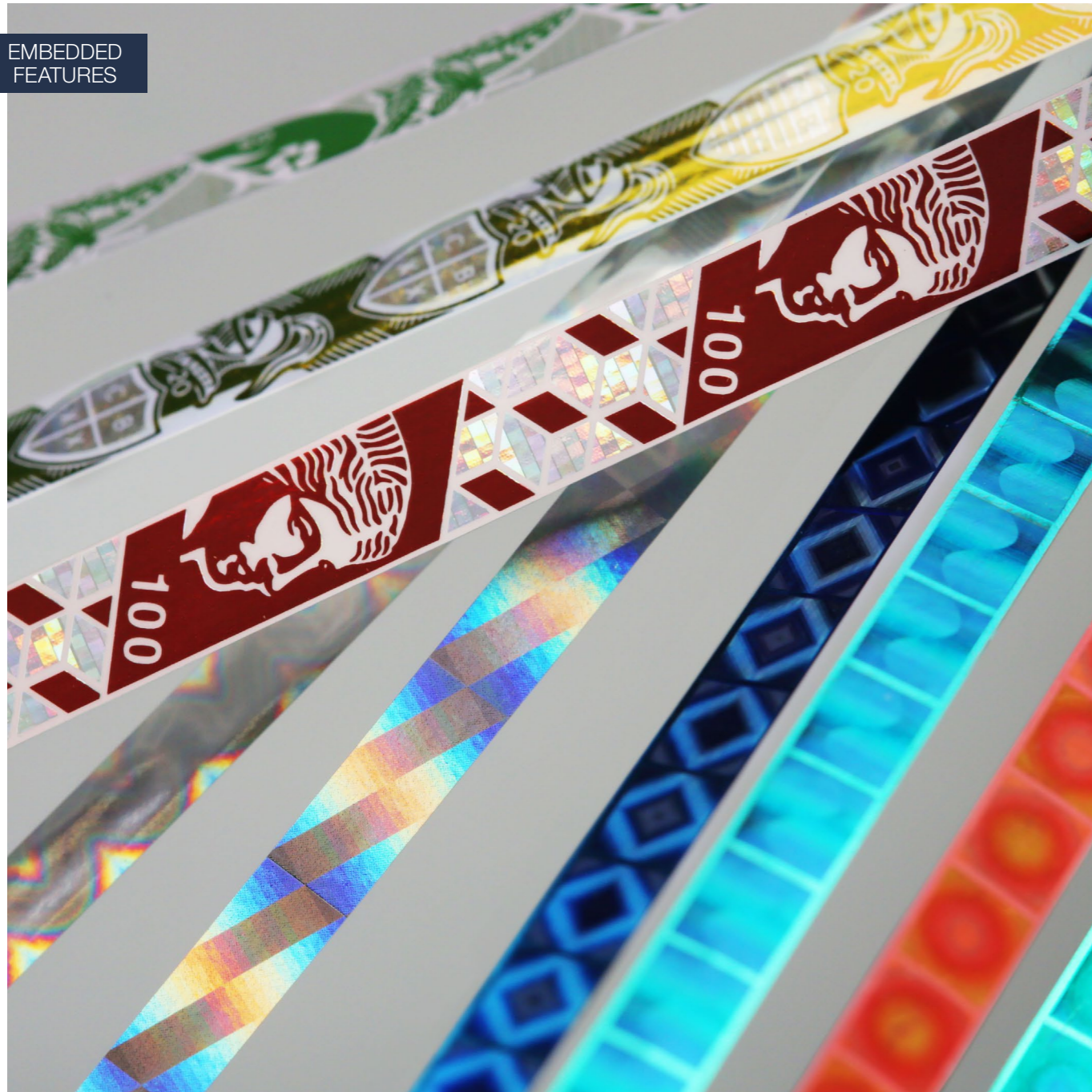




DeLaRue

CURRENCY

# Embedded Features



# De La Rue Currency

We provide banknotes that central banks and issuing authorities can be proud of.

More than half of central banks, banknote issuing authorities and state printing works around the world choose De La Rue. We provide market-leading security features, polymer substrate and fully finished banknotes.

De La Rue banknotes are more than just currency – they are secure, functional and inspiring products that countries can take pride in. They represent the very best of British design and innovation by capturing the richness of the cultures they represent with originality and creative flair.

Today, De La Rue is a progressive global company and international manufacturer, building on a heritage of customer focus, invention and expertise. We value our role as a trusted and long-term partner to banknote issuing authorities and respect this role by striving to offer the best products, support and services via a seamless experience from start to finish.

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## Embedded Technology

De La Rue Currency has one of the most comprehensive suites of embedded security features available circulating on billions of banknotes worldwide. Our products use colour-shifting, micro-optic, holographic effects and combinational technology to create secure and striking primary security features for paper banknotes.

Holographic and colourshift technologies are ideal for lower denominations and can integrate a wide variety of impactful designs or combined with other technologies to double the counterfeit resilience.

Micro-optic effects are frequently used for medium to high denominations and appear on both threads and embedded stripes. The effects and animations are striking and can be tailored and customised for integration into any banknote design.

All embedded technology types are inherently secure by the default of being embedded in the paper. Each type of technology has a particular set of authentication techniques and aesthetics.

Embedded security features act as a prominent component within the layered security of a banknote. Applied patches and stripes can be used to enhance security complexity, each providing different points of engagement, identification and authentication throughout the cash cycle.

# PUREIMAGE™

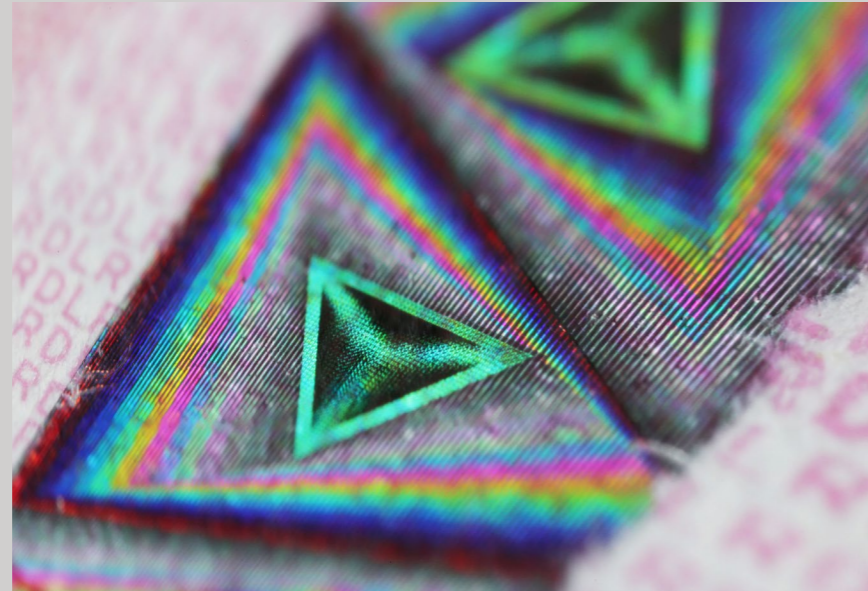
## Embedded security feature

### Bright and bold

PUREIMAGE™ is a next generation holographic thread and patch, with novel movement and dynamic pulsing effects which can be seen at any angle. It is available in a range of dimensions and is customisable to meet specific issuing authority requirements.

Advanced origination techniques have been used by De La Rue's designers to create a range of obvious movement effects, combined with customised images. When these images are embossed into a specifically developed base foil, the result is a very bright thread with bold imagery and movement.

PUREIMAGE™ can be deployed across a series in increasing widths and with bespoke icons and shapes specific to each denomination.



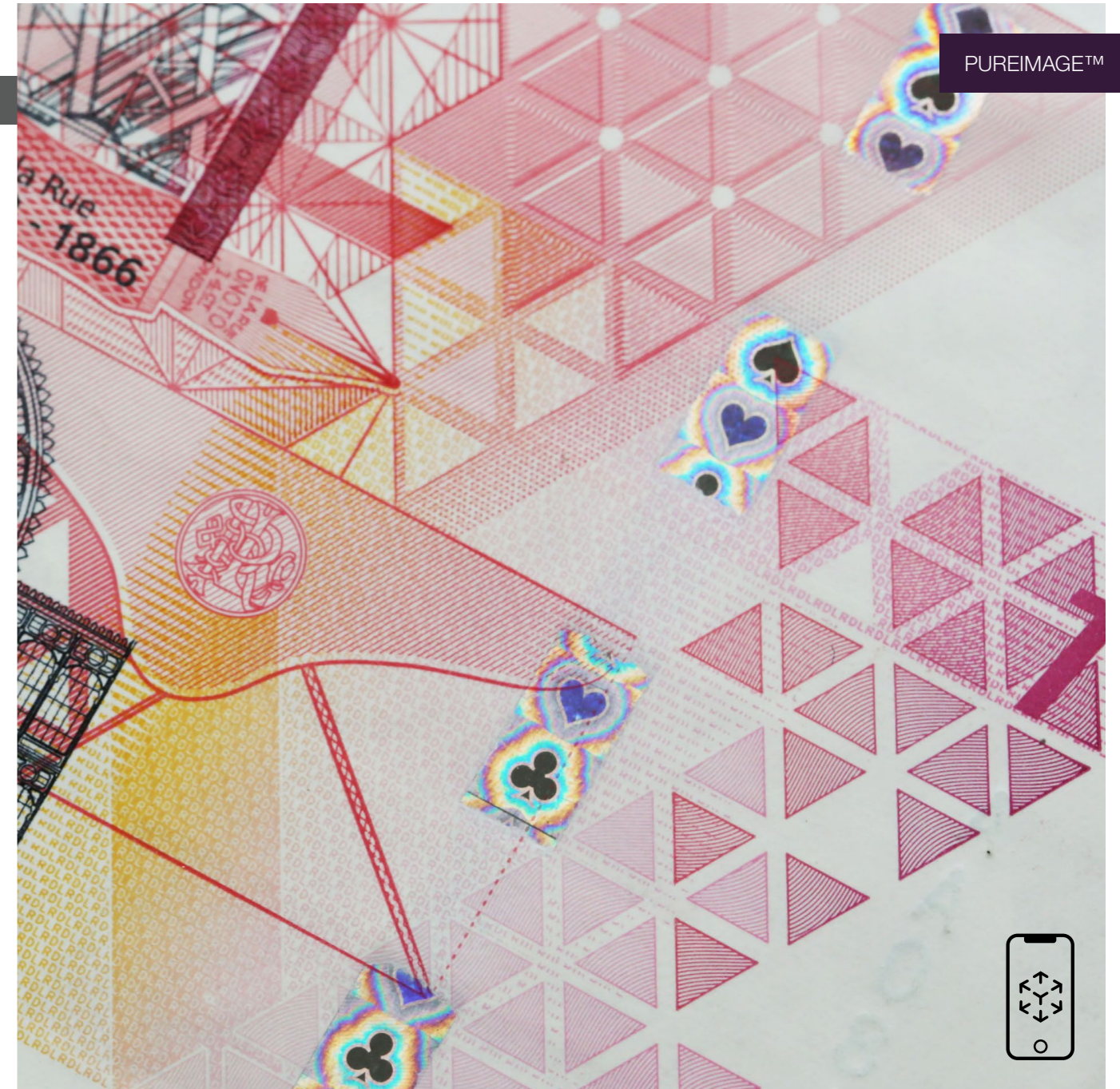
### Resilient and distinct

It is easy to apply a consistent thematic style throughout a series with PUREIMAGE™. The ability to incorporate customised icons and shapes across increasing widths into the note helps make each denomination distinct and unique. The hard-wearing nature of the thread makes it especially suitable for denominations that experience extensive handling in circulation.

### Versatile and popular

PUREIMAGE™ was developed to be a thread for flexible application. It can be combined with KINETIC STARCHROME® in a series, sharing common thematic styles, but with distinct features for the respective denominations. The holographic effects share synergy with applied holographic patches and stripes aiding public recognition and engagement.

“PUREIMAGE™ is the next generation of holographic thread, with novel movement and pulsing effects”



# PUREIMAGE™

## Technical Specifications

Metallic threads naturally catch the eye. Upon closer examination the advanced diffractive microstructures generate effects that are visible when tilted on any angle. With a wide viewing angle, PUREIMAGE™ is impactful in thread widths as narrow as 2mm and even more striking in wider threads.

It can be used across an entire series, selecting wider thread variants for higher value denominations.

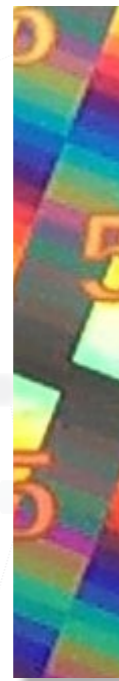
PUREIMAGE™ holographic effects require bespoke imaging equipment that is programmed with advanced code. This leads to novel holographic effect that includes pulsing, intuitive movement (one direction) and counterintuitive movement (opposing directions).

The designs can be customized, for instance incorporating characters or numbers into the effects, making this an incredibly versatile thread.

<b>Thread width</b>	2 - 6mm
<b>Window length</b>	5 - 29mm (note height dependent)
<b>Fluorescence</b>	Multiple colours available (optional)
<b>Holographic colours</b>	Silver
<b>Holographic effects</b>	5 different effects for customisation
<b>Varnish</b>	Pre-print varnish, post-print varnish
<b>Machine readability</b>	Level 2 / Magform available for threads wider than 3.1mm (optional)



Blaze



Climb



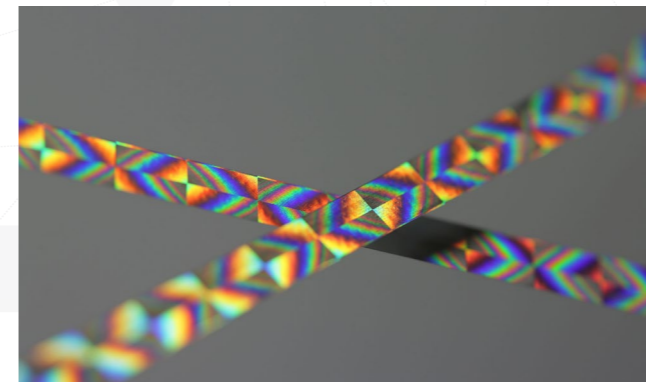
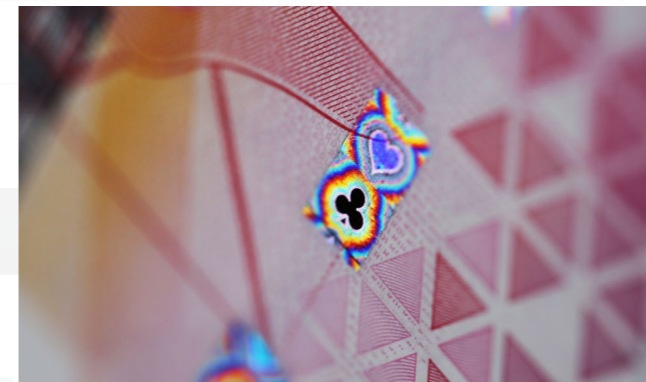
Orb



Slide



Switch



### Engaging and recognisable

Bright and sharp colours matched with dynamic movement and pulsing effects which are visible at all angles even at thread widths of 2mm. Five high-resolution holographic designs and a machine-readable option for wider threads.

### Designed for integration

The basic PUREIMAGE™ thread can be incorporated into paper substrate without difficulty. It is an easy thread to print with, is hard wearing and is ideal for lower to medium value denominations.

The effects in PUREIMAGE™ can be designed to resonate with the theme of the banknote increasing engagement.

### Secure and impactful

The PUREIMAGE™ thread can incorporate ClearText® areas, fluorescence and magnetics at different widths. Diffractive micro-structures and holographic effects create a high threshold against counterfeiting and simulation attempts. PUREIMAGE™ has successfully passed industry standard.

# KINETIC STARCHROME®

## Embedded security feature

### Easy to recognise

KINETIC STARCHROME® is a secure and easily identifiable security thread for all denominations of paper banknotes. It is available in many combinations of width, colour and effects and can be customised easily to specific issuing authority requirements.

The feature uses De La Rue's proven technology platforms of holographics and the colour-shifting of STARCHROME®. The sparkle of the hologram is engaging to the eye and the colour shift characteristic enables easy public identification.



### Flexible application

Using KINETIC STARCHROME® it is easy to apply a common design theme throughout a series of notes, whilst making each thread distinct from the other denominations. This reduces the risk of thread harvesting and increases counterfeit resilience.

PUREIMAGE™ holographic effects can be combined within KINETIC STARCHROME® threads creating distinct features for each denomination across a series. The holographic effects share synergy with applied holographic patches and stripes aiding public recognition and engagement.

### Proven security

The combination of colourshift and diffractive movement ensures that it is very difficult to successfully counterfeit or attempt to simulate

KINETIC STARCHROME®. During adversarial analysis tests, the feature was found to require a large number of steps and multiple materials during attempts to simulate the thread.

KINETIC STARCHROME® can be specified with UV fluorescent capabilities and MAGFORM™.

These options build on the existing level 1 recognition features adding level 2 authentication to the thread, increasing its security.

The technology driving KINETIC STARCHROME® was established with the STARCHROME platform and has been used on 150 billion banknotes worldwide.

KINETIC STARCHROME®

**“KINETIC STARCHROME® is ideal for environments where the risk of thread harvesting is especially high”**



# KINETIC STARCHROME®

## Technical Specifications

KINETIC STARCHROME® incorporates four distinct effects which double the resistance to any risk of counterfeiting, customisable thread design and four distinct holographic effects.

These combinations offer a great deal of design flexibility, permitting many image and shape options to fit in with the overall banknote design theme.

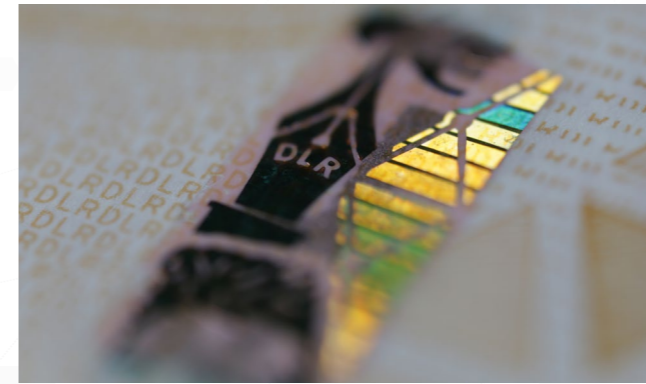
The variety of combinations make each thread visually striking and secure.

<b>Thread width</b>	4 – 6 mm
<b>Window length</b>	5 – 29 mm (note height dependent)
<b>Colourshift</b>	Red/Green or Blue/Green
<b>Kinetic variants</b>	4 standard effects in Silver or Gold. Also available with PUREIMAGE™ effects
<b>Machine readability</b>	Level 2 / Magform (optional)
<b>Fluorescence</b>	Multiple colours available (optional)

### Colourshift options and customisable thread design



### Holographic effects



### Easy to recognise

Sparkling movement engages public interest with the chosen thread designs. Six standard designs with red/green and blue/green colourshift and gold or silver holographic effects.

### Customisable and sophisticated

Highly customisable image designs and multiple combinations available. Demetallisation options for Scroll™ and ClearText® available. Thread widths of up to 6mm and window lengths from 4 - 29mm.

### Secure and durable

Uses colourshift and holographic technologies to create a high adversarial analysis threshold against counterfeiting and counterfeit simulation.

Successfully tested against industry standard physical durability and chemical resistance tests.

# IGNITE®

## Embedded security feature

### Sharp, clear and obvious

IGNITE® is a vivid and dynamic next generation thread for mid to high value denominations of banknotes. It is available in a wide range of colours and movement effects and is developed as a customisable platform to meet issuing authority requirements.

The extensive colour palette and movement mean effects are sharp, clear and obvious across a wide range of viewing angles. IGNITE® expertly layers dramatic colour-shift elements with proprietary microstructure technologies to create original and distinctive effects for public recognition.

### Recognisable and Secure

IGNITE® is an ideal solution for banknotes that require a strongly coloured security thread. It is available



in multiple combinations of colour-shift and movement effects.

The clarity and eye-catching motion engages the user and benefits recognition. The customisation of the thread with denominational values or other designs (such as icons, images or logos) further enhances the recognition and security factors.

### Combinational benefit

The combination of unique colourshift and movement technologies doubles the counterfeit resistance and ensures that it is very difficult to successfully counterfeit or attempt to simulate IGNITE®.

Adversarial analysis tests consistently demonstrated extremely high

resistance to copying or mimicking the simultaneous dynamic and colour-shifting effects of this thread.

IGNITE® can be specified with fluorescent capabilities and MagForm™. These options build on the existing level 1 recognition features and add level 2 recognition capability to the thread, increasing its security.

The technology driving IGNITE® combines advanced microstructures with an evolution of the colour-shift capabilities established on the STARCHROME platform which has been used on 150 billion banknotes worldwide.

“IGNITE® is ideal for medium to high value banknotes, requiring a brightly coloured banknote thread”





# IGNITE®

## Technical Specifications

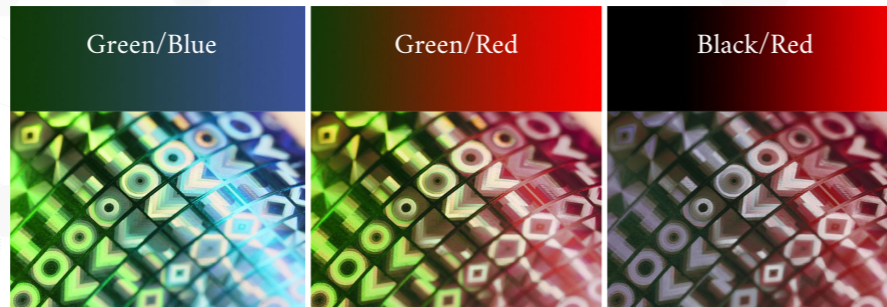
IGNITE® incorporates two distinct effects which double the resistance to any risk of counterfeiting.

Customisable thread design, three colour-shift options and six dynamic effects combinations offer a great deal of design flexibility, permitting many image and shape options to fit in with the overall banknote theme.

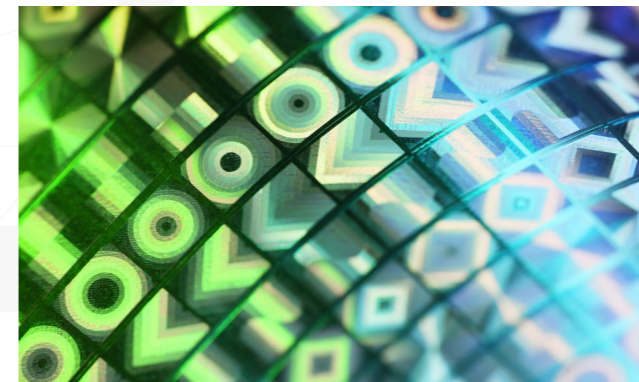
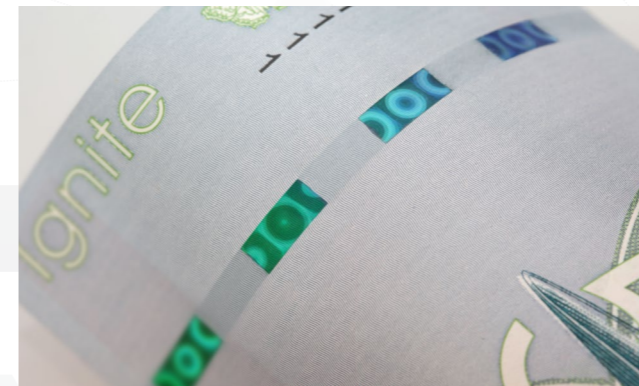
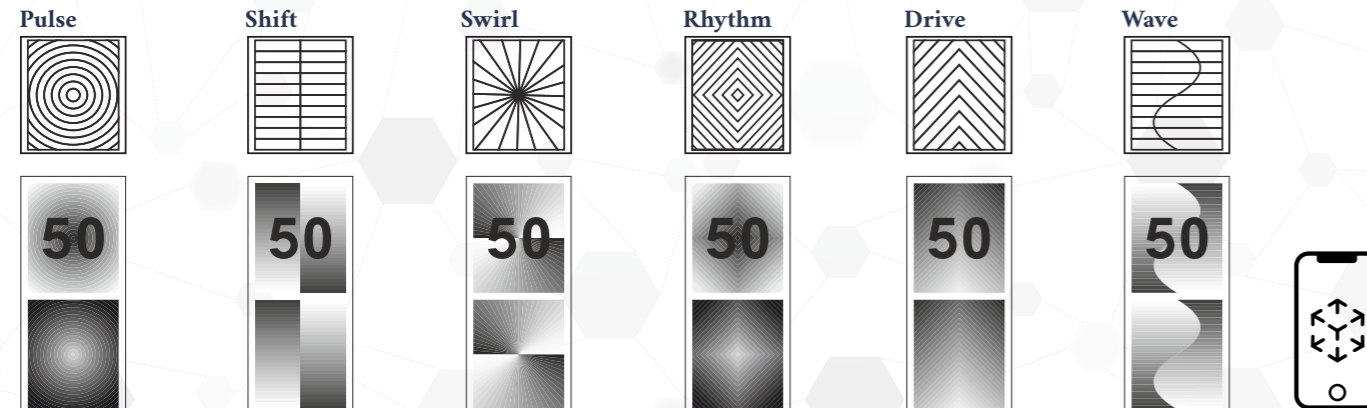
IGNITE® is one of the most secure threads in circulation today.

<b>Thread width</b>	2 - 4.5mm
<b>Window length</b>	6 - 10 mm (note height dependent)
<b>Colourshift</b>	Red-Green, Red-Black or Blue-Green
<b>Movement</b>	6 standard effects
<b>Fluorescence</b>	Yellow
<b>Machine readability</b>	Level 2 with MagForm (optional)
<b>Varnish</b>	Pre-print

### Colourshift options



### Movement effects



### Recognisable and adaptable

Sharp and obvious movement engages public interest with the chosen thread design. A choice of eighteen colourshift and movement combinations provide a wide platform for customisation.

### Broad application

IGNITE® is available in widths of 2 - 4.5mm and is ideal for mid to high denomination banknotes.

### Secure and durable

Uses both colourshift and microstructure technologies to create a complex and multi-technology barrier to counterfeiting and simulation.

Successfully passed industry standard physical durability and chemical resistance tests.

# NEXUS™

## Embedded security feature

### A new type of feature

NEXUS™ is a new category of security feature for mid and high value denomination banknotes - embedded stripe.

The 18mm wide stripe, with a full height window has a surface area populated with bright colours, dynamic imagery and engaging micro-optic effects. It is embedded into the paper, sharing the same high security and durability benefits found in banknote security threads.

The very large surface area provides a superior and memorable alternative to existing feature types and makes the banknote stand out to the public.

### Customisable

The feature is available in multiple colours and bi-colour combinations which utilise depth and inversion movement effects. Custom images can be added to the design which can be echoed across different features on other denominations.

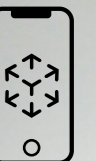
NEXUS™ has a range of effects which can be seen when tilted: depth, inversion and 3D contouring are currently available.

The shape of the stripe is also customisable with non-linear edge designs an option.

### Development

Embedded stripe technology is a development of De La Rue's OPTIKS™ feature, which has circulated across Europe, the Middle East, Asia Pacific and the Caribbean, NEXUS™ couples the embedded nature of OPTIKS™ with new micro-optic effects and features, enabling movement and depth across the entire stripe.

“NEXUS™ is ideal as a premium feature for high denomination banknotes”



# NEXUS™

## Technical Specifications

NEXUS™ incorporates micro-optic effects across a very large surface area.

Customisable designs, multiple colours and movement effects provide a great deal of design flexibility. The width of the stripe permits larger high resolution images to be used, making each denomination of NEXUS™ unique and highly resistant to counterfeiting attempts.

Strong public recognition is afforded by the large micro-optic area. This feature is integrated into the paper at the very start of the paper manufacturing process which grants excellent processability and no increase in overall substrate thickness.

<b>Embedded stripe width</b>	18mm
<b>Window length</b>	Full height of the note
<b>Effects</b>	Depth, Inversion & 3D contouring
<b>Characteristics</b>	Extremely flat ream shape
<b>Colours</b>	Blue, Purple, Magenta, Red, Violet, Teal, Green, Taupe
<b>Security</b>	Level 1 recognition



### MICRO-OPTIC EFFECTS

#### **Depth**

Creates a sense of depth which extends beyond or below the banknote.

Foreground and backgrounds are created, between which customised content appears to float. Moving the note reinforces the sense of depth as the foreground and background respond to the movement, the customised design remains anchored in the midground, providing a visual reference which enhances the perception of depth.

#### **Inversion**

Custom designs flip from light to dark or switch 'on'/'off'. Intertwined symbols and motifs flip to their negative, in a dark-light flip.

#### **3D contouring**

Elements of the design features in the stripe appear to catch the light as the note is tilted. The hibiscus flower used on some of the house note samples appear to curve away from the centre as a light spot rolls over the design.



### Remarkable and distinct

NEXUS™ is visually remarkable, responding to the current trend for large eye-catching features which create engagement and aid public recognition.

A large surface area which utilises micro-optic and movement effects make NEXUS™ a striking and recognisable effect.

### Unique and secure

There is no other micro-optic security of comparable width that can be integrated in this innovative and secure manner.

The extremely flat profile of NEXUS™ makes this feature incredibly resistant to counterfeiting and simulation attempts.

### Customisable

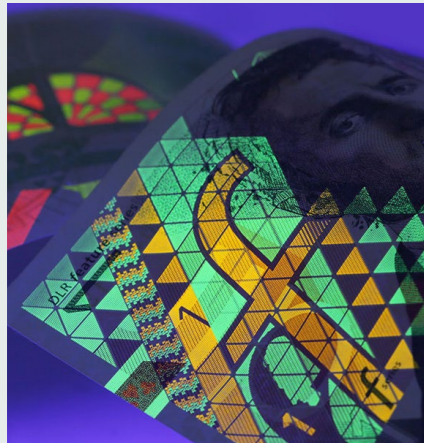
NEXUS™ can be specified with different colours, effects and unique images within the stripe.

The large surface area of the stripe and the full window height permit large high resolution images to be displayed.

“There is no other embedded security feature available today with the size, clarity and visual impact of NEXUS™”

# Complementary features

Available with all Embedded Features



## Enhanced GEMINI™

- Print feature
- Level 2 teller authentication
- Ultra violet reveal
- Used for detailed designs



## MASK™

- Hide and reveal print feature
- A pattern transforms to a hidden image when held up to the light
- Available for print and polymer substrates



## Holographic patch with PUREIMAGE™

- Applied feature
- Various effects
- Bright colours and unique designs
- Supporting feature
- Clear movement



# Contact us

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