

Unitex[®] squeegees printing for the long run





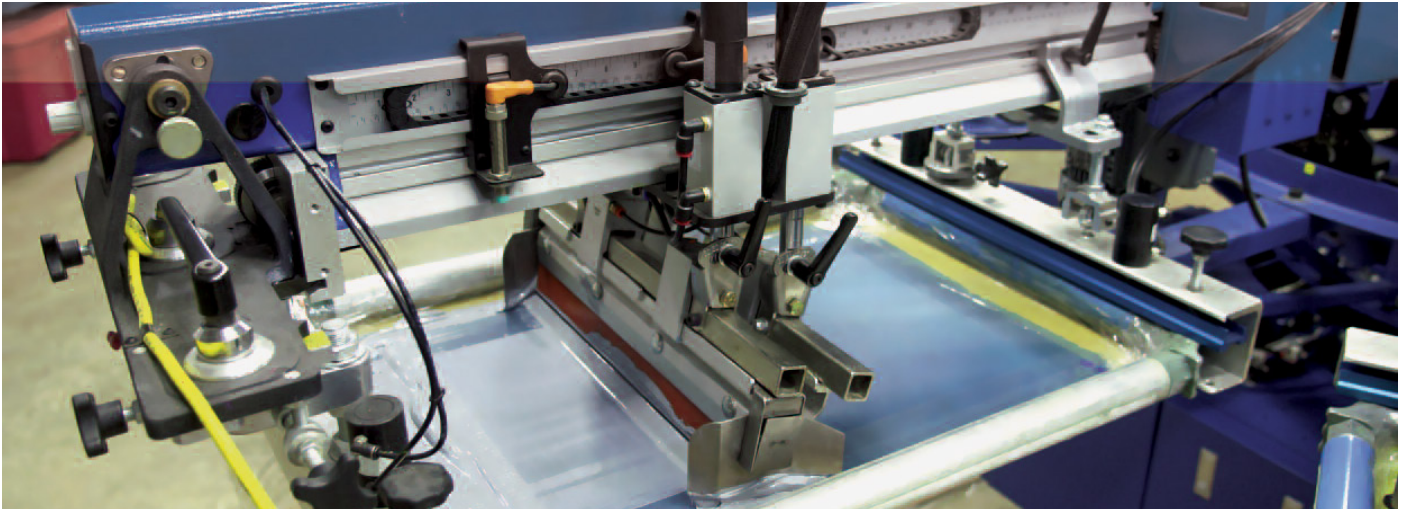
A history of excellence

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 have been producing high quality engineering polymers within polyurethanes and synthetic rubbers, as well as a range of innovative energy control materials for over 55 years.

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 squeegee blades 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 blade technology. The Unitex® squeegee blade range covers the full breadth of screen printing applications.



Market leading screen printing squeegee blades

What makes Unitex® screen printing squeegee blades the best:

Excellent 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
- Significantly slows down the risk of squeegee deformation
- Longer print runs and less downtime

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

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 and significant reduction in scrap

All applications covered

- The Unitex® squeegee range covers the full breadth of screen printing applications including:
 - Electronics
 - Glass
 - Graphics
 - Bottles/ containers
 - Textiles
 - Solar cells

Unitex® Ulon HP Squeegees can offer up to a 43% cost saving on your ink usage

Independent tests carried out – report available on request

Unitex® range specifications

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

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

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

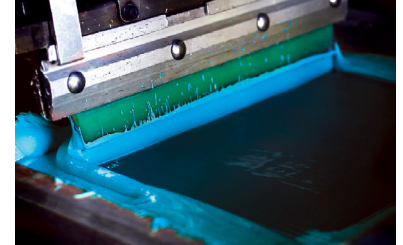
Hardness	Range	Tolerance
Unitex® Sprint	45° - 90° Sh A in 5° increments	+/- 3° Shore A
Unitex® Marathon	60° - 90° Sh A in 5° increments	+/- 3° Shore A
Unitex® Exar	60° - 90° Sh A in 5° increments	+/- 3° Shore A
Unitex® Ulon HP	55° - 95° Sh A in 5° increments	+/- 2.5° Shore A

Specialist squeegee blades 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 squeegee blades, we are also experts in making composite squeegees. We only use the best virgin raw materials and we do not use fillers.

Unitex® Sprint

Unitex® Sprint provides premium screen-printing performance and quality at a competitive price. Unitex® Sprint is designed for use with UV-LED-cured systems, water-based inks systems and the more environmentally friendly chemical systems commonly used in modern textile printing processes. Made from Diphenylmethane Diisocyanate (MDI) technology, Unitex® Sprint has high resistance to degradation by commonly used inks, solvents and monomers used in modern printing processes.

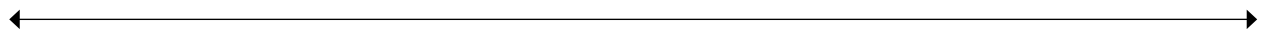


Benefits

- Compatible with most textile inks
- Resistant to solvents used in modern ink systems
- Precision edge printing with pin sharp reproduction
- Good abrasion resistance
- Consistent durometer
- Tight manufacturing tolerances

Durometer / colour coding

Tolerance: +/- 3° Shore A



Softer squeegee

More ink, richer colours

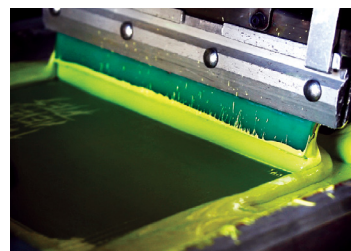
Harder squeegee

Less ink, greater detail

Physical Property	Values	Standard
Tensile break strength	37.5 Mpa	BS ISO 37:2017
Tensile break strain	472%	BS ISO 37:2017
Tensile stress at 100% elongation	3.23 Mpa	BS ISO 37:2017
Tensile stress at 300% elongation	8.57 Mpa	BS ISO 37:2017
Tear strength (die B - nicked)	24.45 kN/m	ISO 34-1:2010
Abrasion resistance - volume loss (rotating cylindrical drum - aluminium oxide 60 grit)	44mm ³	BS ISO 4649:2017
Solvent swell mass increase - 2hr submersion in cyclohexanone	26.21%	BS ISO 1817:2005
Solvent swell hardness decrease - 2hr submersion in cyclohexanone	-13 Shore A	BS ISO 1817:2005
Solvent swell hardness recovery - cyclohexanone 2hr + 120hr recovery	-2 Shore A	BS ISO 1817:2005
Retained hardness post swell - cyclohexanone 2hr + 120hr recovery	97.26%	BS ISO 1817:2005
Retained tensile break strength post swell - cyclohexanone 2hr + 120hr recovery	55.98%	BS ISO 1817:2005
Retained tensile break strain post swell - cyclohexanone 2hr + 120hr recovery	97.25%	BS ISO 1817:2005
Retained tensile stress at 100% elongation post swell - cyclohexanone 2hr + 120hr recovery	78.31%	BS ISO 1817:2005
Retained tensile stress at 300% elongation post swell - cyclohexanone 2hr + 120hr recovery	79.35%	BS ISO 1817:2005
Average percentage of retained properties post swell	81.63%	BS ISO 1817:2005
Resilience - rebound resilience	54%	DIN 53512:2000

Unitex® Marathon

Unitex® Marathon provides premium screen-printing performance and quality at a competitive price. Made from high grade Diphenylmethane Diisocyanate (MDI) polyurethane, Unitex® Marathon is compatible with a wide range of graphic screen printing systems, providing superior resistance to degradation by commonly used inks, solvents and monomers used in modern printing processes.

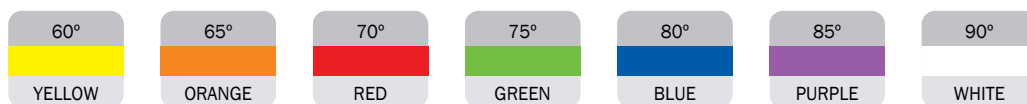


Benefits

- Compatible with most textile and UV graphic inks
- Resistant to solvents used in modern ink systems
- Precision printing edge
- Excellent abrasion resistance
- Made from high grade polyurethane
- Compatible with a wide range of inks and systems
- Tight manufacturing tolerances
- Consistent durometer to keep your colors strong and vibrant
- High degree of inspection

Durometer / colour coding

Tolerance: +/- 3° Shore A



Softer squeegee

More ink, richer colours

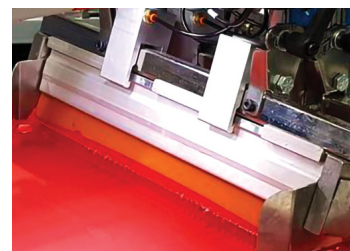
Harder squeegee

Less ink, greater detail

Physical Property	Values	Standard
Tensile break strength	47.4 Mpa	BS ISO 37:2017
Tensile break strain	560%	BS ISO 37:2017
Tensile stress at 100% elongation	3.42 Mpa	BS ISO 37:2017
Tensile stress at 300% elongation	8.39 Mpa	BS ISO 37:2017
Tear strength (die B - nicked)	43.53 kN/m	ISO 34-1:2010
Abrasion resistance - volume loss (rotating cylindrical drum - aluminium Oxide 60 grit)	44 mm ³	BS ISO 4649:2017
Solvent swell mass increase - 2hr submersion in cyclohexanone	17.9%	BS ISO 1817:2005
Solvent swell hardness decrease - 2hr submersion in cyclohexanone	-10 Shore A	BS ISO 1817:2005
Solvent swell hardness recovery - cyclohexanone 2hr + 120hr recovery	-3 Shore A	BS ISO 1817:2005
Retained hardness post swell - cyclohexanone 2hr + 120hr recovery	96.05%	BS ISO 1817:2005
Retained tensile break strength post swell - cyclohexanone 2hr + 120hr recovery	57.49%	BS ISO 1817:2005
Retained tensile break strain post swell - cyclohexanone 2hr + 120hr recovery	89.96%	BS ISO 1817:2005
Retained tensile stress at 100% elongation post swell - cyclohexanone 2hr + 120hr recovery	74.20%	BS ISO 1817:2005
Retained tensile stress at 300% elongation post swell - cyclohexanone 2hr + 120hr recovery	69.55%	BS ISO 1817:2005
Average percentage of retained properties post swell	77.45%	BS ISO 1817:2005
Resilience - rebound resilience	31%	DIN 53512:2000

Unitex® Exar

Unitex® Exar provides excellent screen printing performance for a wide range of applications. Made from a high grade Diphenylmethane Diisocyanate (MDI) polyurethane Unitex® Exar is designed to provide exceptional abrasion resistance, ensuring consistent sharp image quality over long print runs. Independent tests showed a 69% improvement in abrasion loss against a standard MDI polyurethane, which translates to longer screen printing cycles. This will provide significant cost and time savings as the blade does not need to be changed as often.



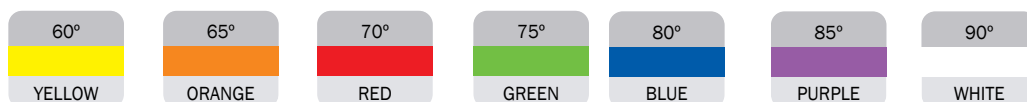
Unitex® Exar is resistant to degradation by commonly used inks, solvents and monomers used in modern printing processes and works exceptionally well on all industrial screen printing as well as decorative printing; such as textiles, graphics, bottles and containers.

Benefits

- Exceptional abrasion resistance compared to similar in its class
- Precision printing edge
- Made from high grade polyurethane
- Compatible with most UV graphic inks
- Tight manufacturing tolerances
- Improved volume swell and hardness retention
- Superior solvent resistance and durability
- Ideal for UV ink systems and continued use and processing

Durometer / colour coding

Tolerance: +/- 3° Shore A



Softer squeegee

More ink, richer colours

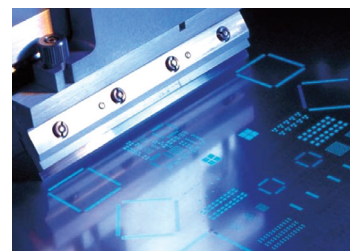
Harder squeegee

Less ink, greater detail

Physical Property	Values	Standard
Tensile break strength	49.5 Mpa	BS ISO 37:2017
Tensile break strain	497%	BS ISO 37:2017
Tensile stress at 100% elongation	3.95 Mpa	BS ISO 37:2017
Tensile stress at 300% elongation	10.66 Mpa	BS ISO 37:2017
Tear strength (die B - nicked)	36.48 kN/m	ISO 34-1:2010
Abrasion resistance - volume loss (rotating cylindrical drum - aluminium Oxide 60 grit)	18 mm ³	BS ISO 4649:2017
Solvent swell mass increase - 2hr submersion in cyclohexanone	16.86%	BS ISO 1817:2005
Solvent swell hardness decrease - 2hr submersion in cyclohexanone	-7 Shore A	BS ISO 1817:2005
Solvent swell hardness recovery - cyclohexanone 2hr + 120hr recovery	-1 Shore A	BS ISO 1817:2005
Retained hardness post swell - cyclohexanone 2hr + 120hr recovery	98.70%	BS ISO 1817:2005
Retained tensile break strength post swell - cyclohexanone 2hr + 120hr recovery	54.5%	BS ISO 1817:2005
Retained tensile break strain post swell - cyclohexanone 2hr + 120hr recovery	90.83%	BS ISO 1817:2005
Retained tensile stress at 100% elongation post swell - cyclohexanone 2hr + 120hr recovery	86.86%	BS ISO 1817:2005
Retained tensile stress at 300% elongation post swell - cyclohexanone 2hr + 120hr recovery	79.69%	BS ISO 1817:2005
Average percentage of retained properties post swell	82.12%	BS ISO 1817:2005
Resilience - rebound resilience	41%	DIN 53512:2000

Unitex® Ulon HP

Unitex® Ulon HP squeegee range provides optimum performance for the most demanding screen print applications. Manufactured from (Naphthalene Diisocyanate) (NDI) polyurethane technology, which provides a high of chemical and abrasion resistance, even when exposed to chemical systems. Unitex® Ulon HP is widely recognized as the best squeegee for use with solvent and UV based inks.



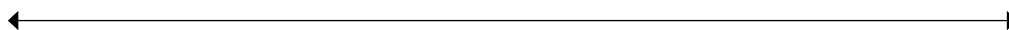
Benefits

- Market leading wear and tear resistance – ideal for printing thick and thin films, as well as minimizing the use of expensive conductive inks
- Precision edge – exceptional quality, especially for printing ultra-thin lines
- Resistant to solvents used in modern conductive and non-conductive ink systems
- Made from Vulkollan® one of the most innovative and technically advanced elastomers in the world

Durometer / colour coding

Tolerance: +/- 2.5° Shore A

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

More ink, richer colours

Harder squeegee

Less ink, greater detail

Physical Property	Values	Standard
Tensile break strength	43.6 Mpa	BS ISO 37:2017
Tensile break strain	635%	BS ISO 37:2017
Tensile stress at 100% elongation	3.00 Mpa	BS ISO 37:2017
Tensile stress at 300% elongation	5.78 Mpa	BS ISO 37:2017
Tear strength (die B - nicked)	37.22 kN/m	ISO 34-1:2010
Abrasion resistance - volume loss (rotating cylindrical drum - aluminium Oxide 60 grit)	18 mm ³	BS ISO 4649:2017
Solvent swell mass increase - cyclohexanone 2hr	23.51%	BS ISO 1817:2005
Solvent swell hardness decrease - cyclohexanone 2hr	-11 Shore A	BS ISO 1817:2005
Solvent swell hardness recovery - cyclohexanone 2hr + 120hr recovery	0 Shore A	BS ISO 1817:2005
Retained hardness post swell - cyclohexanone 2hr + 120hr recovery	100%	BS ISO 1817:2005
Retained tensile break strength post swell - cyclohexanone 2hr + 120hr recovery	86.45%	BS ISO 1817:2005
Retained tensile break strain post swell - cyclohexanone 2hr + 120hr recovery	94.02%	BS ISO 1817:2005
Retained tensile stress at 100% elongation post swell - cyclohexanone 2hr + 120hr recovery	96.61%	BS ISO 1817:2005
Retained tensile stress at 300% elongation post swell - cyclohexanone 2hr + 120hr recovery	94.93%	BS ISO 1817:2005
Average percentage of retained properties post swell	94.40%	BS ISO 1817:2005
Resilience - rebound resilience	45%	DIN 53512:2000

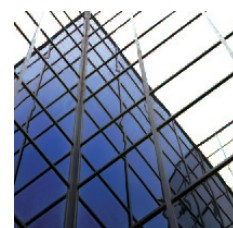
All screen printing applications covered



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 printing 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°- 60° Shore A) hardness is ideal when a large amount of ink is required onto the substrate with good tip control
- Unitex® Ulon HP 500/4 (70°-75° Shore A) hardness when the definition detail is fine



Glass

Graphics

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

- Typically for high resolution graphics a 75° Shore A (or harder) squeegee is used
- Many printers use the Unitex® Marathon or Unitex® Exar Triple 75° 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
- Generally lower hardness squeegees are used for larger mesh openings

Solar cells and electronics

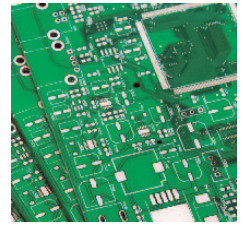
Cell Busbars - Fingers - PCB - Battery - RFID - Insulators -OLED - Bio sensors - Thick-film - Thin-film - Switch membrane

- 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

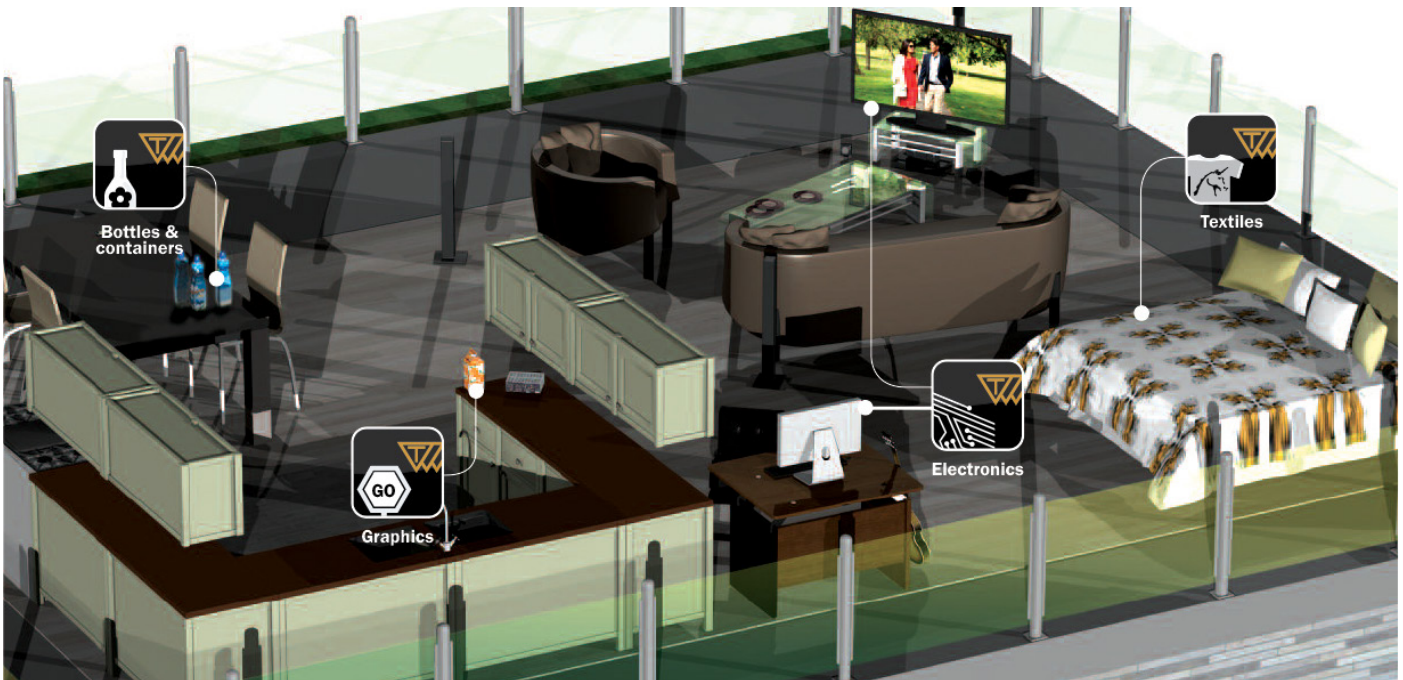


Solar cells

- For fine track spacing and deposits in 20µm to 30µm range use Unitex® Ulon HP 500/4 (70°-75° Shore A) and 500/8 (75°-80° Shore A) hardness. For deposits 50µm+ use Unitex® ULON HP 500/3 (65°-70° 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



Electronics



Bottles and containers

Plastic - glass packaging

- Unitex® Marathon and Unitex® Exar 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 edge control use S-cut and D-cut profiles with Land
- The profiles are available in 45° and 62° angles

Textiles

- Unitex® Marathon and Unitex® Sprint can cope with intricate designs on silk through to durable bold prints on a wide range of fabric-based substrates
- Textiles such as t-shirts often require a large amount of ink deposited, so a softer squeegee is required - such as Unitex® Marathon or Unitex® Sprint 65° Shore A
- For finer meshes, increase the hardness of the squeegee to reduce ink deposited and increase detail - for example Unitex® Marathon or Unitex® Sprint 80° Shore A

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 45° 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 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® squeegee blades 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, and as a result less printing force is required.

Choosing the hardness

There are generally three broad categories of hardness, which includes soft, medium or hard. Ranging from 45° to 95° Shore A, in 5° increments.

Soft grades

45° - 65° Shore A hardness

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

70° - 75° Shore A hardness

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

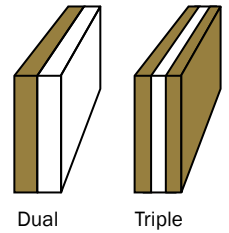
80° - 95° Shore A hardness

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® profiles

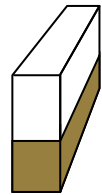
Dual and triple range

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.



Composite range

Our 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.



Composite

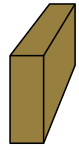
Advantages Include:

- 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.



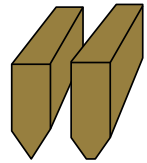
D-Cut and D-Cut with Land

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



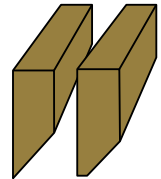
S-Cut and S-Cut with Land

S-Cut - chisel shaped profile with a sharp tip

S-Cut with land - chisel shaped profile with flat tip

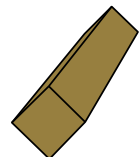
Used extensively in container printing. Good adaptation to irregular surfaces and excellent ink deposit control.

- Profiles are available in 45° and 62° angles
- All lands are normally 1mm



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.



Unitex® squeegee blade care - maintaining quality and reducing costs

Our tips below are 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

- Do not 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 an old squeegee that is 5° to 10° 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
- Each squeegee blade can be shrink wrapped and labeled prior to shipping
- 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, Marathon, Exar or Sprint Squeegee Grade
- Batch Number
- Made in the UK



TRELLEBORG

Trelleborg Applied Technologies delivers innovative and reliable solutions, materials and smart systems that maximizes performance for our customers. Our vast range of specialized, customizable materials ensure peace of mind at every stage of your project. With reliable and efficient project management and manufacturing we endeavour to take performance to new levels by achieving your goals safely, on time and within scope.



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