



Ultimate Night Vision Technology

XD-4[™]

SHD-3[™]

Image Intensifiers for night vision

DEP produces a range of in-house developed compact Image Intensifiers for use in Night Vision applications. This product line runs from standard Image Intensifiers to SHD-3[™] and XD-4[™] up to the top quality of XR5[™] Image Intensifiers. All these tube types are available both in 18 mm inverting and non-inverting format and for SMALL as well as FAT ANVIS configurations. Further, they can also be coupled via tapered fibre-optics to a number of commercially available CCD's for Intensified CCD (ICCD) cameras. DEP Image Intensifiers perform extremely well in every environment and under all circumstances. With its wide spectral range and specific design, they are ideal for use under dynamic light conditions and in green environments, deserts, coastal areas and on water and snow. DEP makes the difference and is your best choice, if you go for high performance and high quality.

THE DEP IMAGE INTENSIFIERS

Image Intensifier performance is mainly determined by three major parameters: Signal-to-Noise Ratio, Resolution and MTF. Night Vision Imaging at low light-levels is a fight against noise and the determining factor with respect to picture quality is the Signal-to-Noise Ratio of the tube. In the High Light-Level Range the Resolution and MTF determine the image quality. Especially the MTF at low spatial frequencies is very important for the sharpness and contrast of the image.

XR5[™] Technology

Unprecedented performance in every environment and under all circumstances is obtained with the DEP XR5[™] Image Intensifier, a result of ongoing R & D efforts. This successor to the well-known XD-4[™] Image Intensifier resolves image details at very low light-levels even better through its improved Signal-to-Noise Ratio combined with an ultra-high Resolution. Sharp and high-contrast images are obtained at the higher light-levels due to an extremely high MTF. The XR5[™] Image Intensifier is equipped with an Auto-Gating feature which gives this tube a full 24-hour day/night operation. An integrated unit has automatic control over the gain

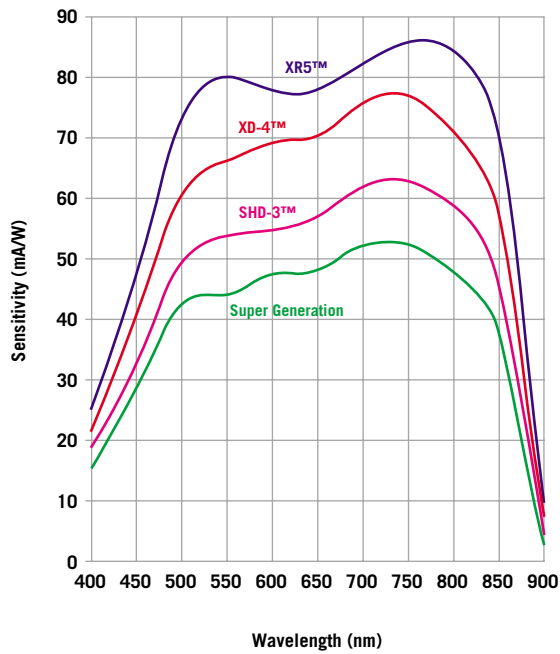


FIGURE 1 Photocathode types

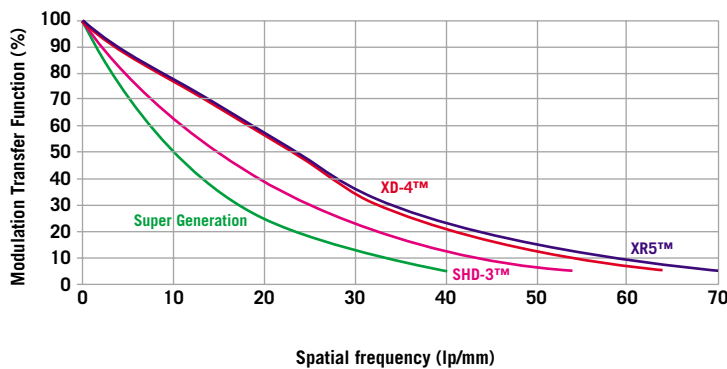


FIGURE 2 Typical MTF curves

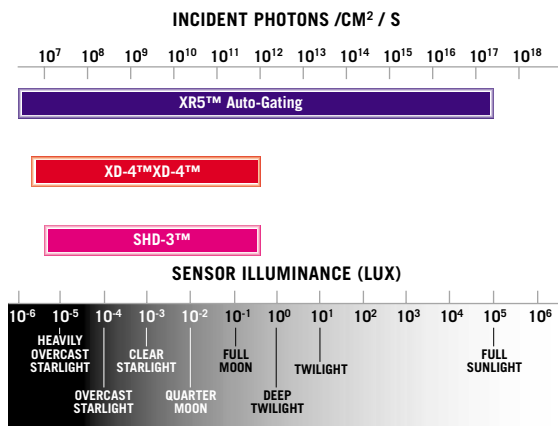


FIGURE 3 Luminance dynamic range

and gating of this tube type when it becomes active at the higher light-levels. The features of enhanced Signal-to-Noise Ratio, Resolution and MTF together with the Auto-Gating lead to excellent image quality from the very dark up to daylight conditions and even under dynamic circumstances, like, e.g., operations at night in urban areas.

XD-4™ Technology

When DEP introduced the state-of-the-art XD-4™ Technology Image Intensifiers, a new European standard in Night Vision was established. With the XD-4™ Technology the user benefits from a superb Signal-to-Noise Ratio in all circumstances, extremely high resolution and MTF and an excellent light amplification level. The XD-4™ Technology guarantees an outstanding image quality, from the lowest light-levels, where the image is usually obscured by noise, up to twilight conditions where the MTF governs the image quality.

SHD-3™ Technology

This technology combines the very good sensitivity of the Super Generation Image Intensifiers with superior resolution and MTF. These improvements produce a much higher contrast in the image. You can see much more image details.

TECHNICAL SPECIFICATIONS OF IMAGE INTENSIFIERS

SIGNAL-TO-NOISE RATIO

	MINIMUM	TYPICAL	MAXIMUM	UNIT
SNR at 108 μ lx:				
XR5™	25	28		
XD-4™	20	24		
SHD-3™	18	20		

RESOLUTION

	MINIMUM	TYPICAL	MAXIMUM	UNIT
Limiting Resolution:				
XR5™	64	70		lp/mm
XD-4™-Type I	55	58		lp/mm
XD-4™-Type II	60	64		lp/mm
SHD-3™-Type I	45	48		lp/mm
SHD-3™-Type II	50	54		lp/mm

LUMINANCE DYNAMIC RANGE

	MINIMUM	TYPICAL	MAXIMUM	UNIT
XR5™	1.0 ^E -06		5.0 ^E +04	lux
XD-4™	2.0 ^E -06		0.5	lux
SHD-3™	4.0 ^E -06		0.5	lux

OTHER TECHNICAL DATA

	MINIMUM	TYPICAL	MAXIMUM	UNIT
- Phosphor: P20*				
- Reliability:				
XR5™	15,000			hours
XD-4™	15,000			hours
SHD-3™	10,000			hours
- Gain at 2 ^E -05 lux	30,000/ π		50,000/ π	cd/m ² /lx
- Maximum Output Brightness	2		17	cd/m ²
- E.B.I.			0.25	μ lx
- Input voltage:				
XR5™	2.0		3.7	Volt
XD-4™ and SHD-3™	2.0		4.0	Volt
- Input current				
XR5™ - at 3 Volt		25	35	mA
XD-4™ and SHD-3™		13	26	mA
- Output uniformity at 2850 K		1.8 : 1	3 : 1	
- Weight (18 mm)		80	95	grams
- Shock	500			g

* Also available with P43 phosphor