3750mm (147")	+/- 10mm
Width	15 - 50mm (0.6 - 2") 50 - 100mm (2 - 4") 100mm - 610mm (4 - 24")	+/ - 0.5mr +/ - 1mm +/ - 5mm
Thickness	Up to 12.5mm (0.5")	+/ - 0.4mr

Dimensions	D-Cut/S-Cut Section	Tolerance
Length	Up to 3600mm (141")	+/- 10mm
Width	15 - 50mm (0.6 - 2") 50 - 100mm (2 - 4")	+/-0.5mr +/-1mm
Thickness	Up to 10mm (0.38")	+/- 0.4mr

Dimensions	Triple Section	Tolerance
Length	Up to 3750mm (147")	+/ - 10mm
Width	15 - 50mm (0.6 - 2") 50 - 100mm (2 - 4")	+/ - 0.5mr +/ - 1mm
Thickness	Up to 10mm (0.38")	+/ - 0.4mı

Type	Hardness	Tolerance
Ulon HP	55° - 95° Sh A in 5° Increments	+/- 2.5° Shore A

Technical Data - Unitex® Ulon HP 500/4 70-75° Shore A (Durometer)

Properties	Values	Units	British Standard
Shore A hardness @ 20°C	72.5	°Sh A	BS ISO 7619-1:2004
Tensile modulus at 100% elongation	2.600	Mpa	BS ISO 37:2005
Tensile modulus at 200% elongation	3.570	Mpa	BS ISO 37:2005
Tensile modulus at 300% elongation	4.591	Mpa	BS ISO 37:2005
Tensile strength (Maximum)	39.73	Mpa	BS ISO 37:2005
Tensile strain at break	666.4	%	BS ISO 37:2005
Tear resistance (initiated tear)	38.14	KN/m	BS ISO 34-1:2004
Specific gravity	1.23	g/cm³	BS 903:A1:1996
Swelling in solvent (I.P.A. 24 Hrs)	10.03	%	BS ISO 1817:2005
Abrasion weight loss (mg)	13.2	(mg)	BS 903 :A9:1988

Unitex® Marathon

Dimensions	Plain Section	Tolerance
Length	Up to 3750mm (147")	+/ - 10mm
Width	15 - 50mm (0.6 - 2") 50 - 100mm (2 - 4") 100mm - 610mm (4 - 24")	+/ - 0.5mr +/ - 1mm +/ - 5mm
Thickness	Up to 12.5mm (0.5")	+/ - 0.4mr

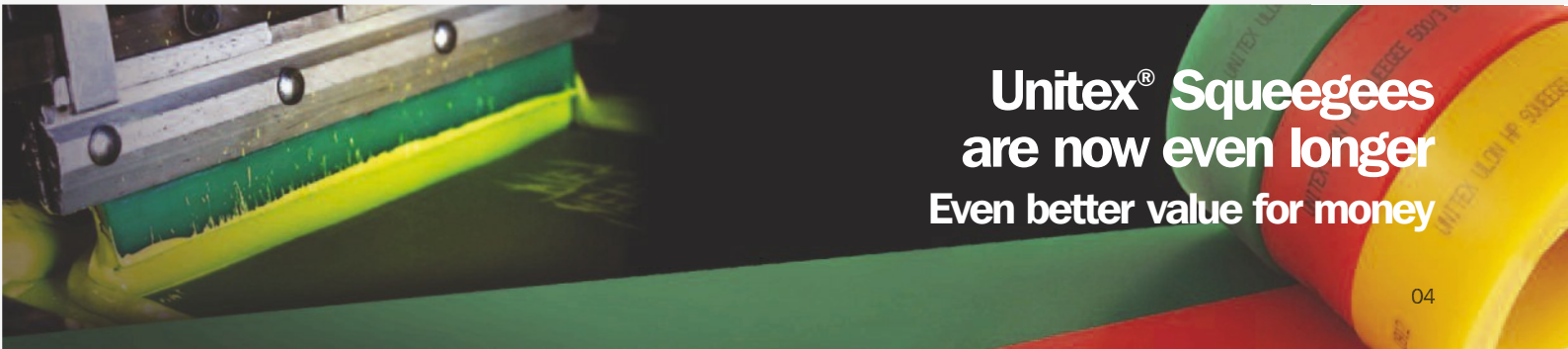
Dimensions	D-Cut/S-Cut Section	Tolerance
Length	Up to 3600mm (141")	+/ - 10mm
Width	15 - 50mm (0.6 - 2") 50 - 100mm (2 - 4")	+/ - 0.5mr +/ - 1mm
Thickness	Up to 10mm (0.38")	+/ - 0.4mr

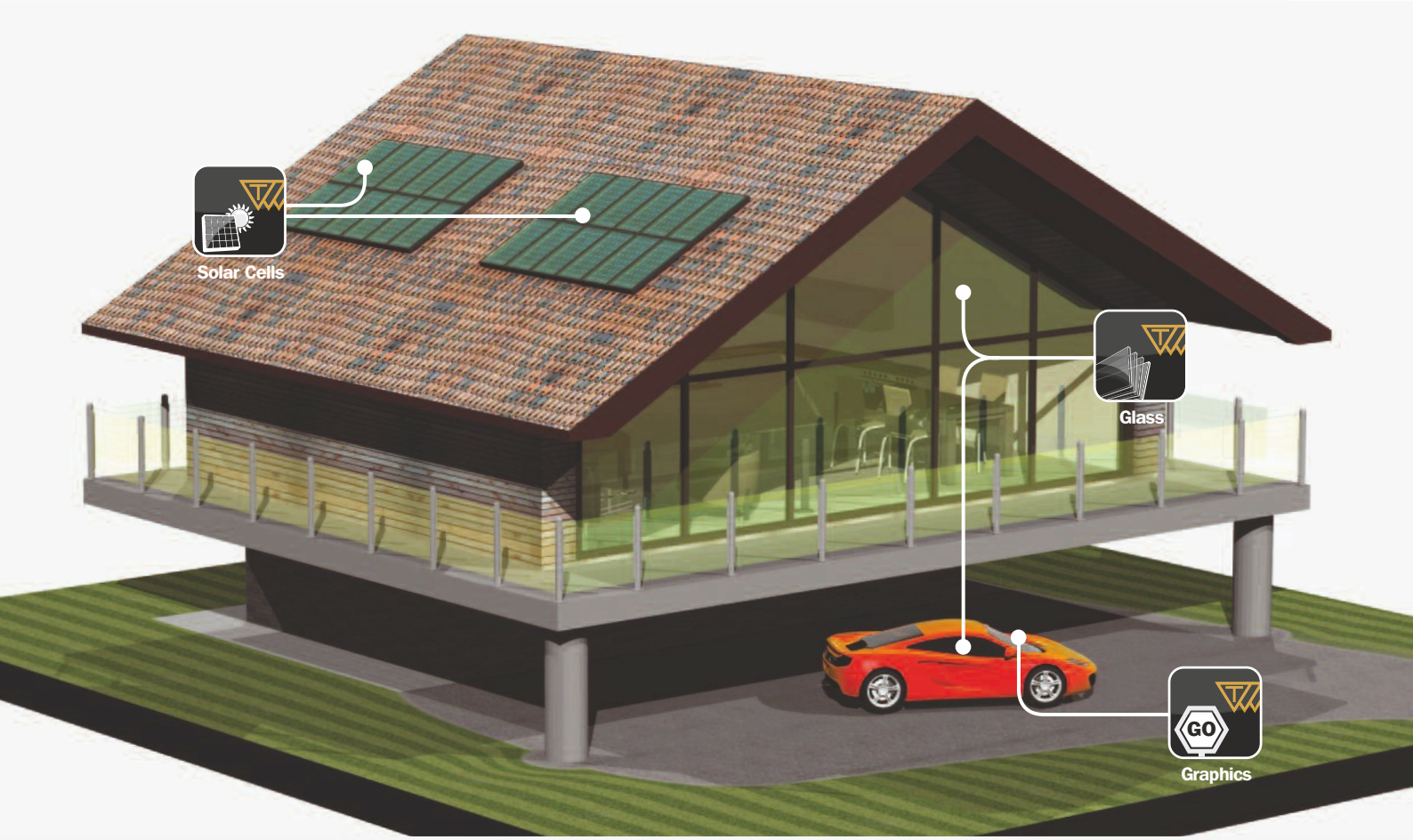
Dimensions	Triple Section	Toleran
Length	Up to 3750mm (147")	+/ - 10mm
Width	15 - 50mm (0.6 - 2") 50 - 100mm (2 - 4")	+/ - 0.5mr +/ - 1mm
Thickness	Up to 10mm (0.38")	+/ - 0.4mı

Type	Hardness	Tolerance
Marathon	60° - 90° Sh A in 5° Increments	+/ - 3° Shore A

Technical Data - Unitex® Marathon GREEN 75° Shore A (Durometer)

Properties	Values	Units	British Standard
Shore A hardness @ 20°C	75.0	°Sh A	BS ISO 7619-1:2004
Tensile modulus at 100% elongation	4.060	Mpa	BS ISO 37:2005
Tensile modulus at 200% elongation	6.577	Mpa	BS ISO 37:2005
Tensile modulus at 300% elongation	10.809	Mpa	BS ISO 37:2005
Tensile strength (Maximum)	47.47	Mpa	BS ISO 37:2005
Tensile strain at break	498.3	%	BS ISO 37:200
Tear resistance (initiated tear)	38.01	KN/m	BS ISO 34-1:2004
Specific gravity	1.18	g/cm³	BS 903:A1:1996
Swelling in solvent (I.P.A. 24 Hrs)	4.76	%	BS ISO 1817:2005
Abrasion weight loss (mg)	13.4	(mg)	BS 903 :A9:1988





All screen printing applications covered

Glass

Automotive - Architectural

- A high value finished product demands a high quality squeegee for perfect results and reduced product defects
- Unitex® Ulon HP is an excellent squeegee for screen printingg onto glass substrates using enamels which are fired permanently into the surface of the glass. It is also ideal for the frequently abrasive cold ceramic 'Frit' waterbased inks used in architectural glass applications
- Unitex® Ulon HP Composite 500/1 (55-60º Shore A) hardness is ideal when a large amount of ink is required onto the substrate with good tip control - see page 8 for more information on our Composite range
- Unitex® Ulon HP 500/4 (70-75º Shore A) hardness when the definition detail is fine

Graphics

Plastic - PVC - Decals - Vinyl - Paper - Packaging Labels

- For printing graphics the squeegee must have the right amount of flexing to transfer ink correctly through the screen and have good solvent/UV ink resistance. Also, it must be free from surface imperfections and irregularities, especially for high quality graphics
- Typically for high resolution graphics a 75º Shore A (or harder) squeegee is used
- Many printers use the Unitex® Marathon Triple 75º Shore A or higher when high print pressure is required to ensure fine detail. As it is a multi purpose squeegee can be used on many different types of machines which cuts down on inventory - see page 8 for more information on our Triple range
- Generally lower hardness squeegees are used for larger mesh openings

Bottles and Containers

Plastic - Glass Packaging

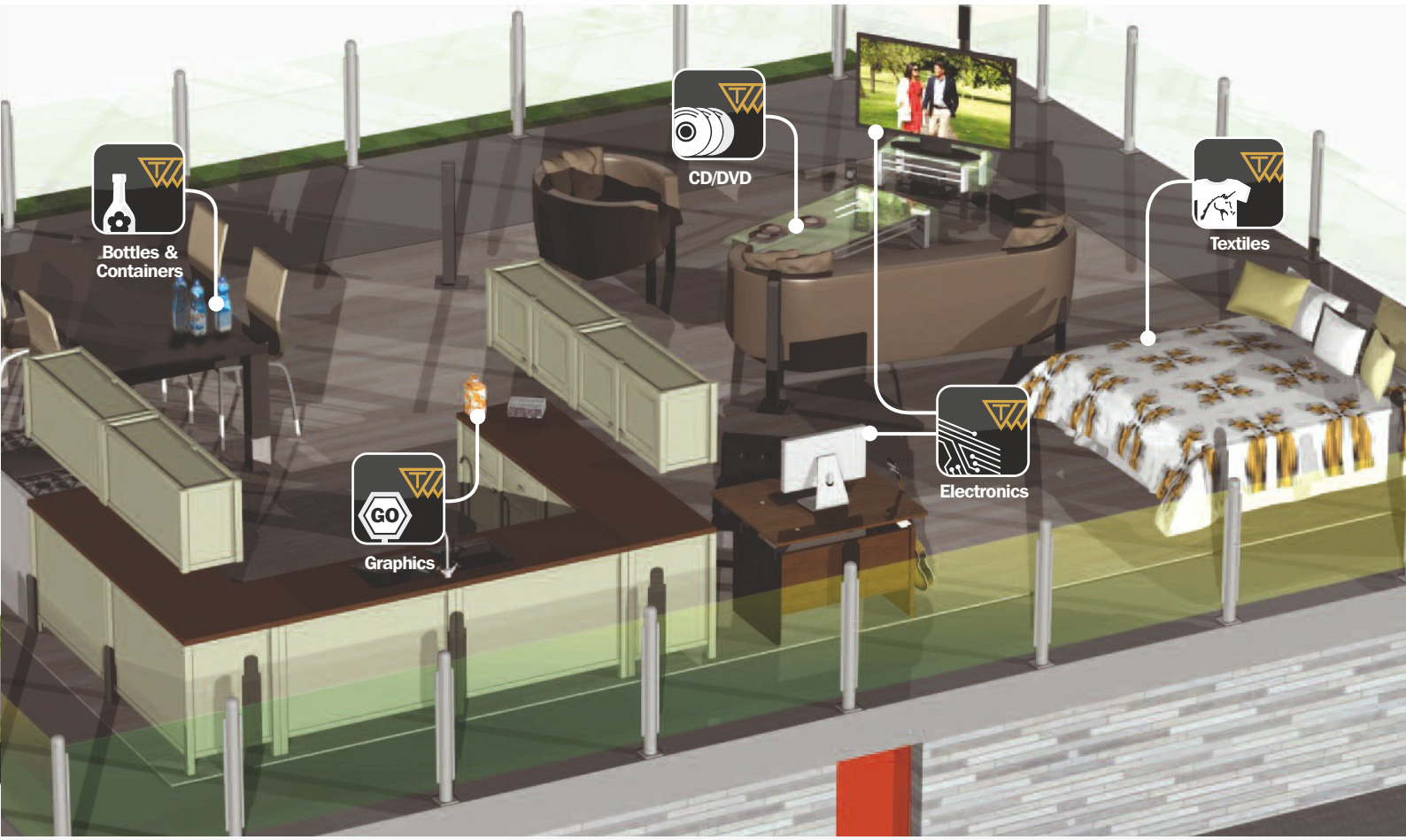
- Unitex® Marathon S-Cut and D-Cut squeegees play an important role in meeting the increasing demands on the bottle printer. S-Cut and D-Cut profiles provide the benefit of a sharper edge for an accurate ink deposit, in addition to maximum definition
- For greater tip control use S-Cut and D-Cut profiles with Lan Land indicates a flat tip which is normally 1mm
- The profiles are available in 45˚ and 65˚ angles - see page 9 for more information on our profiles

Glass

Graphics

Graphics

Solar Cells



Solar Cells and Electronics

Cell Busbars - Fingers - PCB - Battery - RFID - Insulators - OLED - Bio Sensors - Thick-Film - Thin-Film - Switch Membrane

- A high value finished product demands a high quality squeegee for perfect results and reduced product defects. Unitex® Ulon HP is the squeegee of choice for numerous electronics manufacturers worldwide
- Unitex® Ulon HP squeegee is ideal for multi layer printing where tight registration control and printing accuracy is essential
- For fine track spacing and deposits in 20µm to 30µm range use Unitex® Ulon HP 500/4 (70-75º Shore A) and 500/8 (75-80º Shore A) hardness. For deposits 50µm+ use Unitex® ULON HP 500/3 (65-70º Shore A) hardness
- Used with inks, pastes, resins etc
- Unitex® Ulon HP is OEM on many of today's Electronic Printing Machines
- Unitex® Ulon HP is fully RoHS compliant

Textiles

Most Substrates - Decorative/Personalised Printing

- Screen printing can cope with intricate designs on silk through to durable bold prints on a wide range of fabric based substrates. Inks range from water or solvent based pigments and dyes to plastisol types
- Textiles such as T-shirts often require a large amount of ink deposited, so a softer squeegee is required such as Unitex® Marathon 60 and 65º Shore A
- For finer meshes, increase the hardness of the squeegee to reduce ink deposited and increase detail
- If a very heavy ink deposit is required use a Bull Nose profile - see page 9 for more information on our profiles

CD/DVD

Screen Printing

- The CD/DVD industry require squeegees with high durability, close tolerances and a wide range of sizes
- The print quality must be high with maximum definition and machine set up times kept to a minimum
- Unitex® Ulon HP and Unitex® Marathon are available in a range of sizes, from length 100mm to 160mm and width 20mm to 35mm
- They are both ideal for high speed printing applications and one to five colour processes

Electonics

Textiles

CD/DVD

Bottles and Containers

Guide to selecting the right Unitex® squeegee

Hardness/Durometer

The hardness of squeegees is measured in Shore A° (Durometer) usually covering a range of grades from 55° to 95° as a means of identification for the industry. Unitex® uniquely offers strict 5° hardness bands, and guarantees the printer a more repeatable performance. Although hardness plays a dominant role in a blade's deformation and wear, the elastic modulus of the squeegee controls the stiffness or amount of flexing or bending.

Many squeegee manufacturers may produce blades with the same hardness, but the elastic modulus can differ from one producer's squeegee to another. This can have a marked effect on performance. Unitex® squeegees are manufactured to tight specifications thus minimising print variables. The hardness value influences the way the squeegee aligns to the surface and determines the level of printing force required to achieve the transfer of ink through the screen. The softer the grade the more adaptable the squeegee is to the surface - as a result less printing force is required.

Unitex Grade	Hardness Shore A°	Profile	Pressure	Ink Viscosity	Mesh Size	Off-contact Distance	Screen Tension	Substrate Adaptability	Ink Deposit	Image Definition
SOFT										
Ulon HP 500 /1	55-60°	Plain	Medium	Low	Large	Medium	Low	Good	High	Fair
Ulon HP 500/3	60-65°	D-Cut	Medium	Low	Large	Medium	Low	Good	High	Fair
Marathon	65°	S-Cut	Medium	Low	Large	Medium	Low	Good	High	Fair
Marathon	70°	D-Cut/S-Cut with Land	Medium	Low	Large	Medium	Low	Good	High	Fair
MEDIUM										
Ulon HP 500/3	4 65-70°	Plain	High	Variable	Variable	Variable	High	Moderate	Moderate	Good
Ulon HP 500/4	70-75°	D-Cut	High	Variable	Variable	Variable	High	Moderate	Moderate	Good
Marathon	75°	S-Cut	High	Variable	Variable	Variable	High	Moderate	Moderate	Good
Marathon	75°	D-Cut/S-Cut with Land	High	Variable	Variable	Variable	High	Moderate	Moderate	Good
HARD										
Ulon HP 500/8	75-80°	Plain	Maximum	High	Variable	Low	High	Minimal	Low	Good
Ulon HP 500/9	80-85°	Plain	Maximum	High	Variable	Low	High	Minimal	Low	Good
Ulon HP 101/9	85-90°	D-Cut	Maximum	High	Variable	Low	High	Good	Low	Good
Ulon HP 500/15	90-95°	S-Cut	Maximum	High	Variable	Low	High	Good	Low	Good
Marathon	80°	D-Cut/S-Cut with Land	Maximum	High	Variable	Low	High	Good	Low	Good
Marathon	85°	D-Cut/S-Cut with Land	Maximum	High	Variable	Low	High	Good	Low	Good

The chart recommendations are for standard pressures, medium stroke of printing speeds and standard squeegee angles. It does not cover squeegees which are swollen or damaged through misuse or wear, or to squeegees which are outside the manufacturer's dimensional specification.

Choosing the hardness

There are generally three broad categories of hardness, which includes soft, medium or hard. Ranging from 55° to 95° Shore A, in 5° increments.

Soft Grades

Unitex® Ulon HP 500/1 500/3
Unitex® Marathon 60° 65°

Generally used for medium squeegee pressure with large mesh opening and low viscosity inks. They are ideal for irregular substrates and uneven beds. In general, softer squeegees will deposit a high amount of ink with medium detail control. Ideal for use with large coloured surfaces and glazes, as well on to glass and ceramics.

Medium Grades

Unitex® Ulon HP 500/3-4 500/4
Unitex® Marathon 70° 75°

Ideal for higher squeegee pressure with a wide range of mesh count and inks. Will give good ink deposit and fine detail control. They are used for most screen printing applications.

Hard Grades

Unitex® Ulon HP 500/8 500/9 101/9 500/15
Unitex® Marathon 80° 85° 90°

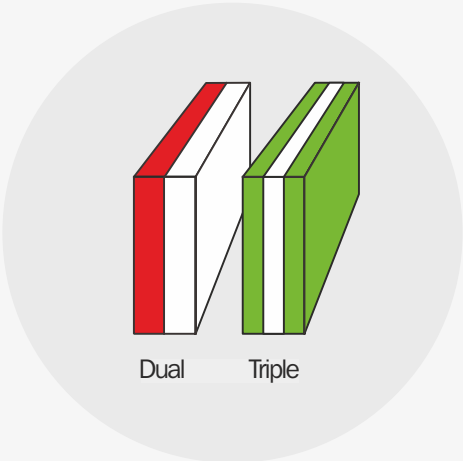
Used for maximum squeegee pressure and high viscosity inks. Gives lower ink deposit and good, fine detailed control. They are mainly used for fine mesh screens and thin ink layers.

Unitex® Ulon HP/Marathon Dual and Triple Range

The Dual and Triple hardness range of squeegees have a unique chemically laminated designed blade.

Generally of a soft/hard and soft/hard/soft construction. These squeegees are designed to overcome the problems normally associated with applying too much pressure with a soft or medium hardness blade.

At high pressure, softer blades will distort, considerably decreasing the attack angle and drastically reducing the ability of the squeegee to shear the ink correctly. The blade may then aquaplane over the surface leaving ink on the screen. The harder section of these blades prevents bending under high pressure and the softer layer gives the perfect print.

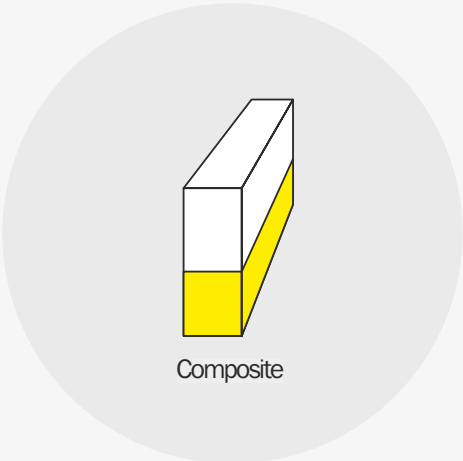


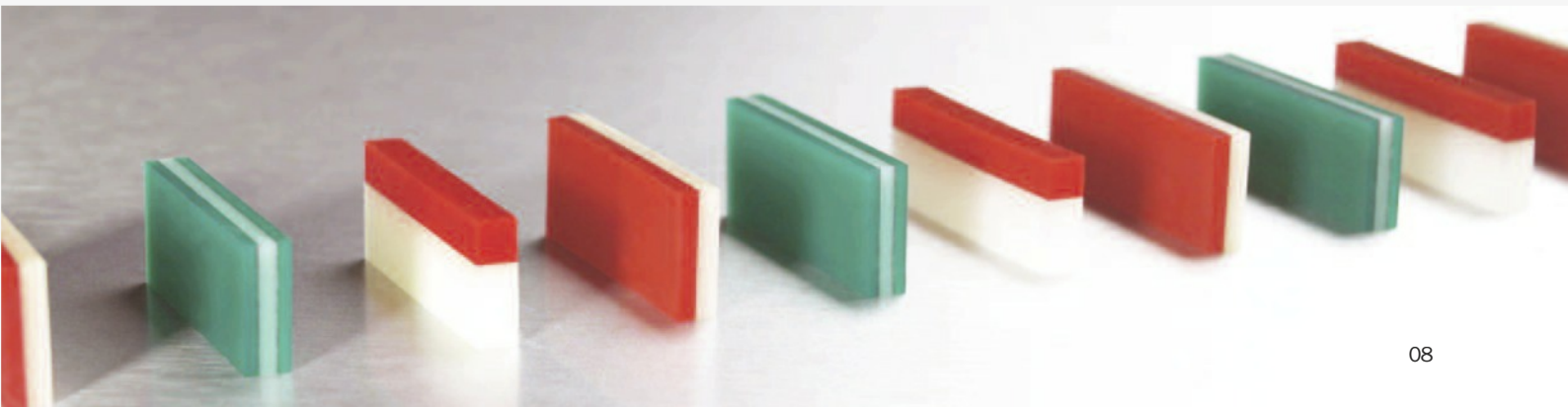
Unitex® Ulon HP Composite Range

The Unitex® Ulon HP range of Composite squeegees complements our range of Plain and Angled squeegees. They have proved to give excellent results on high speed machines in applications such as flat glass, solder paste as well as giving consistent film thickness on multi colour and UV lacquer products.

Advantages Include:

- Prevents blade distortion
- Less vibration
- Reduced screen pressure
- Increases stencil and mesh life
- Less screen stretching
- Excellent ink control
- Stability without distortion

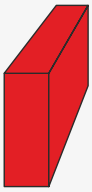




Choosing the right profile

Plain

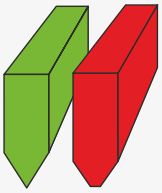
Standard rectangle profile - most commonly used profile for general graphics and textiles. Can be used on a variety of substrates with a wide range of inks. Provides medium adaptability and maximum force. Pushes the smallest amount of ink through the screen. Ideal for sharp line and halftone dot production. The less ink deposited the sharper the printed image.



D-Cut and D-Cut with Land

D-Cut - V-shaped profile with a sharp tip.
D-Cut with Land - V-shaped profile with flat tip.

Gives excellent control when printing on glass or plastic cylindrical objects. The Land version gives good control of printing angle. Also used for fine printing on textile cloth.

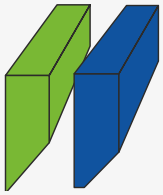


- Profiles are available in 45˚ and 62˚ angles.
- All Lands are normally 1mm.

S-Cut and S-Cut with Land

S-Cut - Chisel shaped profile with a sharp tip.
S-Cut with Land - Chisel shaped profile with flat tip.

Used extensively in container printing. Good adaptation to irregular surfaces and excellent ink deposit control.



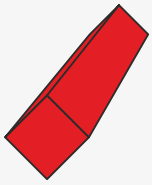
- Profiles are available in 45˚ and 62˚ angles.
- All Lands are normally 1mm.

Bull Nose

Rounded Bull Nose profile - Used for a variety of applications from textile printing to adhesive printing. Will give maximum ink deposit.

Diamond

Diamond profile - This blade profile is specifically designed for the use on PCB machines, the squeegee is held close to the holder giving greater control whilst printing. It enables very close control of the squeegee angle and shows very little squeegee bending under pressure.



What do our customers say...

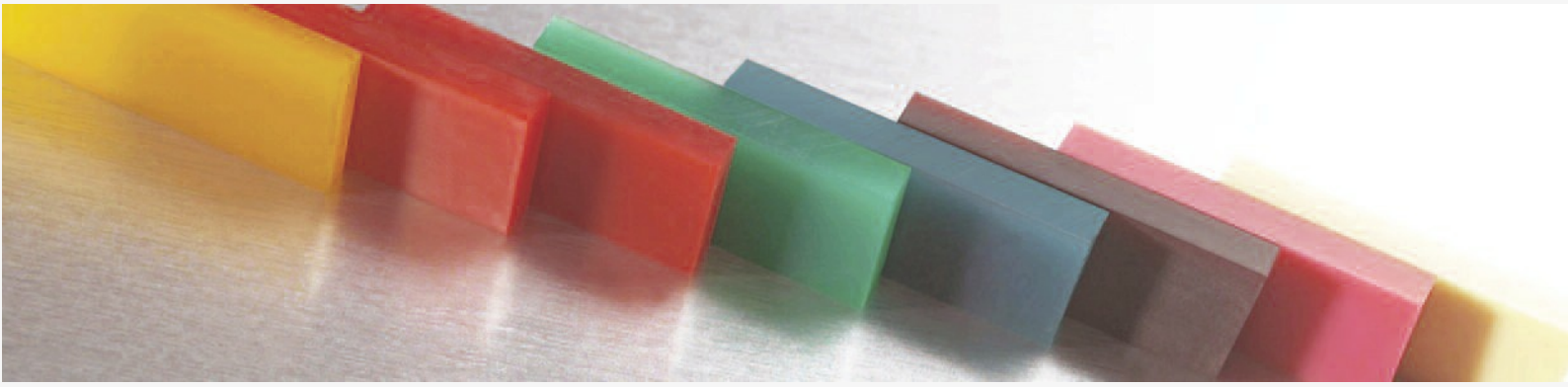
'Yes, there is cheaper out there but there isn't anything better than Unitex® squeegees.'
Print Supervisor, Textile Printer, Indonesia

'Our purchasing department saved a few Dollars by getting a low cost squeegee, what a mistake, we lost a large customer through providing an inferior print.'
Managing Director, Automotive, Taiwan

'From a single shipment of one (Non Unitex®) squeegee type the Shore Hardness ranged between 69˚ and 82˚. It took ages to set up and the finished product was inconsistent.'
Screen Printer, Graphics, USA

'While printing with our last new squeegee there was a defect right in the middle of the printing edge. We went straight back to Unitex® after that.'
Printing Technician, Multi-National Electronic Goods Manufacturer, Asia

'We print Solar Cells. Saving a few Euros on a squeegee and potentially scrapping a print run worth thousands is not a risk we are willing to take.'
Technical Manager, Solar Cell Manufacturer, Europe



Unitex® squeegee care - maintaining quality and reducing costs

The Squeegee Care guide is designed to ensure your Unitex® Squeegee is running to an optimum level of performance at all times.

Before use

- Squeegees should not be stored in sunlight or bright light - UV light will darken the squeegee colour, although this will not have a negative effect on the quality of its performance
- Try to store squeegees between 15-25°C in dry conditions and away from inks - in high humidity squeegees will absorb moisture and solvents from the air
- Store squeegees flat, do not leave rolled up
- When using a roll, leave flat for 24 hours so the squeegee has time to relax

In use

- Squeegees should be cleaned immediately after use to prevent the accumulation of dried ink
- Remove all remaining ink deposits from the holder and the squeegee. Any remaining can cause marks from the squeegee during subsequent printing operations
- Print quality may deteriorate during a long run as the sharp edge is lost; therefore plan to swap the squeegee early. Rounded edges use and deposit more ink
- When storing a squeegee still mounted in the holder, do not rest it on the squeegee or allow the squeegee to touch anything during storage
- Squeegees or their holders must not be left in solvents to soak. Soaking will cause swelling and loss of resilience
- When cleaning the squeegee use a soft cloth and always wipe away from the edge
- To prolong the life of a squeegee, “rest” it for 12 hours after cleaning and before the next printing operation starts

Grinding/Sharpening

- You should not be required to sharpen a squeegee prior to use
- Only sharpen a squeegee that is clean, dry and has not been used for printing for at least 12 hours

General

- Squeegees harden with time – test old squeegee regularly. Do not use old squeegee that is 5 to 10 degrees more than its original hardness
- The shelf life of the new unused squeegee is approximately two years if stored correctly
- Do not use a squeegee without ink. It will quickly destroy the printing edge after very few passes

Packaging

- Your squeegee packaging is optimised to ensure it arrives with you in the best condition possible
- We use secure, moisture proof containers for sea freight.
- Light weight packaging for air freight
- Priority freight if required for fast delivery
- Customer specified carriers when required

Squeegee marking

Unless specified at time of ordering all Unitex® squeegees are marked with:

- UNITEX
- ULON HP or MARATHON
- Squeegee Grade
- Batch Number
- Made in the UK

TRELLEBORG

Trelleborg is a world leader in engineered polymer solutions that seal, damp and protect critical applications in demanding environments. Our innovative engineered solutions accelerate performance for customers in a sustainable way. The Trelleborg Group has local presence in over 40 countries around the world.

WWW.TRELLEBORG.COM/APPLIED-TECHNOLOGIES

www.twitter.com/trelleborgat
www.linkedin.com/company/unitex--trelleborg-applied-technologies

Trelleborg Applied Technologies, Trinity Park, Randall Way, Retford, DN22 7AX, United Kingdom
Phone: +44 (0) 1777 712500 Email: appliedtechnologies@trelleborg.com