Cinema Screen Portfolio

WORLD LEADERS IN MOVIE SCREEN TECHNOLOGY

CinemaCon 2023, Augustus Ballroom
at Caesars Palace, Las Vegas

harkness®

EXCITING NEW TECHNOLOGY. BREATHTAKING RESULTS.

For over 90 years, our pledge at Harkness has never wavered; to use our imagination, innovation and industry leading technologies to enrich every cinema experience, wherever it may be.

Our optical research, combined with specialist coatings, create Harkness Screen Technology; the very reason why Harkness Screens are supplied to over 150 countries from our advanced manufacturing centres in the USA, China, UK, India and France.

Whether cinemas require 2D or 3D surfaces, Harkness technology is trusted the world over to provide consistent and robust presentation quality for the lifetime of the screen, industry optical properties ensuring unrivalled uniformity and the latest advances to reduce visible speckle from laser projection.

Harkness' screens are available to all and using advanced modelling, screens can be supplied to meet a cinema's exact requirements based on projection technology, room geometry and safety standards.

Under projection, Harkness' screens provide a smooth, seamless and blemish free surface providing movie-goers with the best possible, distraction-free immersive experience.

Mark Ashcroft
CEO Harkness Screens

OUR JOURNEY.

From humble beginnings to becoming the world's biggest manufacturer, our screen technology has been developed over ninety years and can now be found in 130 countries.

This is the Harkness Story.

1929
Harkness Screens is founded by Andrew Harkness and his son Tom.

1932
In the early years, Harkness has huge manufacturing success. Firstly, woven screens are produced before moving into washable woven screens as the cinema industry rapidly grows. During the 1930s, there were more than 5300 screens in the UK.

1942
Tom Harkness identifies PVC as an alternative to woven screens. This new material possesses all the properties for an ideal screen, but still needs to be joined; hence Harkness develops the revolutionary Tearseal method of welding plastic, producing a flat seam and ensuring further success for Harkness.

1952
The Rank Organisation, purchases the majority of Harkness shares with a view to global expansion.

1950's
The decade sees rapid development in cinema, with the introduction of widescreen, 3D and colour as it looks to compete with the new medium of television. Harkness incorporates small perforations into their screens, enabling behind-the-screen speaker placement to create a whole new cinema experience.

1957
Andrew Harkness buys The Gate Studios.

1960
As more and more technology finds its way into enhancing cinema presentations, Harkness files a new patent for a unique method of coating cinema screens.

1981
Harkness screens acquire Hall Stage Products Ltd and change their name to Harkness Hall.

1986
With cinemas looking to feature larger screens but the ability to put sufficient light on screen limited by the available technology, Harkness develops its first coated gain screen: Perlux®. Capable of providing a brighter, more vivid presentation. Perlux® technology helps transform Harkness into the world's leading screen maker.

1990
By the mid-1990s, with the Multiplex boom accelerating globally, Harkness identifies future growth in demand for 3D projection in cinema. After investing heavily in research and development, the company launches its Spectral™ 3D silver screens – later to become the world's leading 3D screen brand.

2001
Now the global leader in its field, Harkness quickly expands its overseas operations to provide a truly worldwide service through the purchase of a European competitor based in France, together with the creation of new manufacturing facilities in the USA.

2008
Harkness expands its global business even further, adding manufacturing facilities in Beijing in anticipation of the rapid growth of Asian cinema in subsequent years.

2011
The first 3D boom reaches its climax, and with over 30,000 screens installed worldwide Spectral™ becomes the world's leading polarised silver screen brand.

2012
To cater for the enormous popularity of Indian cinema and the burgeoning growth of the Bollywood film industry, Harkness expands its operations further by opening new manufacturing facilities in Bangalore.

2013
In an industry first, Harkness launches a range of screen lifecycle management apps. Their impact is considerable, redefining the way the cinema industry thinks about specifying and maintaining screens.

2014
Following significant research and development by the Harkness team, the 4th generation laser-ready Clarus XC 3D screen technology for 2D and polarised 3D is launched, creating a screen surface for the new age of immersive cinema.

2016
With no fewer than five manufacturing plants now operating across the globe, Harkness increases its production capacity further by purchasing a brand new state of the art facility in China.

2017
Extra capacity and screen sizing is added to Harkness' top of the range facility in Roanoke as part of a new focus on the North American market.

2018 /2019
The company's investment programme continues. Over the last four years, Harkness has added two new bespoke spray coating rigs, two new perforating machines for in-house perforating of their groundbreaking Digital 4K perforation pattern, and modern RF seaming machines to ensure consistent seam quality.

2020 /2021
During the global pandemic, Harkness continues to invest in new screen technologies to help reduce the impact on cinema operators around the world.

2022
With movie goers returning to theatres the world over, Harkness develop NOVA to deliver an unforgettable viewing experience, with an ultra-high gain 3D/2D screen.

OUR INVESTMENT IN TECHNOLOGY SETS GLOBAL STANDARDS IN IMMERSIVE CINEMA.

At Harkness we believe that to make any viewing experience truly unforgettable is down to more than just improving the screen.

It's about making sure a whole range of elements come together to excite the senses. Achieving this wouldn't be possible without the technology to introduce new materials, new ways of measuring and new approaches to design – all of which are fundamental to every Harkness installation, wherever in the world that may be.

Only we can harness the experiences and knowledge gained over 90 years, to create new cutting edge technologies and innovative ways to help our customers deliver the ultimate viewing experience.

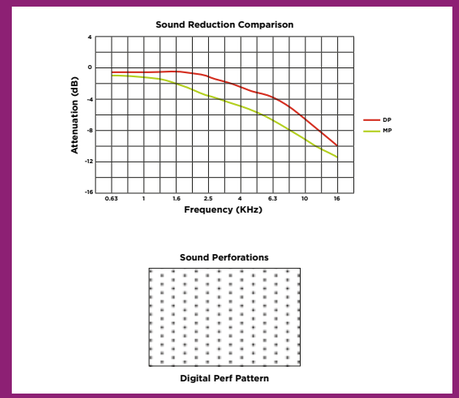
But we don't stop there. We remain firm in our commitment to continuous improvement in everything we do, and continue to lead the industry as pioneers in presentation excellence.

ACOUSTIC PERFORMANCE BUILT IN

All Harkness movie screens are available either unperforated, or perforated to optimize the acoustic performance of behind-screen speakers.

For most auditoria, Harkness' custom standard Digital Perforation (DP) pattern is used. For close viewing situations, such as preview theatres or premium auditoria where seats are typically close to the screen (less that 5m/16ft), Harkness always recommends the use of its custom mini-perforation pattern (MP) products. The mini-perforation (MP) pattern has smaller diameter perforations, but a greater density of holes to provide the best surface type for close viewing conditions. Non-perforated screens are available for use when there are no speakers situated behind the screen.

Harkness' perforation patterns have been independently tested by leading audio companies to ensure their acoustic performance inside an auditorium.

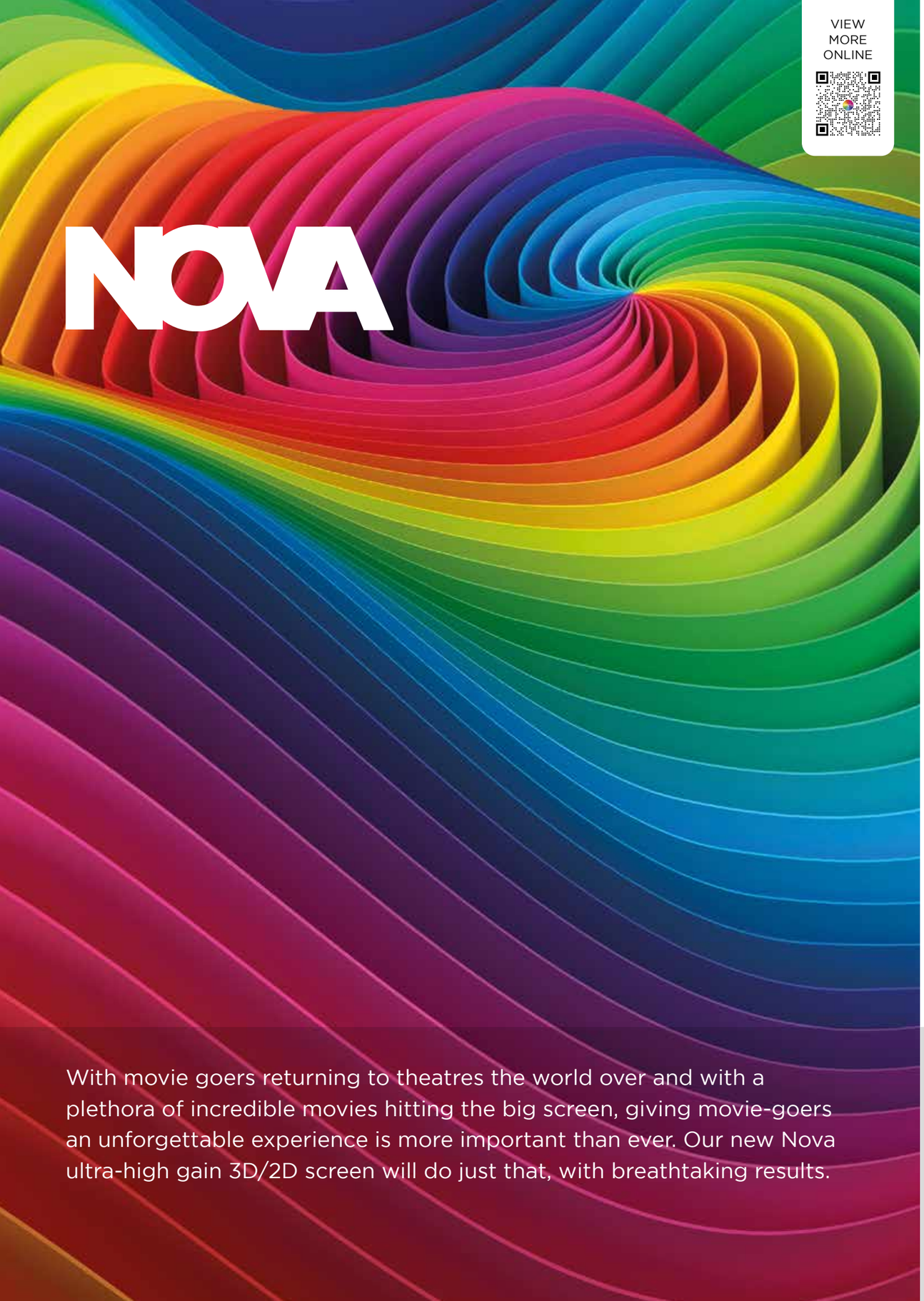


4K Digital perforation pattern

- Exclusive to Harkness Screens
- Designed for 4K Digital Projection
- Reduces Moiré fringing
- Smaller perforations
- Acoustic optimised for spoken voice range
- Allows closer viewing experience

FIRE TESTING & CERTIFICATION

All of Harkness' cinema screen products are independently tested and certified to meet local fire regulations. These include: UK BS 5867 Part 2, USA NFPA 701, France M2, Germany B1, Spain M2, Italy Class 1. Japan BT-08-050, Korea and Australia. Fire certificates for individual products are available on request. Harkness is also able to provide small samples for local fire testing should this be required.



With movie goers returning to theatres the world over and with a plethora of incredible movies hitting the big screen, giving movie-goers an unforgettable experience is more important than ever. Our new Nova ultra-high gain 3D/2D screen will do just that, with breathtaking results.

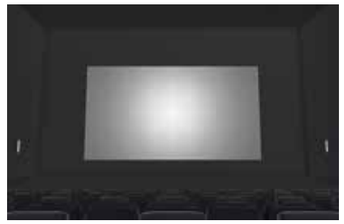
Exceptional image quality, made to last.

A completely new surface coating, Nova creates an unrivalled viewing experience both in 3D and 2D. The in-built technology and screen coating adds optical clarity and sharpness to images to help showcase movies as the Director intended. We've also integrated Nanolast™ Technology, for longer lasting screen durability and performance.

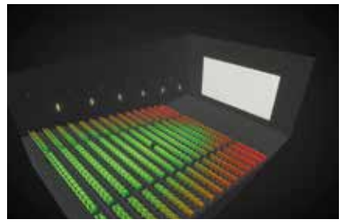
Features and Benefits

- Breathtaking image quality
- Additional optical clarity and sharpness
- Ultra-High Gain with no additional hot-spotting
- High extinction ratio for an unparalleled 3D performance

N310



Brightness uniformity



Gain: 3.1
Extinction ratio: 280:1

Technical Overview

	Perforation	Maximum size	Packing method
N310	Digital perf or mini-perf	44.19m x 18.28m (145' x 60')	Rolled

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SPECTRAL™

With over 30,000 screens installed around the world, Spectral is considered the industry standard for polarized 3D screens by cinema exhibitors. Spectral screens provide the optimum 3D projection surface for “passive” 3D applications using polarized light.

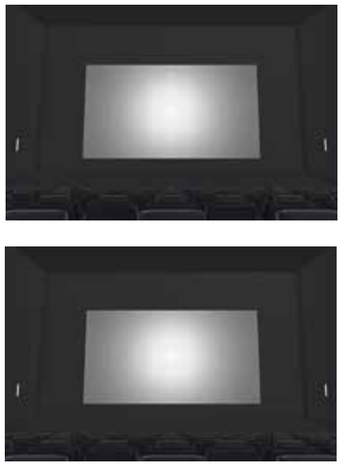
The unique coating formulation provides a perfect balance between peak brightness and light distribution allowing for crisp, dynamic and visually outstanding 3D pictures whilst supporting conventional 2D content.

Part of a wide portfolio providing breathtaking picture quality with lamp and laser phosphor technologies.

Features and Benefits

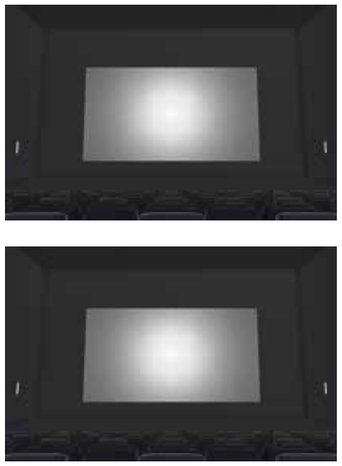
- Cost effective and suitable for all polarized 3D systems.
- Spectral™ 3D screens are considered by cinema exhibitors and special venue operators worldwide to be the trusted 3D projection surface for 3D applications.
- Higher gain screen which offer improved peak brightness and can help manage operational costs for lamp-based projection systems.
- A water-based low odour environmentally sensitive screen surface incorporating Nanolast™ technology offering a significantly more robust and durable surface which minimises the risk of surface damage during installation and everyday use.

S240



Gain: 2.40
Extinction Ratio: 155:1

S300



Gain: 3.00
Extinction Ratio: 200:1

Technical Overview

	Perforation	Maximum size	Packing method
S240 and S300	Digital perf or mini-perf	44.19m x 18.28m (145’ x 60’)	Rolled

PWT

VIEW MORE ONLINE

We've combined the industry expertise of RealD with Harkness' state-of-the-art screen engineering and manufacturing techniques to create the best performing premium 3D screen surface; Precision White Technology (PWT).

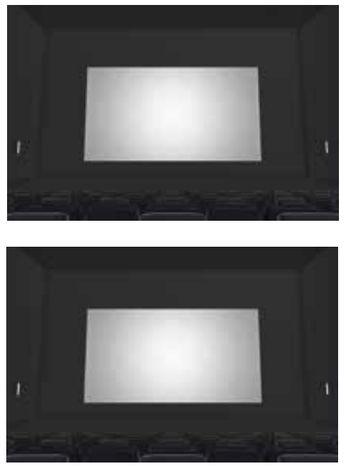
"The future of screen technology is here", announced RealD in 2013. Precision White technology is a revolutionary, highly sophisticated, scientifically engineered surface technology that delivers incredible images in both 2 and 3D formats.

A truly engineered screen surface that is smooth in texture, creating a beautifully sharp, perfectly coloured, clean and precise image.

Features and Benefits

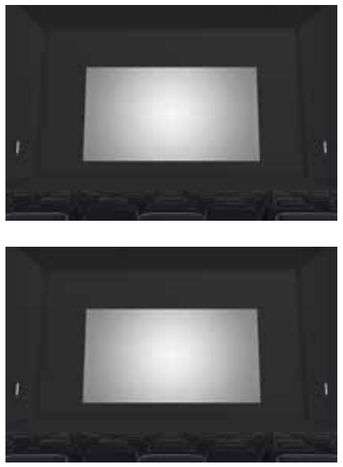
- 2D performance from a 3D screen.
- Designed to deliver enhanced 2D and 3D presentations with wide viewing angles similar to white screens of equivalent gain, PWT features edges substantially brighter than a standard silver screen.
- PWT features a smooth, white surface under projection, which generates better image contrast for improved image quality in both 2D and 3D presentations
- The improved screen efficiency results in 40% more total light coming off the screen, providing more uniform brightness than a standard silver screen.
- A water-based low odour environmentally sensitive screen surface, incorporating Nanolast™ technology offering a significantly more robust and durable surface which minimises the risk of surface damage during installation and everyday use.

PWT



Gain: 1.40
Extinction Ratio: 133:1

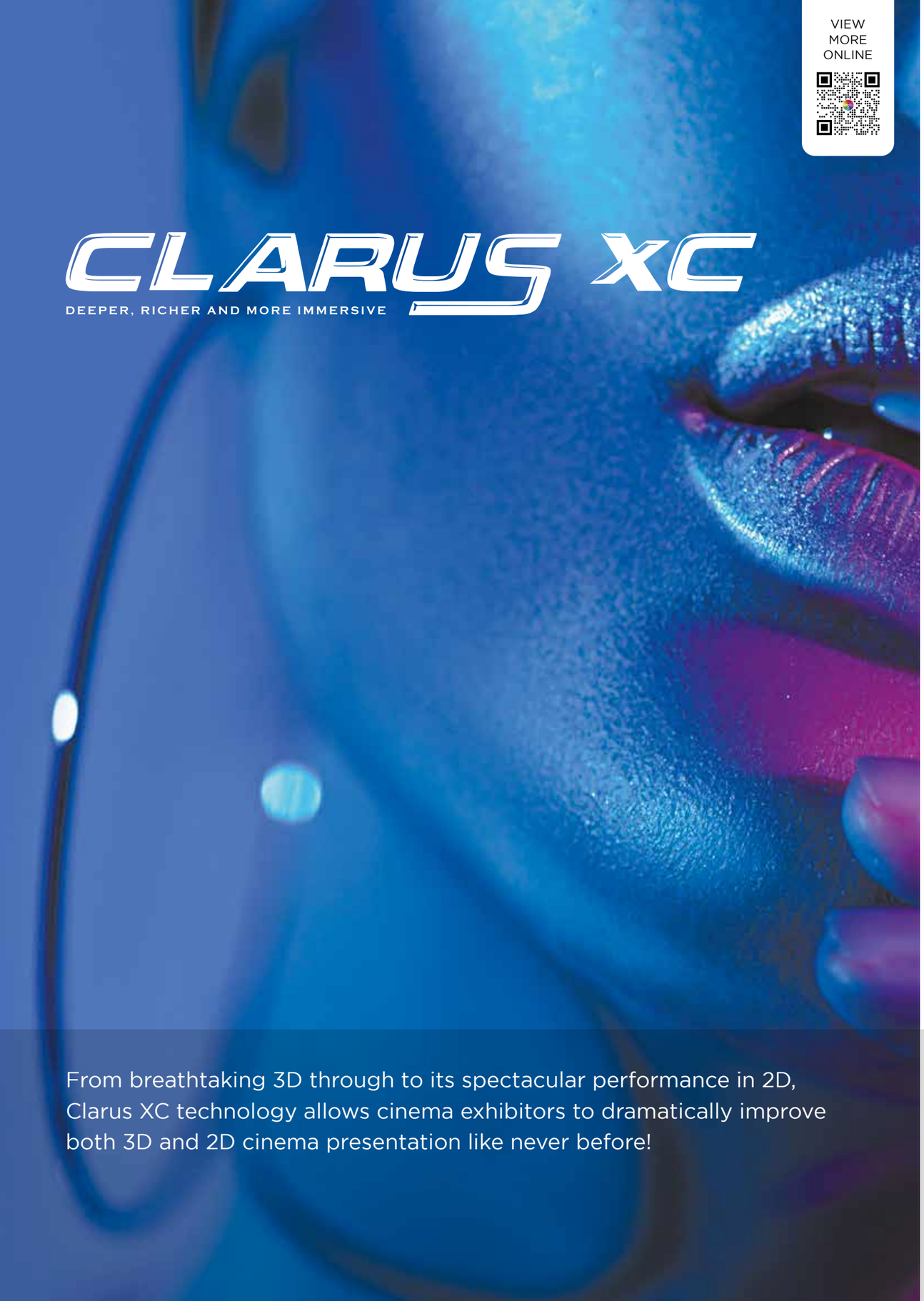
PWT+



Gain: 2.00
Extinction Ratio: 195:1

Technical Overview

	Perforation	Maximum size	Packing method
PWT and PWT+	Digital perf or mini-perf	33.0m x 14.0m (108' x 45'9")	Rolled



From breathtaking 3D through to its spectacular performance in 2D, Clarus XC technology allows cinema exhibitors to dramatically improve both 3D and 2D cinema presentation like never before!

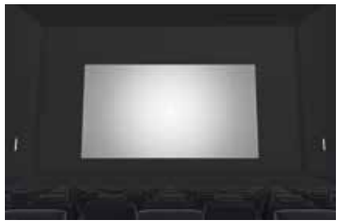
Clarus XC incorporates 4th generation d-smooth coating technology which contains specific properties more commonly seen in white screens giving a whiter appearance with deeper blacks and richer colours.

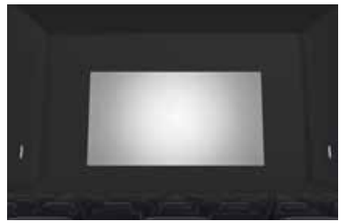
Part of a wide portfolio providing breathtaking picture quality with lamp, laser phosphor and RGB projector technologies, Clarus XC is considered by many to be the polarized 3D screen of choice for laser projection.

Features and Benefits

- Significantly improved viewing experience compared to standard polarised silver screens for both 3D and 2D viewing.
- From uniformity maximizing lower gain through to higher gain; a variety of surfaces designed to optimize performance and achieve optimum brightness levels for 3D.
- The screen surface has been designed to increase reflectance, improve light distribution, optimize clarity, 3D depth and colour. This ensures no compromise on any element of viewing performance allowing movie-goers to receive a truly incredible cinema experience.
- All Clarus XC screens feature Harkness' exclusive Nanolast™ technology giving additional durability and proprietary 4K Digital Perforation Pattern for improved audio fidelity, light reflectance and reduced Moiré fringing.
- The improved viewing angle benefits are noticeable not only from the best seats in the house but from the traditionally challenging seats.
- Nanolast™ technology offers a significantly more robust and durable surface which minimises the risk of surface damage during installation and everyday use. This is achieved with a water-based environmentally sensitive screen surface.

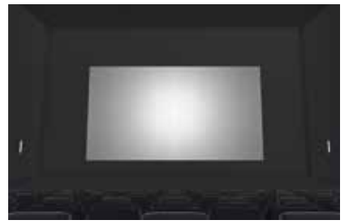
C170

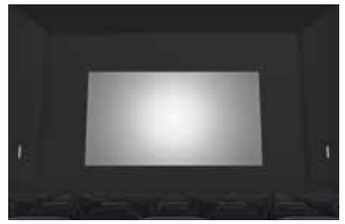




Gain: 1.70
Extinction Ratio: 120:1

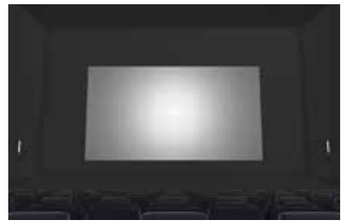
C220

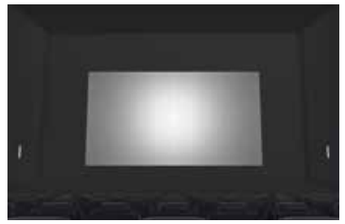




Gain: 2.20
Extinction Ratio: 150:1

C290





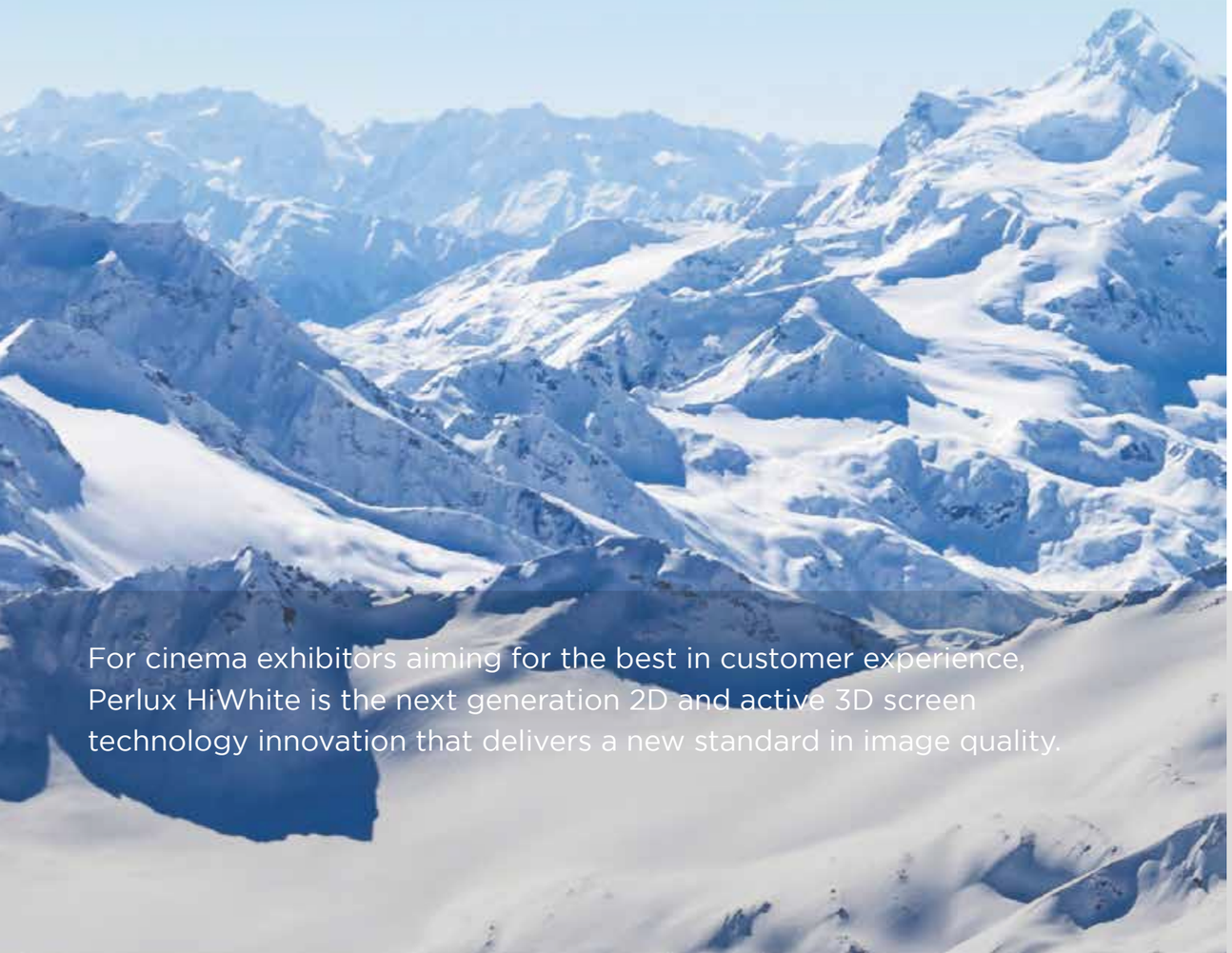
Gain: 2.90
Extinction Ratio: 180:1

Technical Overview

	Perforation	Maximum size	Packing method
C170, 220 and 290	Digital perf or mini-perf	44.19m x 18.28m (145' x 60')	Rolled

VIEW MORE ONLINE

Perlux®
HiWhite



For cinema exhibitors aiming for the best in customer experience, Perlux HiWhite is the next generation 2D and active 3D screen technology innovation that delivers a new standard in image quality.

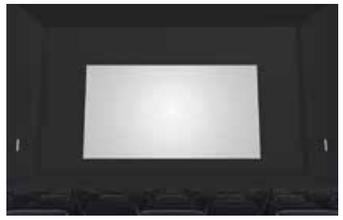
Unlike conventional white gain screen technologies, Perlux HiWhite offers a much whiter matt finish. Gain without gloss, and increased half gain angles thereby greatly enhancing the viewing experience from all seats.

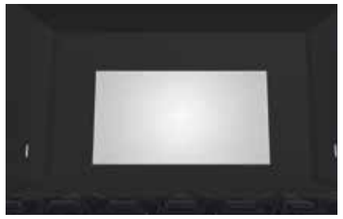
Part of a wide portfolio providing breathtaking picture quality with lamp, laser phosphor and RGB projector technologies. Considered the industry standard for white gain screens and the screen of choice for the leading PLF theatre locations.

Features and Benefits

- Breathtaking image quality for 2D and non-polarized 3D projection.
- Visibly whiter appearance providing a bright image with rich colours and improved contrast that accurately conveys the creative intent of the filmmaker.
- Widest viewing angles meaning half gain angles within the Perlux HiWhite family are increased by up to 40%. Enhanced brightness uniformity and reduced perception of hot-spotting contribute to an improved visual experience.
- From uniformity maximising lower gain through to higher gain; a variety of surfaces designed to optimize performance and achieve optimum brightness levels for 3D.
- A low odour, water-based surface coating that is environmentally sensitive. The coating incorporates Nanolast™ technology offering a significantly more robust and durable surface which minimises the risk of surface damage during installation and everyday use.
- Perlux HiWhite can be shipped as a foldable option if required.

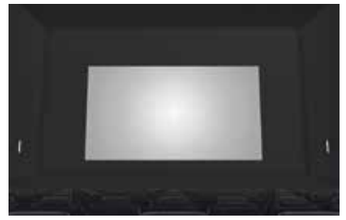
PHW140

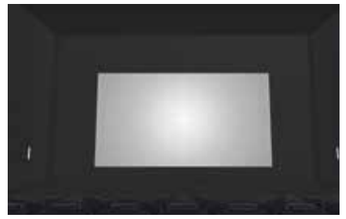




Gain: 1.40

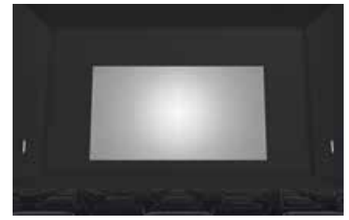
PHW180

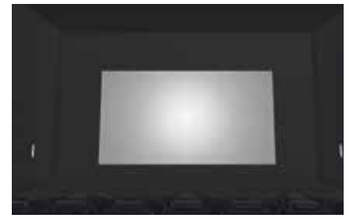




Gain: 1.80

PHW220





Gain: 2.20

Technical Overview

	Perforation	Maximum size	Packing method
PHW 140, 180 and 220	Digital perf or mini-perf	44.19m x 18.28m (145' x 60')	Rolled; folded as an option

VIEW MORE ONLINE

MATT PLUS

Matt Plus is a versatile 2D or active 3D screen surface intended for a variety of auditoria and where there is sufficient illumination from the projector, power is relatively high.

The flexible uncoated PVC-based material is manufactured to a unique formulation and specification providing incredibly wide viewing angles, high contrast, bright pictures and excellent colour temperature.

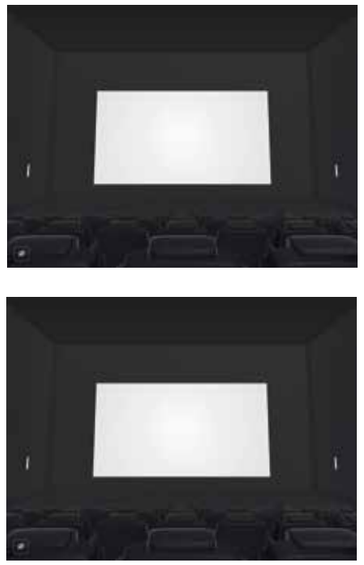
Matt Plus and Matt Preview have been engineered to mitigate laser speckle using phase, angular and polarization diversity. Matt Plus provides the base product for all other Harkness screen surfaces.

Harkness' Matt Preview screens are a premium 2D or active 3D coated surface used in preview theatres, screening rooms, grading suites and small theatres where seating positions are close to the screen and the projector power is relatively high.

Features and Benefits

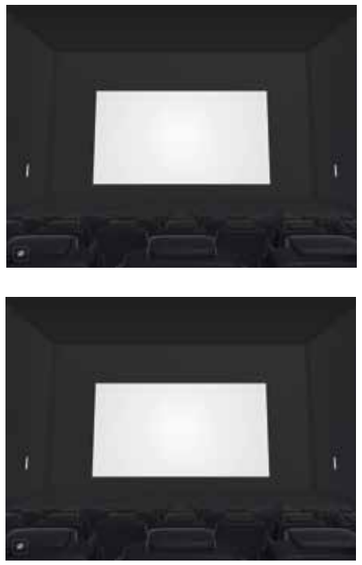
- Breathtaking image quality for 2D and non-polarized 3D projection.
- The whitest screen surface technology, providing a bright image with rich colours and improved contrast that accurately conveys the creative intent of the filmmaker.
- The best in brightness uniformity, with zero hot-spotting and complete laser speckle mitigation.
- Matt Preview uses a water-based, environmentally sensitive screen surface coating.
  This incorporates Nanolast™ technology; offering a significantly more robust and durable surface; which minimises the risk of surface damage during installation and everyday use.

MATT PLUS



Gain: 1.00

MATT PREVIEW



Gain: 1.00

Technical Overview

	Perforation	Maximum size	Packing method
Matt Plus	Digital perf, mini-perf or mini-perf super	No maximum size	Rolled; folded as an option
Matt Preview	Mini perf recommended	44.19m x 18.28m (145' x 60')	Rolled

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