Overview of the InnospeXion CanSeamScanner

PART OR FUNCTION	DETAILS	SPECIFICATIONS
X-ray source	Microfocus 20-90 kVp (aluminium) Microfocus 20-110 kVp (steel + aluminium)	Focal spot size 3-10μm
Detector	6 inch X-ray image intensifier (standard) 50 mm CdTe-CMOS detector (option for composite cans)	Pixel size from 130 to 85 μm (equals 5-10 μm resolution)
Manipulator	2-axis with 360 degrees rotation stage	Precision 1-2 μm (1-2 degrees on rotation stage)
Door	Motorised with automatic, semi-automatic or manual operation	Maximum opening 400 by 400 mm. Door fitted with dual interlock of the pal type
Control	PC with MS Windows XP	Specific software program or automatic operation directly to profibus or ethernet
User interface	Keyboard & mouse. Optional touch screen interface	User interface only needed for manual operation
Can positioning	Automatic	Can is placed in special holder that erects out of the cabinet top when measurement is completed
Measurement accuracy	Depends on can type & can dimensions, from <5 to 25 μm	For beverage cans, resolution is about 10 μm
Repeatability	5-40 μm (Depends on can & can geometry variations)	Allowed can variation is +/- 1 mm in all directions (maximum)
Automation	Interfacing to external feeding mechanism, incl. robot	Actuator system to place and extract the can erected from the cabinet top or sides
Installation	In laboratory or directly at the production line	Temperature below 25 deg. C. Cooling by forced air. Avoid dust. Vibrations below 10 μm. 230 VAC, Ethernet and/or profibus
Dimension & Weight	Requires sturdy support table of specified length and width	1600 x 550 x 550 mm (WxDxH) 250 kg

Specifications subject to change without prior notice

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X-ray technology solutions also for

- Can Lid score line measurement
- Detection of foreign bodies in closed cans
- Other tailored inspection solutions

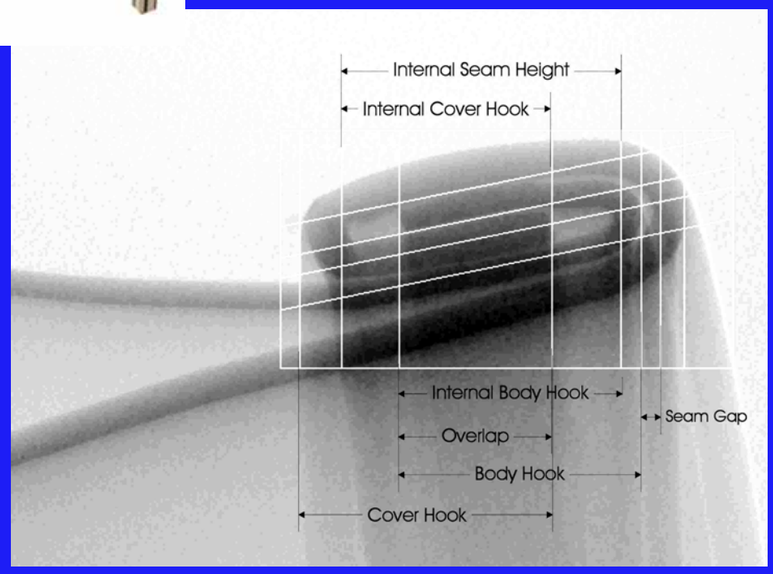
The **CanLidScanner** is a unique, cost-effective system for at-line assessment of the score line of EOE's. Simple to use, reliable, accurate and of low cost! Contact us!

X-RAY TECHNOLOGY
CAN SEAM INSPECTION

The CanSeamScanner from InnospeXion

X-ray based non-destructive measurement of the can seam on aluminium, alu-steel, steel, composite and carton cans

NON-DESTRUCTIVE
ULTRA COMPACT
OPERATOR INDEPENDENT
AUTOMATIC ANALYSIS
ON-LINE USAGE
HIGH SPEED
ROBUST
SIMPLE DESIGN
RADIATION SAFE
DANISH DESIGN



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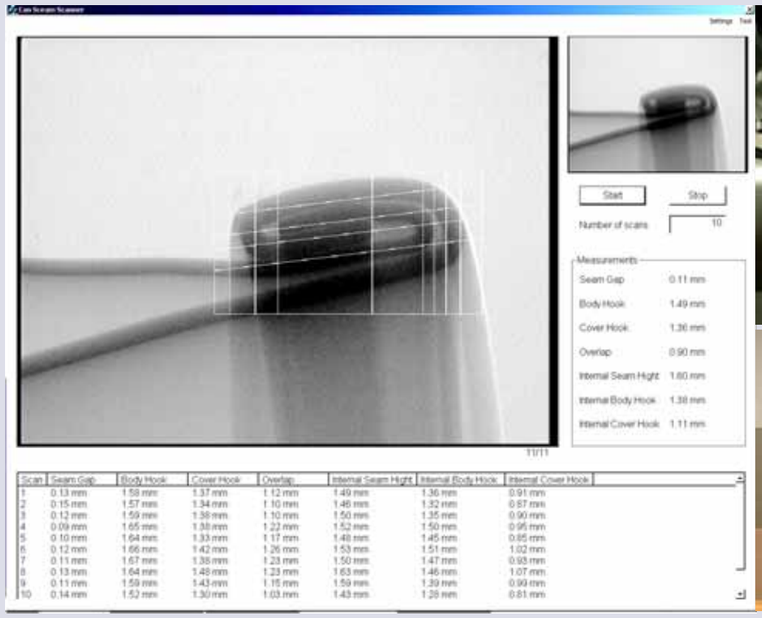
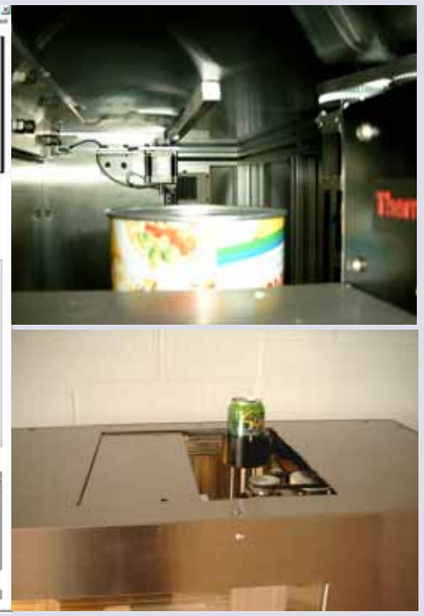
The CanSeamScanner: Real-time can seam measurements

The **InnospeXion X-RAY BASED CanSeamScanner** performs the measurement of the can closure details quickly, reproducibly and accurately.
The technology entirely replaces destructive methods, that involve sectioning and micro analysis. The main advantage is to obtain a measurement of how the can closure ACTUALLY is. It is disputable whether a destructive measurement reflect the actual situation. Also, speed, costs, and operator independency are significant improvements provided with the CanSeamScanner.

The CanSeamScanner is an automatic can seam measurement machine in which all internal details of the quality of the seam can be measured. A high resolution X-ray imaging system is used to acquire the pictures at pre-defined angular increments. The variation of these measures along the can perimeter can be extracted and validated. The can is automatically ejected when the inspection is completed.





The user interface is simple, reflecting that the system is completely automatic. The can seam measurements are performed without any operator decision taking, is accurate and reproducible. All data are stored according to the customer specific requests.

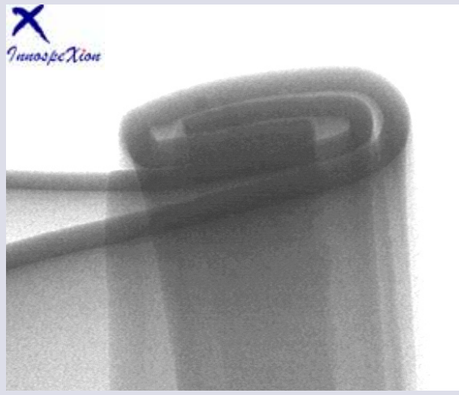
Sample loading is manual or automatic. The system starts as soon as a new can is sensed. The entire sequence last < 20 seconds for 16 measurements

Traditional can seam quality control methods is destructive and does not allow the assessment of the seam “in situ”. This can be readily verified when the X-ray image of the can closure is regarded during a continuous rotation at a moderate speed. The variation is extraordinary large, and should be considered as a QC parameter. When the can is rotated, all the quality control measures that may be extracted will vary by several tens of μm. This is reflected from the data set shown atop the opposite page. Here, the distance of the overlap formed is shown as function of the angular position, in 8 consecutive measurement of a beverage can. See movie clips on www.innospexion.dk.

VERSATILE X-RAY TECHNOLOGY

- Suitable for all can types
- Measurement time down to < ten seconds per can
- Automatic operation—no operator needed
- Very good reproducibility
- Safe in use & CE marked
- No sample preparation necessary
- Can dimensions from 50 mm Ø to 250 mm Ø
- Robust technique
- Reliable technology—measures ”what is”
- Cost effective
- Traceable accuracy (repeatable measurements)
- Competitively priced

Reliable can seam measurements



Position	A	B	C	D	E	F	G	H	Mean	Std.dev	Max. Dev.
0	1.14	1.11	1.12	1.12	1.12	1.12	1.13	1.13	1.12	0.01	0.03
36	1.19	1.19	1.22	1.19	1.19	1.2	1.21	1.21	1.20	0.01	0.03
72	1.15	1.16	1.14	1.15	1.16	1.15	1.15	1.16	1.15	0.01	0.02
108	1.23	1.23	1.24	1.22	1.23	1.23	1.24	1.24	1.23	0.01	0.02
144	1.24	1.24	1.23	1.23	1.24	1.24	1.23	1.22	1.23	0.01	0.02
180	1.24	1.21	1.22	1.23	1.24	1.21	1.21	1.23	1.22	0.01	0.03
216	1.21	1.25	1.21	1.23	1.24	1.22	1.23	1.24	1.23	0.01	0.04
252	1.16	1.16	1.17	1.17	1.16	1.16	1.17	1.18	1.17	0.01	0.02
288	1.19	1.18	1.17	1.19	1.16	1.18	1.18	1.17	1.18	0.01	0.03
324	1.2	1.18	1.18	1.19	1.18	1.17	1.17	1.18	1.18	0.01	0.03
360	1.12	1.14	1.12	1.1	1.12	1.1	1.13	1.12	1.12	0.01	0.04
Max.dev	0.12	0.14	0.12	0.13	0.12	0.14	0.11	0.12	0.115		

X-ray image acquired through a can seam, using the tangential imaging technique of the can under rotation. The can may be inspected and the seam assessed continuously during an entire revolution.

The accuracy and repeatability of the system is reflected from the above data, showing the overlap measurements at 10 angular positions of one can, re-loaded and measured 8 times.The maximum deviation is 40 μm, with a std.dev. of 10-20 μm. This is insignificant considered relative to the actual can seam overlap variations of about 120 to 140 μm.

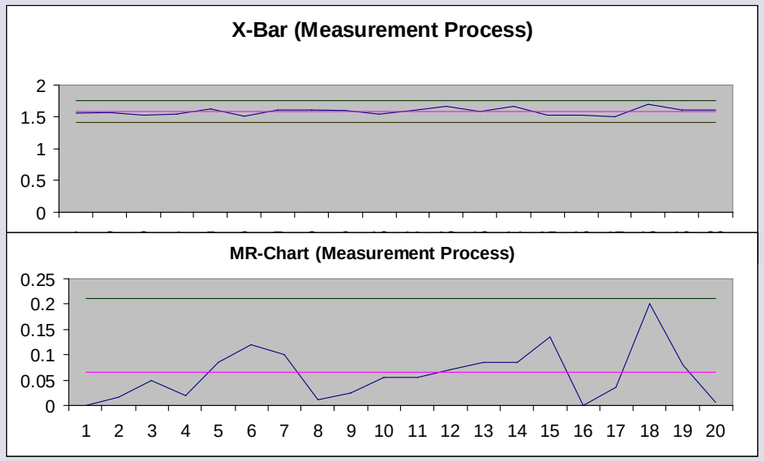
BODY-HOOK	Process			Measurement Error	DR Ratio:	6.18
Sample	Rdg. 1	X-Bar 1-2	MR X-Bar	Rdg. 2	X-Bar 1-2	Range 1-2
1	1.55	1.555		1.56	1.555	0.01
2	1.58	1.57	0.015	1.56	1.57	0.02
3	1.54	1.52	0.05	1.5	1.52	0.04
4	1.55	1.54	0.02	1.53	1.54	0.02
5	1.62	1.625	0.085	1.63	1.625	0.01
6	1.5	1.505	0.12	1.51	1.505	0.01
7	1.62	1.605	0.1	1.59	1.605	0.03
8	1.61	1.615	0.01	1.62	1.615	0.01
9	1.59	1.59	0.025	1.59	1.59	0
10	1.56	1.535	0.055	1.51	1.535	0.05
11	1.6	1.59	0.055	1.58	1.59	0.02
12	1.66	1.66	0.07	1.66	1.66	0
13	1.56	1.575	0.085	1.59	1.575	0.03
14	1.66	1.66	0.085	1.66	1.66	0
15	1.53	1.525	0.135	1.52	1.525	0.01
16	1.53	1.525	0	1.52	1.525	0.01
17	1.48	1.49	0.035	1.5	1.49	0.02
18	1.69	1.69	0.2	1.69	1.69	0
19	1.61	1.61	0.08	1.61	1.61	0
20	1.61	1.615	0.005	1.62	1.615	0.01
Average		1.580	0.065		1.580	0.015
Std Dev			0.0574			0.0133
Variance			0.0033			0.0002

DR values as used e.g. in the US, expresses the ability of the measurement technology to identify the variations of the process.
Although the CanSeamScanner can be supplied to provide about 10 microns accuracy, its merits depends on the variation of the process.

The table at left shows 20 consecutive tests of cans with a very narrow process window, leading to a very small variation to be considered.

Nonetheless, the DR ration is satisfactory at a level of about 6, indicating the ability of the measurement technique to unveil these minor variations in a reproducible manner.

The accuracy depends mainly on can dimensions, X-ray source choice and the can material.



At left: Plot of the above presented data on body hook measurements on 20 cans relative to the variation of the measurement.

Please consult InnospeXion concerning specific tests and reproducibility data relative to your can design.