

# Y.XRS235-D1000, Y.XRS305-D1000 High-resolution image intensifier systems for industrial use



With XRS235-D1000 and XRS305-D1000, YXLON International is offering a generation of industrial-grade image intensifiers for material testing that combines decades of experience in the field of image intensifiers with state-of-the-art digital technology.

These image intensifiers distinguish themselves through robustness, long lifespans and, with 1000 x 1000 pixels, high detail resolution for the widest variety of applications and X-ray voltages up to 450 kV. Three depiction formats provide a low-distortion and high-contrast radioscopic image. The use of "non-browning glass" slows down aging due to burn-in effects to a great degree, increasing system operating life considerably. An additional safeguard against damage due to dose overloads is supplied by an integrated dosage output control that automatically shuts off the image intensifier when a preset threshold is reached.

*YXLON. The reason why.*

- Inspection decision with assurance through highly detailed image
- Long product life through "non-browning glass" and dosage output control
- Space-saving through compact construction design

## Compact, modular construction

The image intensifier systems XRS235-D1000 and XRS305-D1000 consist of an image intensifier tube with a high-resolution, 1 megapixel camera and a system control unit that houses the format selection function, the mains supply and the reset function following a shutdown of the voltage supply depending on dosage. Data transmission of the camera images takes place via a digital Camera Link® interface. YXLON IMAGE software is recommended for image depiction.

Installation of the image intensifier systems XRS235-D1000 and XRS305-D1000 can occur both laterally (XRS305-D1000 with optional mechanical adapter) and from the front. When required, image orientation is rotated +/- 90° using YXLON IMAGE software.

## Visual resolution of image intensifier systems

Different applications place different demands on the image crop, expansion and resolution of image intensifier systems. XRS systems are equipped with a 3-stage format selection function that enables the "active input screen" to be adapted to the application involved.

## Integrated dosage output control

In the case of a preset dose threshold, the integrated dosage control shuts off the voltage supply to the image intensifier tube by means of a signal from the CCD chip. Damage to the image intensifier tube due to an unintentionally high dose of X-rays can thus be prevented.

## User-friendly operation

The image intensifier's three format settings and the reset function following a shutdown of the voltage supply depending on dosage are operated via a separate device (tabletop XRS FS-Box or built-in 19" XRS FS-Panel module). All of the camera's other parameters such as

- offset and gain
- overlay and service pattern
- shading correction

as well as the parameters for the integrated dosage output control are set via the corresponding YXLON IMAGE software. The factory settings upon delivery enable all conventional NDT applications. In addition, the XRS FS-Box tabletop housing or the built-in 19" XRS FS-Panel module offer an external control input with potential-free contacts that enables format selection and a resetting of the dosage output control, e.g. via SPS.

## Safety and quality standards

YXLON International image intensifiers are manufactured and tested in compliance with a variety of domestic and international standards. e.g.

- IEC 1262 (quality of image intensifier tube)
- Low-Voltage Directive (73/23/EEC)
- EN 61000-6-2 (electromagnetic compatibility)
- EN 61000-6-4 (basic norm for emitted interference)
- 47CFR Chap. 1, Sect. 15 (FCC Sect. 15)

The YXLON International X-Ray GmbH Quality Management System is certified in accordance with DIN ISO EN 9001.

## Overall system resolution

	Y.XRS235-D1000		Y.XRS305-D1000	
	Input Screen		Input Screen	
	Width	Resolution*	Width	Resolution*
N	(9") 155x155 mm	23 Lp/cm	(12") TBD	TBD
M1	(7") 115x115 mm	32 Lp/cm	(9") TBD	TBD
M2	(4.5") 85x85 mm	40 Lp/cm	(7") TBD	TBD

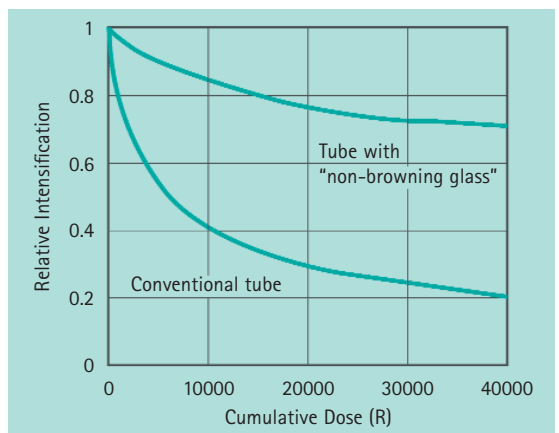
\* Typical values



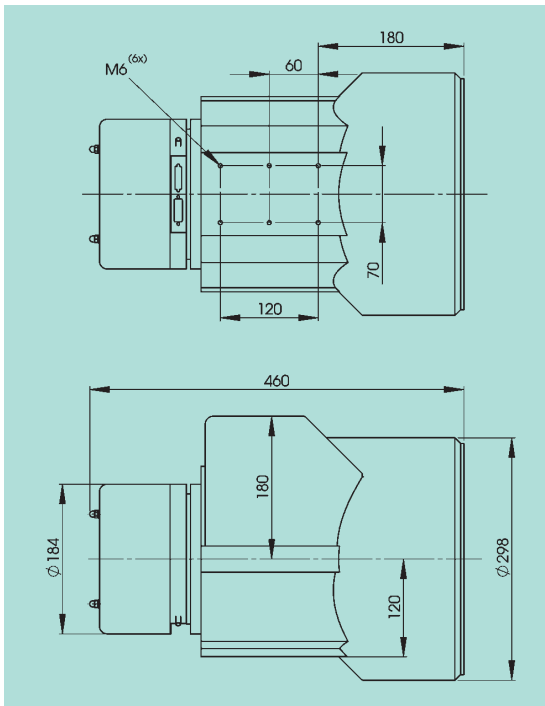
Pb-line grid for Y.XRS235-D1000, M2

## Aging of image intensifier tubes

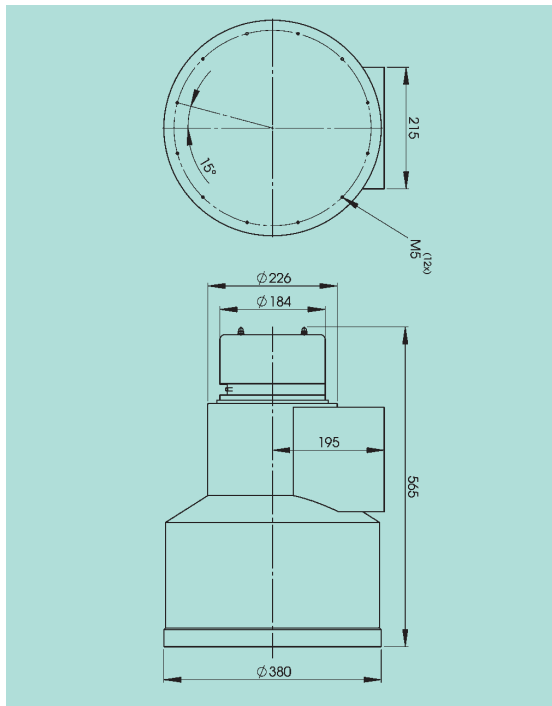
Comparison between a conventional tube and a tube with "non-browning glass".



## Dimensions Y.XRS235-D1000



## Dimensions Y.XRS305-D1000



	Y.XRS235-D1000			Y.XRS305-D1000		
Area of deployment/X-ray voltage	20 – 450 kV					
<b>Image intensifier tube</b>	Type 9" QX			Type 12" QX		
Nominal input screen [mm]	230			313		
- Format selection	N	M1	M2	N	M1	M2
- Usable input screen acc. to IEC 1262 at 1 m Focus-Detector-Distance [mm] <sup>1</sup>	215	160	120	290	215	160
- Resolution (Lp/cm) <sup>1,2</sup>	54	62	70	48	54	62
- Conversion factor (cd/m <sup>2</sup> )/(μGy/s) <sup>1,3</sup>	14.5	9	5	16	7.5	3
- Integral distortion (%) <sup>1,3</sup>	4	3	2	8	5	3
<b>Camera</b>	2/3" CCD					
Resolution / Frame refresh rate	1,000 x 1,000 pixel with 12 bit / 30 fps					
Interface	Camera Link®					
<b>Control and supply unit</b>						
Interfaces	2 x RS 232 (PC, service) – 1 x SPS (potential-free control contacts)					
Mains connection figures	100 – 240 VAC, 50/60 Hz, fuse 1 A					
<b>Dimensions and weights</b>						
Image intensifier unit						
- Exterior dimensions (L x W x H) [mm]	460 x 300 x 330			565 x 380 x 385		
- Weight [kg]	ca. 30			ca. 50		
Control and supply unit (L x W x H) [mm]	245 x 235 x 145 (Y.XRS FS-Box / Tabletop housing)					
- Weight [kg]	ca. 2					
Environmental conditions						
- Operating temperature	+5 °C bis +40 °C					
- Storage temperature	-10 °C bis +55 °C					
- Relative humidity (at 40 °C)	max. 85%					

<sup>1</sup> Typical values

<sup>2</sup> Visual borderline resolution; measured by microscope directly on output screen

<sup>3</sup> Acc. to IEC 1262

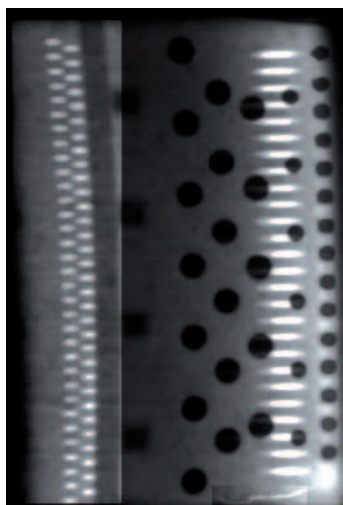
## Image intensifiers and image enhancement

In many fields involving non-destructive material testing, X-ray image intensifiers are increasingly replacing the use of radiographic film technology. The time-consuming and costly exposure and development of X-ray films is omitted through the possibility to manipulate inspection parts during the beaming process and the direct depiction of the radioscopic image on a video monitor.

### Typical applications

Together with modern image processing software, the 4096 gray shades of the Y.XRS235-D1000 system make it also possible to inspect structured parts in a certain position.

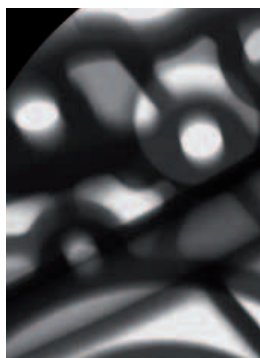
*Turbine blade inspection, here with a local gray scale in the lower right and left image sector.*



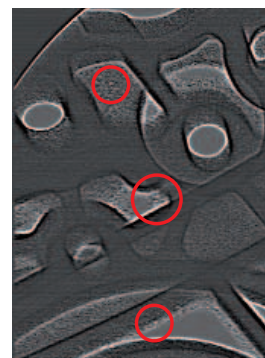
Together with image enhancement systems, the Y.XRS235-D1000 system achieves a resolution that can be comparable to film-based technology. The high resolution equal to one million pixels comes to bear especially in the case of applications such as the inspection of turbine blades and cast aluminum parts, because the image's brilliance and detailed accuracy are not influenced by image noise to any significant degree.

### Use of filters

The use of filters in the inspection process enables even the tiniest defects to be detected at first glance.

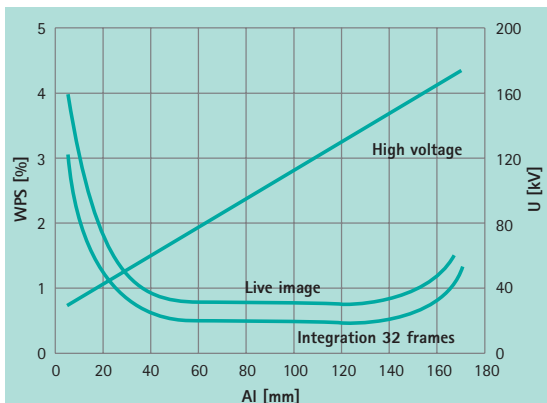


Radioscopic image

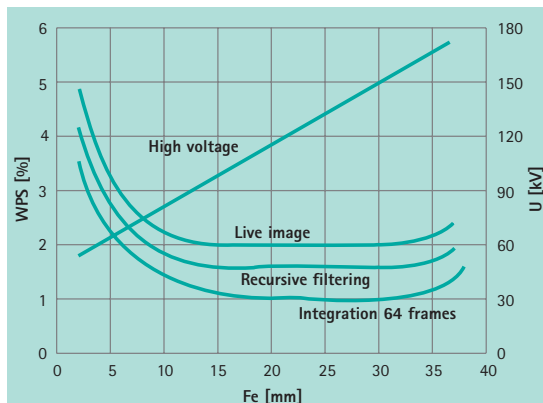


Radioscopic image processed using special high-pass filter

## Wire penetrameter sensitivity curves in a live and an enhanced image



Max. radioscopic wire penetrameter sensitivity (WPS) of Al (%)  
 MG165/Y.TU 160-D04, focal spot: 1.0 mm (EN 12543)  
 Distance focal spot - image intensifier: 1000 mm  
 Distance focal spot - object: 500 mm  
 XRS235 - 7" format



Max. radioscopic wire penetrameter sensitivity (WPS) of Fe (%)  
 MG165/Y.TU 160-D04, focal spot: 1.0 mm (EN 12543)  
 Distance focal spot - image intensifier: 1000 mm  
 Distance focal spot - object: 500 mm  
 XRS235- 7" format

For further information about YXLON image enhancement systems, please refer to the respective data sheets or feel free to contact us directly.