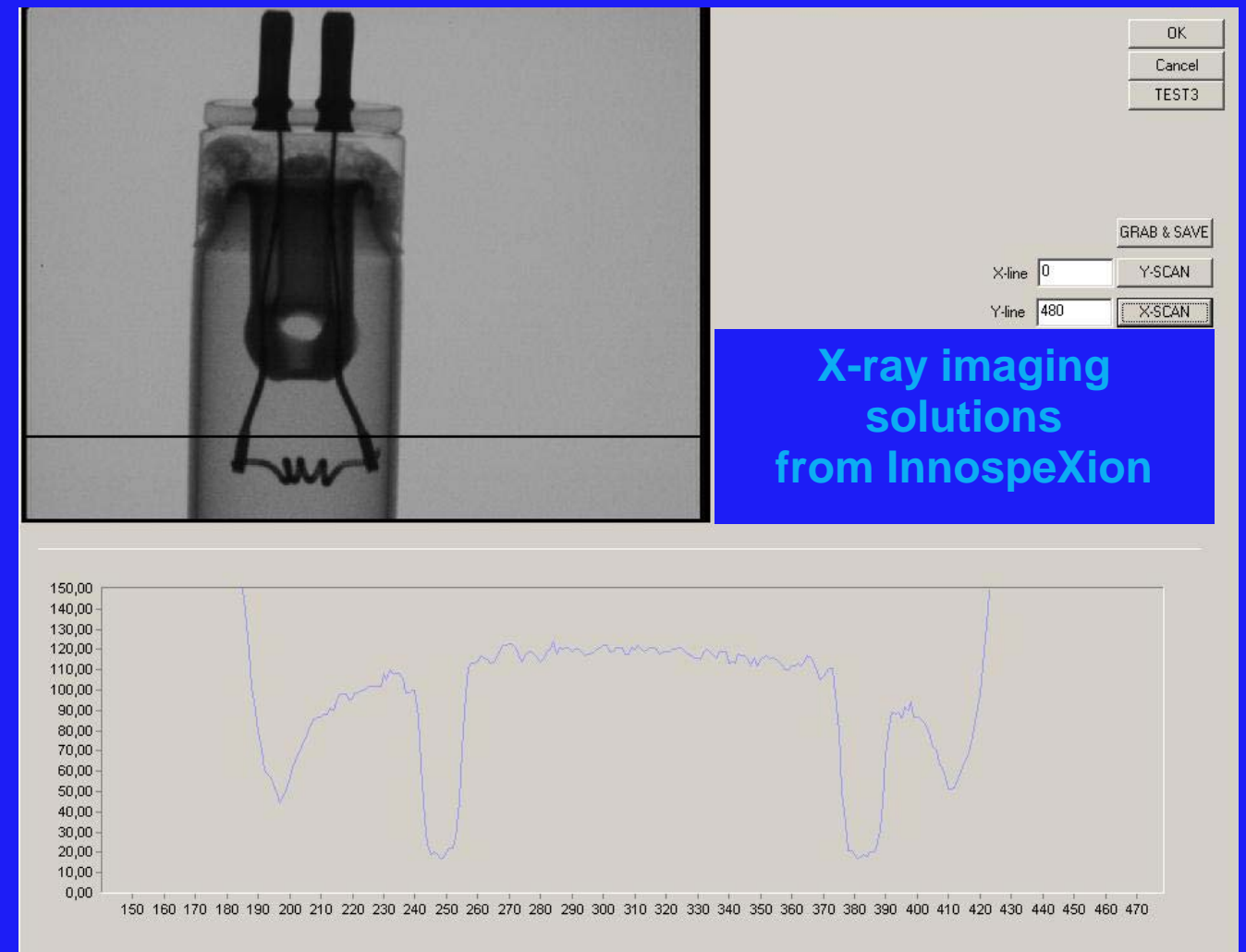


Overview of the InnospeXion Lamp inspection systems

Parameter	#	Unit	NOTES
Accuracy limit	5	µm	Depend on configuration
Lamp dimensions	10 to 200	mm	Diameter
Geometrical form of object	Any: cylindrical, rectangular, square, etc.		
Position accuracy (optimum)	1-5	µm	
Position accuracy (required)	1-100	µm	Depends on resolution requirement (at 1 sec / measurement)
Scanning time per lamp	0.3	Seconds	Range 1-60
Scanning profiles per hour	60	-	
X-ray maximum energy	60	kVp	Factory set
X-ray control	RS 232. Separate event log in EPROM		
Motor control	RS 232 step motor control, 12 VDC		(only for automatic systems)
System control	Specific software, stand-alone		(only for automatic systems)
Operative system	MS Windows 2000 or XP		
User interface	17" touch screen.		Optional keyboard
Weight	300	kg	
Dimensions	1100(l)x600(d)x800(h)	mm ³	Excl. lamps
Operating temperature	10 – 30	° C	Non-condensing
Cooling	Forced air (fan in cabinet)		
Power supply	230	VAC	
Power consumption, max.	600	W	
Declarations of conformity	CE		Radiation approved
Maintenance	Yearly safety service check. Remote monitoring option recommended. Automatic system requires further service >3-5 years. Control platform upgrades possible		
System lifetime			

Specifications subject to change without prior notice

Modular X-ray systems for lamp inspection & quality control



X-ray solutions also for:

Micron-sized revelations
 Detection of foreign bodies
 Other tailored inspection solutions

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NON-DESTRUCTIVE TECHNOLOGY

ULTRA COMPACT DESIGN

OPTIONAL OPERATOR INDEPENDENT MEASUREMENT

OPTIONAL COMPLETELY AUTOMATIC FUNCTIONING

SUITABLE FOR ON-LINE USAGE

HIGH SPEED ASSESSMENT OF LAMP CONFORMITY

CONFORMITY WITH RADIATION PROTECTION REGULATIONS

DESIGNED & MANUFACTURED IN DENMARK

InnospeXion ApS

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Lamp inspection: Cost-effective Quality Control using X-rays

The InnospeXion X-RAY systems for lamp inspection enables the assessment of the **electrode position & integrity** within non-transparent lamps.

The system can be entirely manually operated or automatic, with automatic measurement of the critical dimensions, in real-time.

The systems are safe, reliable, with long life time and very little or no maintenance required.

The system is based on a modular configuration enabling the configuration with different X-ray sources and different detectors, depending on detection accuracy and resolution required.

Systems can be configured for manual operation, or as completely autonomous, remote monitored automatic systems.



The system is designed as compact as possible, hereby enabling that the system can be placed next to the production line. Automatic systems are extremely compact in design, so that they may be implemented to an existing production line with a minimum of changes required

The system can be configured for inspection of regular lamps, or of special, complex shaped, lamps.

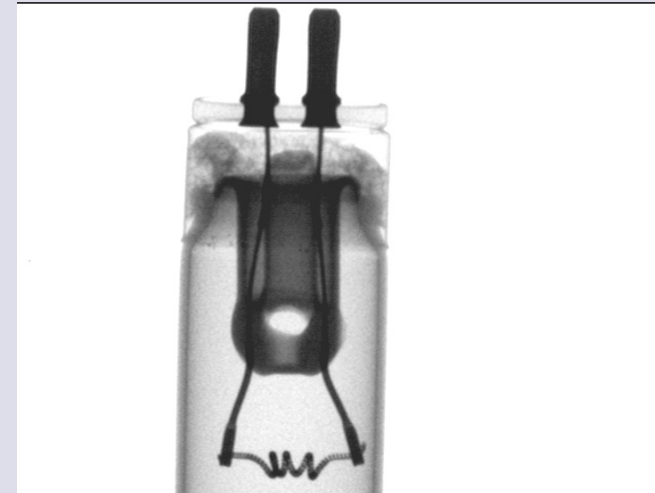
Manual systems are based on operator decision taking, optionally aided by automatic measurements.

Automatic systems are in-line systems where all relevant measurements of lamp critical dimensions and tolerances are evaluated automatically.

No human access enabled: the systems are completely closed and maintenance costs are low.

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Reliable and Effective Inspection of Fluorescent lamps, Halogen lamps, Low energy lamps, etc.



◀ Typical X-ray image of a fluorescent lamp end, showing the positioning of the electrode relative to the glass wall.

The advantage of X-rays is their ability to image beyond non-transparent coatings. With modern technology, imaging at 300 frames per second is feasible and automatic on-line detection is reliable, cost effective and precise.

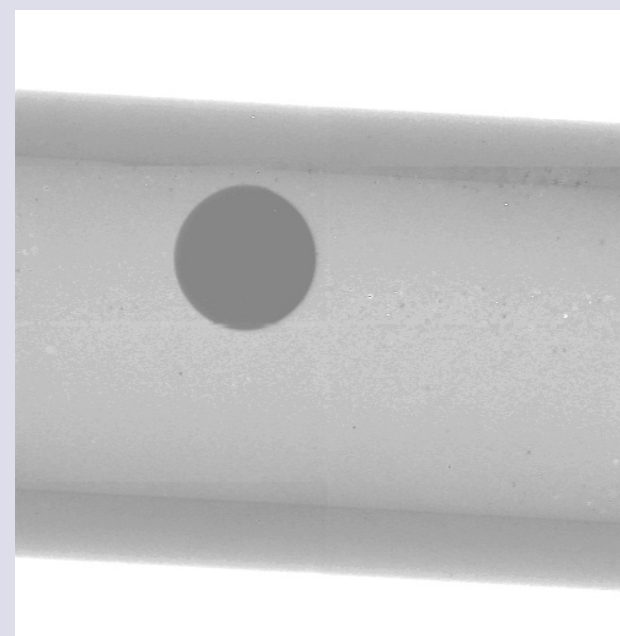
X-ray imaging technology is implemented in a large variety of industrial sectors. In general, the pay back time is less than 12-18 months.

HOW IT WORKS

The system is based on a low kV mini- or microfocus X-ray source that emits radiation which is attenuated by the lamp. The glass wall is relatively transparent to the low energy X-rays, whereas the electrodes are almost opaque to the X-rays. The X-ray image is detected by an X-ray image intensifier or another area imaging X-ray detector. The image recorded is grabbed with an A/D card in a PC. Image processing and derivation of relevant measures is accomplished as for ordinary vision systems.

Automatic systems involves motorised lamp movement and triggering of X-ray image acquisition at specific lamp positions. Images are automatically analysed and relevant data transferred to the plant data base, or the X-ray system automatically triggers a sorting mechanism that discards lamps that are out of the tolerances.

▼ MERCURY droplet detection & measurement: Microfocal X-ray imaging enables detection and quantification of very small objects, such as Mercury (Hg) droplets. The image below shows a 30 micron diameter droplet in a 0.1 mm Ø thin walled glass cylinder.



VERSATILE X-RAY TECHNOLOGY

- Suitable for all non transparent lamps
- Largest dimension about 200 mm in diameter
- Measurement time to less than 0.1 second
- Robust technique
- Optional Automatic operation—no operator needed
- Reliable technology—measures "what is" not "what was"
- Very good repeatability
- Modular design of hard- and software
- Remote monitoring as part of extended warranty
- Cost effective
- CE marked, Safety proven technology
- "Plug-and-play" - no installations required
- Fast delivery
- Competitively priced

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