dnp denmark webinar Supernova screen technologies

Webinar agenda

- > What is ALR?
- > What is optical screen technology?
- > dnp Supernova screen technologies
- > dnp Supernova screens
- > Image Quality Calculator
- > Questions?



Johnny Jensen, Senior Product Manager

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dnp denmark

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- > Optical projection screen manufacturer
- Part of Dai Nippon Printing since 1989
- > ALR pioneers
- Supernova BS screen technology 2005



What is ALR?

- No clear definition of ALR
- > A L R = Ambient Light Rejecting
- > "True-ALR" (narrow term):

"Screen technologies that reject or absorb ambient light and process it differently than projected light"

> Broad term ALR (common use):

"Screen technologies that prevent ambient light from washing out the projected image"

Tinted screens are <u>not</u> ALR screens As there is no difference to how ambient light and projected light is reflected, high-contrast (grey) diffusion screens have no ALR properties.



What is optical technology?

No clear definition of optical screen technology

> Optical:

"use of mirrors and lenses to reflect and refract light"

> dnp denmark optical screen technology definition:

"Projection screen technologies incorporating engineered lenses, specifically designed to control light rays"

This includes the use of lenticular lenses (straight) and Fresnel lenses (concentric).

Does not include spherical glass beads or "silver-dust" diffusion powder.





- Contrast is the ratio between white level and black level in a projected image
- > To increase contrast you can either boost white or lower black
- > Increase white is easy: More lumens (old-fashioned way to increase contrast)
- > Black is absence of light. The easy way of lowering black is to turn off room lighting
- > But what if you could leave lights on and still have high contrast? This is ALR!!
- The SRF (Screen Reflectance Factor) shows how much, in percentage, of the ambient light hitting the screen that is reflected to the adience
 - > SRF of typical matte white projection screen is 25%
 - > SRF vary with light source position and screen orientation (if assymmetric)



The Black-Stripe technology

(for standard throw)

dnp Supernova Black-Stripe technology





- > A black lenticular lens structure inside the screen foil is why it works
- > Light in front of the screen (the projector) is reflected
- > Light from above/below (ambient light) is absorbed
- > (SRF value 5-7%)
- Light from the side (window light) is a combination of absorbed/reflected (depending on incident angle)
- > (SRF value 8-15%)

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- Maximum height in one piece 1.5m (60")
 - > Max. 120" in 16:9 or 110" in 16:10
 - Multiple panels/lanes to build large screens
- Hard coat surface for high durability and easy cleaning
- Lens pitch 0.065mm (65 micron)
 +23K "lines" @ 1.5m height
 - Two types
 - > BS 23-23 for high brightness
 - > BS 08-85 for perfect uniformity and colors (only option for large venue screens)

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Screens using The Black-Stripe technology

dnp Supernova One

- > Up to 1.5 m (60") image height:
 - > 100", 110", 120" in 16:9 format
 - > 100", 110" in 16:10 format

Product Features:

- > Supernova 08-85 or 23-23 screen material
- > 20 mm aluminum frame
- > Silver or Black frame options
- > 10 mm masking frame on silver version
- Screen material laminated on 3 mm fireretardant aluboard for perfect flatness
- Ships assembled in robust cardboard box, ready to hang
- > Hanging accessories included
- > Magnets hold the screen to the wall
- > Custom sizes and colors available



Supernova

Supernova

dnp Supernova Blade

- > Up to 1.5 m (60") image height:
 - > 100", 110", 120" in 16:9 format
 - > 100", 110" in 16:10 format

Product Features:

- > Supernova 08-85 or 23-23 screen material
- > NO frame solution!!!
- Screen material laminated on 3 mm fire-retardant aluboard for perfect flatness
- > Precision cut for perfect edge-trimming
- Ships assembled in wooden crate for maximum protection, ready to hang
- Hanging accessories included for both wall- or ceiling mounting
- > Magnets hold the screen to the wall (wall mounting)
- > 2x 5m Ø1.5mm steel wire included
- > Custom sizes available



dnp Supernova Core

- > Up to 1.5 m (60") image height:
 - > 100", 110", 120" in 16:9 format
 - > 100", 110" in 16:10 format

Product Features:

- > Supernova 08-85 or 23-23 screen material
- > 80 mm alu frame
- > 4 frame options: Black, Velvet, Silver, White
- > Ships un-assembled in robust cardboard box
- > Screen material tensioned with rubber rings for perfect flatness
- > Assembly- and hanging accessories included
- > Custom sizes and colors available



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dnp Supernova XL

- > Up to 5.1 m wide and 3.0 m high:
 - > 160-230" in 16:9 format
 - > 160-220" in 16:10 format

Product Features:

- > Supernova 08-85 screen material
- > 0.3 mm joint-line (gap) in center
- > 80 mm alu frame
- > 4 frame options: Black, Velvet, Silver, White
- > Ships un-assembled in robust packaging
- Screen material tensioned with rubber rings for perfect flatness
- > Assembly- and hanging accessories included
- > Magnets hold the screen to the wall
- > Custom sizes and colors available



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dnp Supernova Infinity STD

> Sizes: Endless!

Product Features:

- > Supernova 08-85 screen material
- > Tiled panels make one big screen
- > Max. panel size 1.5 m high / 2.7 m wide
- > Seamless viewing experience No physical gab between panels (0.3mm tolerance)
- > CNC precision-cut for perfect edge-trimming
- Panels attached to easy-to-assemble support structure with very strong magnets
- > 50 mm alu frame with Black Velvet finish
- > Ships un-assembled in wooden crate for max. protection
- > Assembly- and hanging accessories included
- > Custom sizes and colors available
- > Edge-blending possible
- > Floor stand or ceiling mounting hardware available



dnp Supernova Flex Classic

- > Sizes in 16:9 format: 100" and 120"
- > Sizes in 16:10 format: 100" and 110"

Product Features:

- > Supernova 08-85 screen material
- > 95 mm white housing for on-wall or on-ceiling installation
- > Light weight bottom bar with tension-adjustment for best possible flatness
- > Nature of screen material = limitation of flatness
- > 50 mm (2") black painted border
- > 110V or 230V silent motor
- > IR remote control and contact closure operation
- > Ships in robust cardboard box
- > Hanging accessories included
- > Custom sizes only available in large quantity



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The circular Fresnel technology

(for ultra short throw)



World's first Fresnel front projection screen!





A lens structure is directing/reflecting the light straight out from the screen

Thereby enhancing the efficiency of the projector and reduce reflection of ambient light

Result = Improved image contrast

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- > Unique 6-layer technology
- Circular Fresnel lens for directing light straight out from screen
- > 2H hard-coat front for high durability surface (touching, cleaning)
- > Maximum height 1245 mm (49")
- > Maximum width 2214 mm (87.2")
- > One type = STF10 (for high brightness)
- > Peak gain 1.0
- > Half-gain 20 degrees
- > Lens pitch 0.1 mm













Not optimal contrast with projector above





When the screen is positioned with the projector above the Fresnel is open for reflecting ambient light from above in the same direction as the projected light



Screens using The circular Fresnel technology

dnp Supernova STS

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- > Up to 100" in 16:9 format
- > Up to 92" in 16:10 format

Product Features:

- > Supernova STF screen material
- > 20 mm black alu frame
- Screen material laminated on 4 mm aluboard for perfect flatness and rigidness
- Ships assembled in wooden crate for maximum protection, ready to hang
- > Hanging accessories included
- > Magnets hold the screen to the wall
- > Custom sizes and colors available





The black/white lenticular technology

(for ultra short throw)





- > Multi-layer technology
- Lenticular reflector to diffuse light in all directions from screen
- No front protection (not suitable for touching)
- > Maximum height 1.5 m
- > Maximum width 2.8 m
- > Peak gain 0.5
- > Horizontal half-gain >80 degrees
- > Lens pitch 0.3 mm
- One type = STL05 (for high uniformity)

















Examples of contrast with projector above/below the STL05





Screens using The black/white lenticular technology

dnp Supernova STW

- > Up to 120" in 16:9 format
- > Up to 100" in 16:10 format

Product Features:

- > Supernova STL screen technology
- > 20 mm black alu frame
- Soft screen material tensioned with springs for perfect flatness
- Ships disassembled in cardboard box for reduced transportation cost
- > Hanging accessories included
- > 6 standard sizes
- > Custom sizes available



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dnp Supernova Infinity UST

> Sizes: Endless!

Product Features:

- > Supernova STL screen material
- > Tiled panels make one big screen
- > Max. panel size 1.5 m high / 2.7 m wide
- > Seamless viewing experience No physical gab between panels (0.3mm tolerance)
- > CNC precision-cut for perfect edge-trimming
- Panels attached to easy-to-assemble support structure with very strong magnets
- > 50 mm alu frame with Black Velvet finish
- > Ships un-assembled in wooden crate for max. protection
- > Assembly- and hanging accessories included
- > Custom sizes and colors available
- > Edge-blending possible
- > Floor stand or ceiling mounting hardware available



Image Quality Calculator

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The IQC can simulate/predict the Projected Image System Contrast Ratio (PISCR), based on screen, projector and environment

> OR

The IQC can help you finding the right projector brightness, based on desired PISCR, screen and environment

Projector Brightness	Image	Contrast		ICR Chart						
The Image Contrast Calculator below is the "basic formula" for calculating the image quality (contrast ratio setup. Used in cases where you want to determine the contrast ratio of a certain picture and you have info about the screen, projector and the environment.										
Image contrast ratio = $\frac{B}{C}$	+ R + R									
L				Change to US unit	Сору	inf	ormation from	n scei	nario 1 to 2 🖸	
B = Image brightness (Determined fro R = The amount of ambient light reflection)	m the projector Lur ted in the front sur	nens and t face of the	he screen g	ai Image brightness needed based on best estin	nates:		Scenario 1		Scenario 2	
C = The projector checkerboard contra	st measured accord	ling to the	ANSI/ISO s	ta Ambient brightness level in the room	ALR	0	300	LUX	300	LUX
Change to US unit 🕨				Ambient brightness level on the screen surface	ALS	0	150	LUX	150	LUX
				Screen reflectance factor	SRF	0	5.0	%	5.0	%
Effective gain in viewing position (EG)	0.80			Contrast level needed in final image	ICR	0	15.0	:1	30.7	:1
Effective projector brightness (PBN)	5,000	lum		Projector checkerboard contrast	С	0	100	:1	100	:1
Image height (IH)	1,494	mm		Ambient light reflected back to the audience	R	1	7.5	NIT	7.5	NIT
Image width (IW)	2,657	mm		Image brightness needed based on best estimates	В	1	123.5	NIT	321.4	NIT
Image area =	3.97	m2		Maximum brightness allowed to be "eye-gonomica	l" Bmax	1	286.5	NIT	286.5	NIT
Screen Reflectance Factor (SRF)	5	%								
Ambient light level on screen (ALS)	150	lux		Projector brightness needed for the actual sc Image height	reen size: size		Scenario 1 1,494	mm	Scenario 2 1,494	mm
Image Brightness (B) =	gain*lumens	= 0.8	0 * 5,00			1	2,657	mm	2,657	mm
	creen area * pi	3.97	7 * 3.14	Image area		1	3.97	m2	3.97	m2
				Peak gain		0	0.80		0.80	
Reflected ambient light (R) =	SRF*ambient light	= 0.0	50 * 150	Gain effeciency for horizontal viewing position		0	100	%	100	%
				Gain effeciency for vertical viewing position		0	100	%	100	%
Measured brightness (B + R) =	28.3 nit			Effective gain in viewing position		1	0.80		0.80	
Projector checkerboard contrast (C):	0 100.0	1		Effective (net) projector brightness needed	PBN]	1,926	lum	5,011	lum
				Dimensioning the projector(s):			Scenario 1		Scenario 2	
$\frac{320.8 + 7.5}{320.8 + 7.5} = 30.7$:1			Loss for start-up adjustment of colours		0	10	%	10	%
100	-			Number of projectors		1	1		1	
				Blending zone		0	100	%	100	%
				Lamp efficiency		0	75	%	75	%
				Brightness need adjusted for start-up adjustment	of coulours	ĺ	2,140	lum	5,567	lum
				Brightness need adjusted for loss for edgeblending	1	1	2,140	lum	5,567	lum
				cagabienany		1	2.052		7 400	L.
				Brightness need adjusted for loss due to lamp deca	av		2.853	lum	7.423	IUM



Summary

dnp Supernova screen material offering



- <u>3</u> different Supernova technologies: <u>BS</u> + <u>STF</u> + <u>STL</u>
- <u>2</u> options for standard throw: <u>BS 23-23</u> + <u>BS 08-85</u>
- <u>2</u> options for ultra-short-throw: <u>STF10</u> + <u>STL05</u>

	High brightness	Perfect uniformity
STD throw	BS 23-23 PG 2.3 Max. 120" 16:9 LTR 1.8 SRF 7-15%	BS 08-85 PG 0.8 No size limit LTR 1.5 SRF 5-11%
UST throw	STF10 PG 1.0 Max. 100" 16:9 LTR 0.19-0.28 SRF 4-12%	STL05 PG 0.5 Max. 120" 16:9 LTR 0.15-0.50 SRF 4-9%

• SRF for typical matte white projection screen is 25%

dnp Supernova screen offering



	High Brightness	Perfect Uniformity
STD Throw (LTR > 1.5:1)	 Supernova Blade Supernova Core Supernova One 	 Supernova Blade Supernova Core Supernova One Supernova XL Supernova Infinity STD Supernova Flex Classic
UST throw (LTR < 0.5:1)	 Supernova STS 	 Supernova STW Supernova Infinity UST



Questions?

Find more information on dnp-screens.com

Thank you for your attention