

# BERKHOF X-rad

Radalytica and the company Berkhof Construction s.r.o. combined their strengths and years of experience in the field of industrial automation and X-ray imaging. The result of the cooperation is a new device for automatic X-ray inspection of products directly in the production line.

**AUTOMATIC X-RAY  
INSPECTION AND IMAGING DEVICE**



# BERKHOF X-rad

X-rad is a device with an integrated source ionizing radiation.

The facility is subject to the atomic law and related implementing legislation.

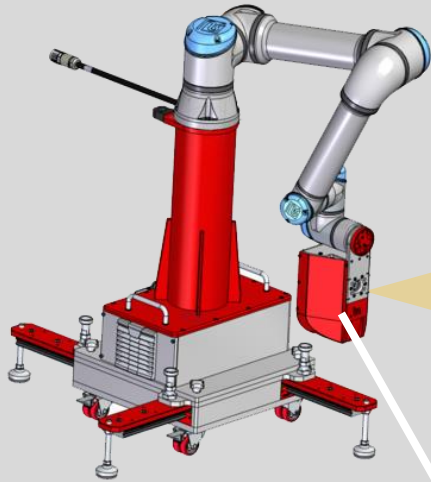
It's a type of small source approved by The State Office for Nuclear Safety, so it can be operated without a permission for management of ionizing radiation sources.

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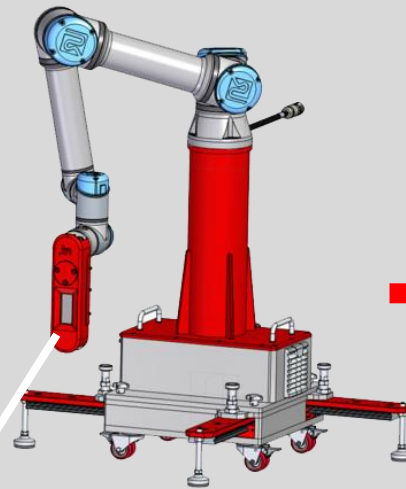
X-ray source



sample



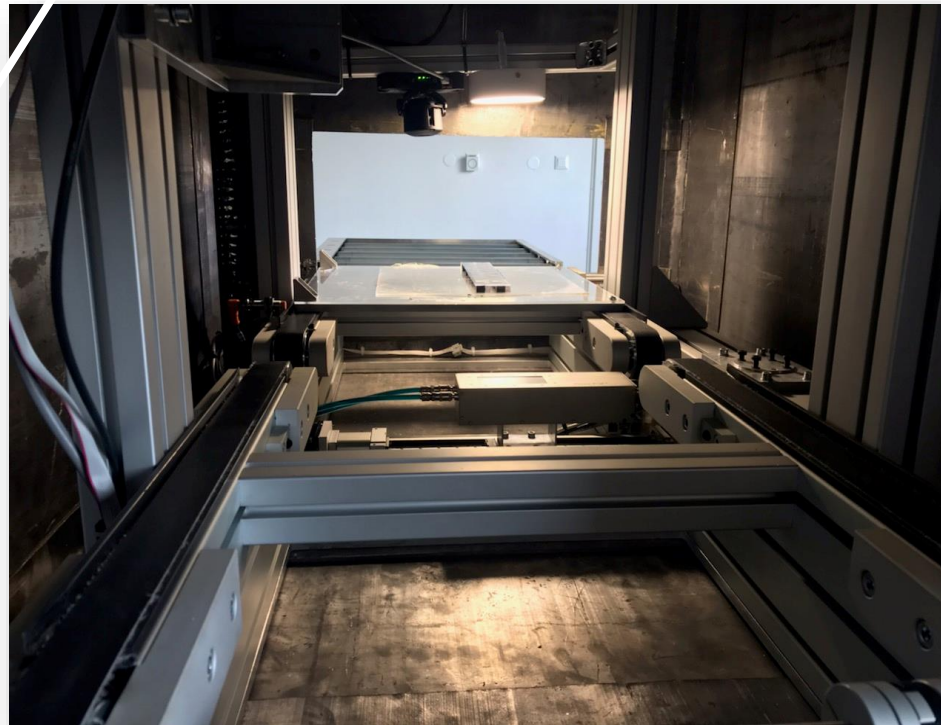
X-ray detector



X-ray image



# PRINCIPLE OF X-RAY IMAGING



The new-generation X-ray detector is integrated into a stand-alone unit of the whole device connected to the production line and thus fully automate the whole process.

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The design of the device is developed so that the new-generation X-ray detector can be integrated into a stand-alone unit of the whole device connected to the production line and thus fully automate the whole process.



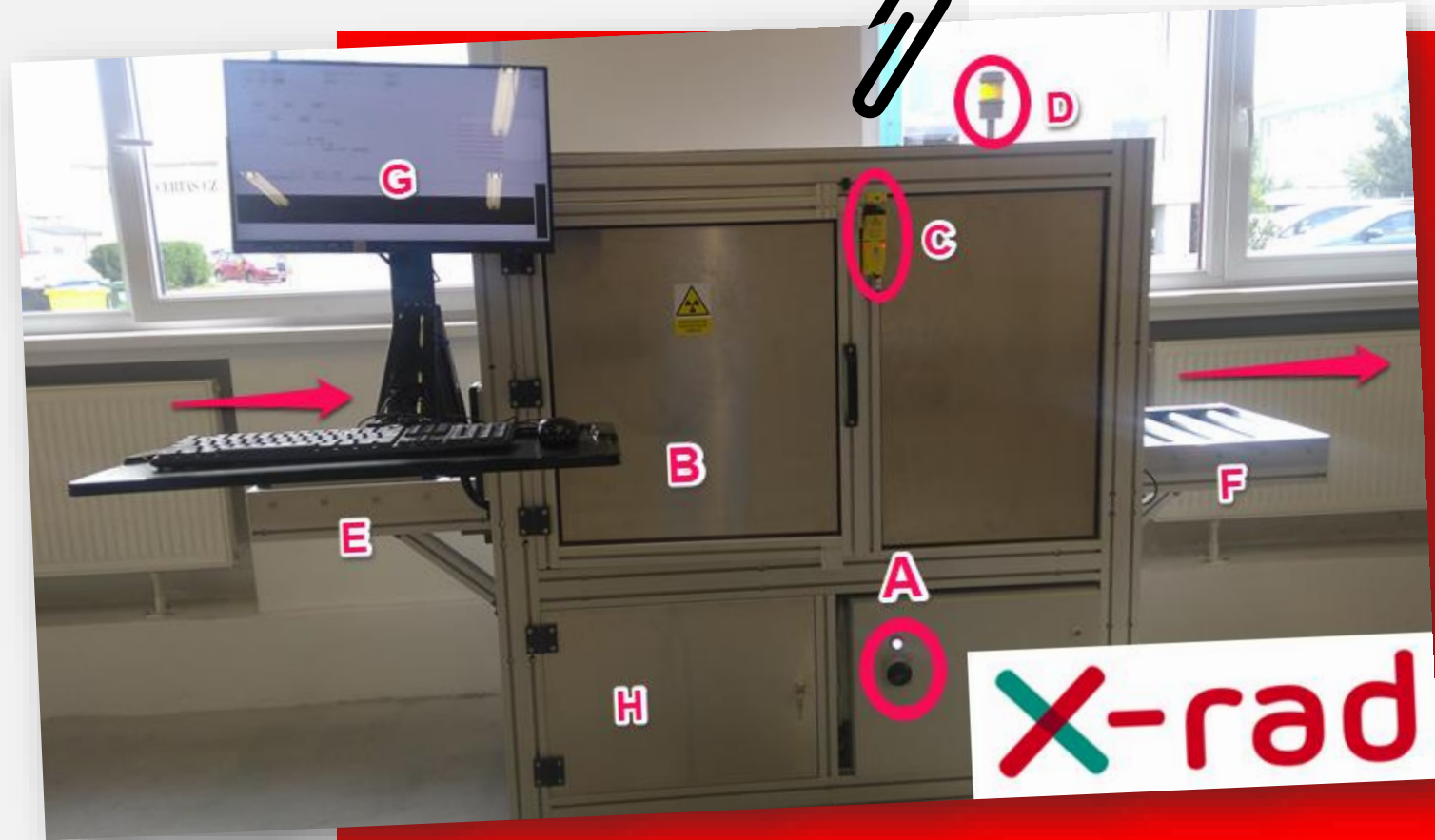
## DEMO UNIT

Inside the unit there is an imaging technology using very sensitive detector, which is characterized by its unique capabilities such as high resolution, almost unlimited range of grey levels and high sensitivity.



# SYSTEM OVERVIEW

- A) Main switch
- B) Shielded chamber servicing side-door
- C) Safety lock sensor for servicing side-door
- D) Signaling light indicating closed safety circuit (high voltage enabled)
- E) Entry inter-rolls for the transporting pallets with the tested samples
- F) Exit inter-rolls for removing the tested samples from the pallet
- G) Touch monitor for controlling the system (see the description of full screen software in next paragraph)
- H) Door for access of the unshielded compartment for regular servicing



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# LIST OF CONTROLLING FUNCTIONS IN USER AND SUPERVISOR ACCOUNT RIGHTS

## A) System status overview

### A1) X-ray ON status Indication

- grey symbol => X-ray is OFF
- blinking color yellow-green symbol => emitting X-rays

### A2) Front door status indication

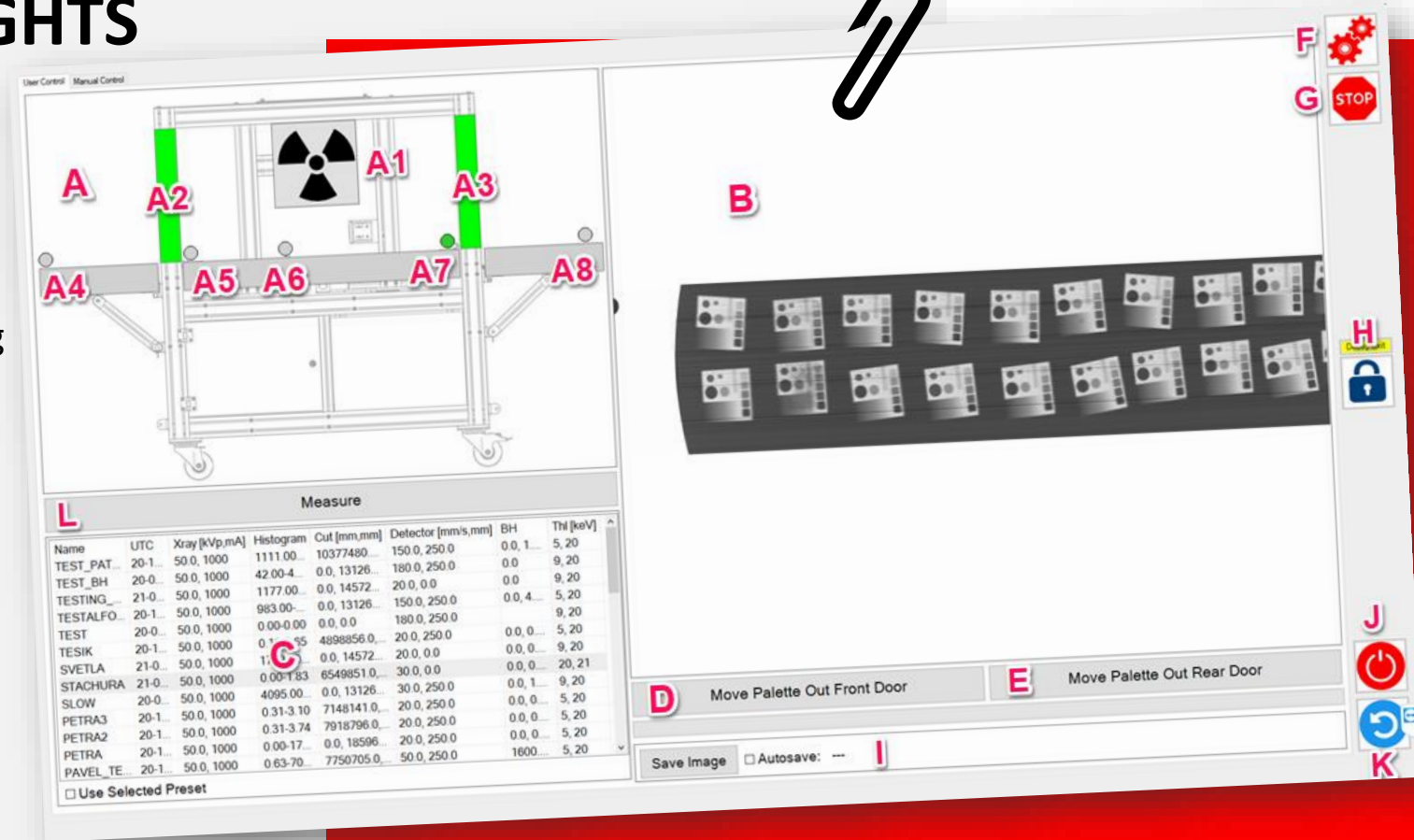
- full green/white => closed/open door
- stripes moving up/down => opening/closing door

### A3) Back door status indication

- full green/white => closed/open door
- stripes moving up/down => opening/closing door

### A4, A5, A6, A7, A8) Circular Indicators of pallet position

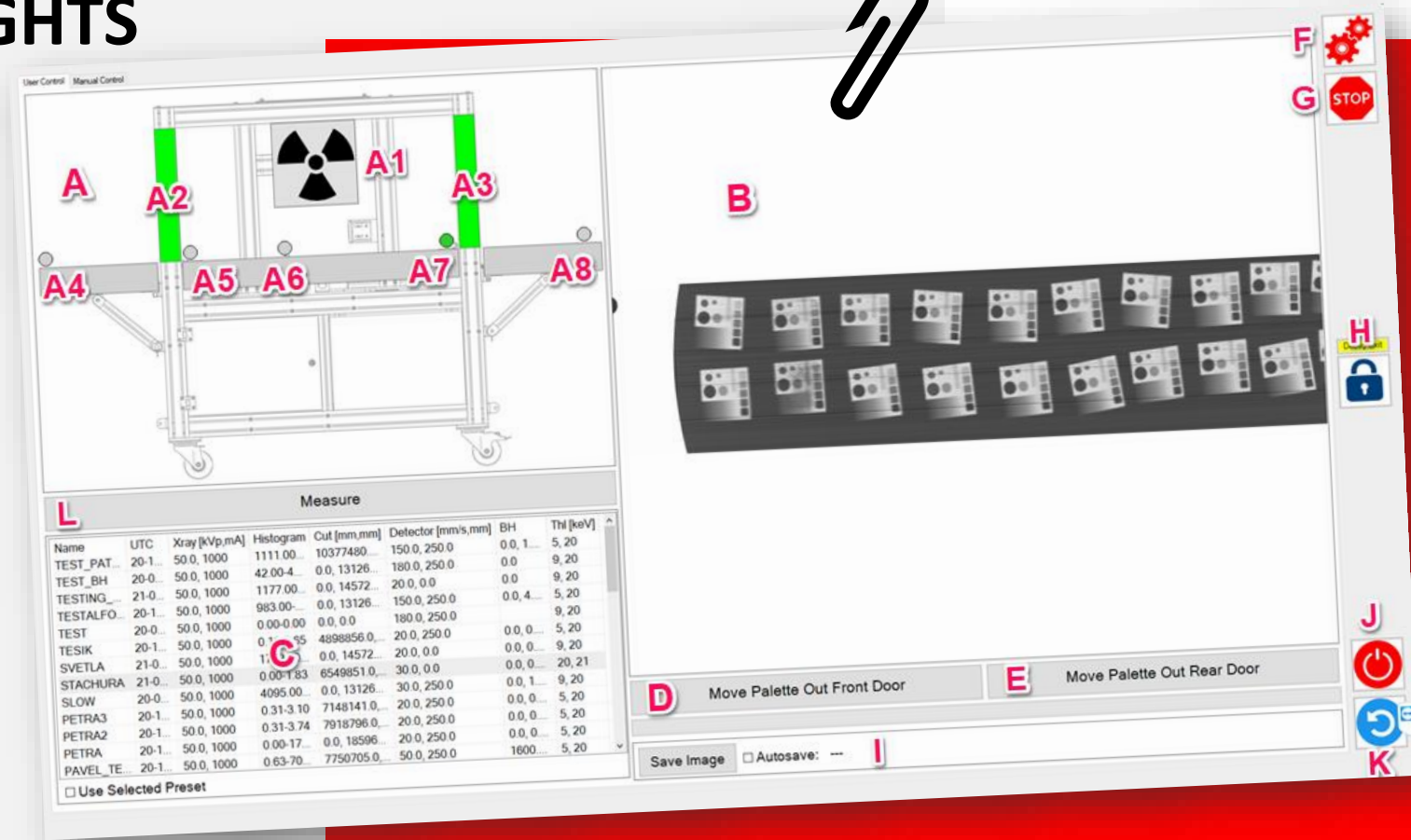
- Full grey => pallet with sample is NOT on a given position nor is moving towards this position
- Full green color => pallet with sample is on a given position
- Blinking green-grey => pallet with sample is moving towards this position





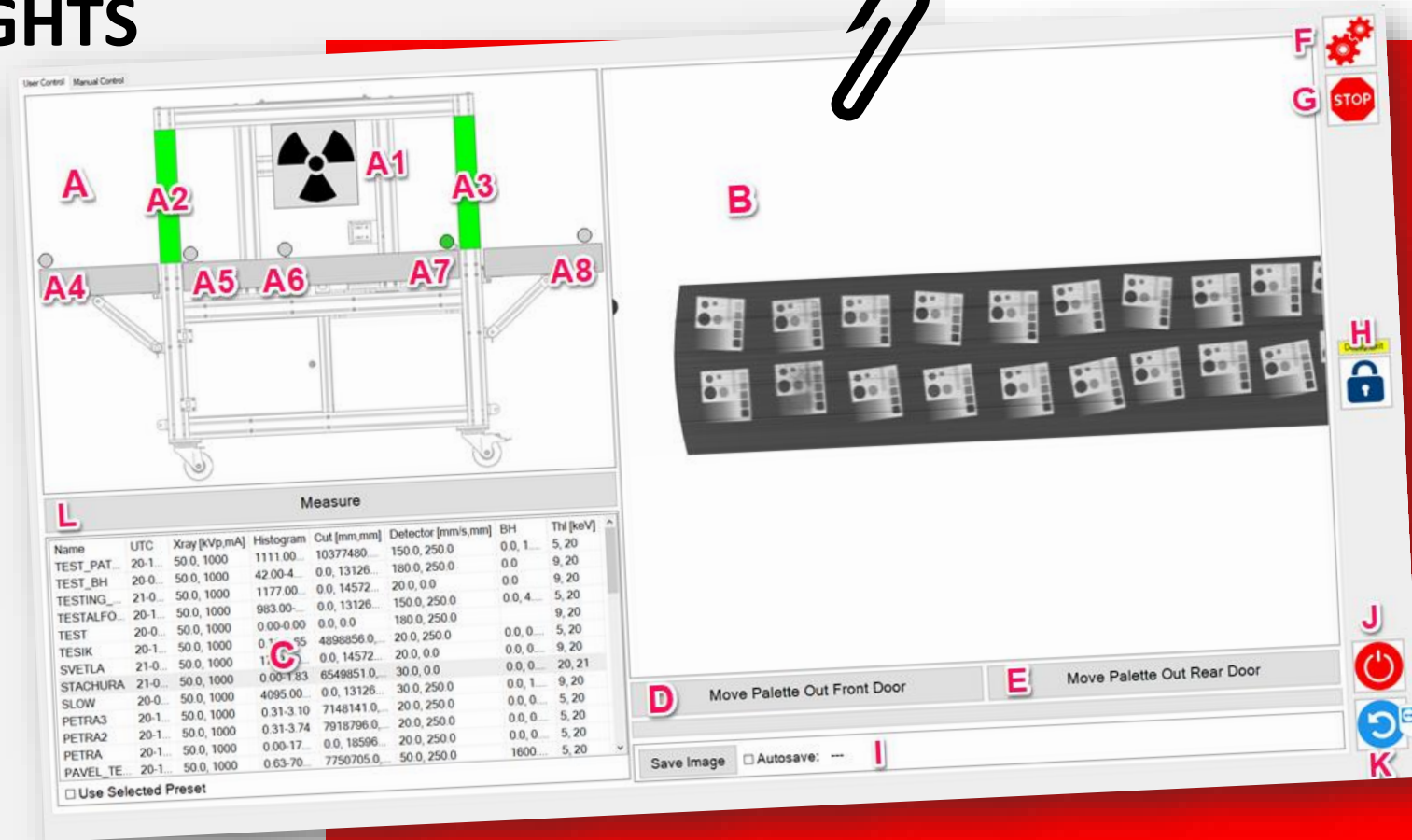
# LIST OF CONTROLLING FUNCTIONS IN USER AND SUPERVISOR ACCOUNT RIGHTS

- B) Resulting measured image
- C) List of scanner system settings for choosing the required parameters of the device
- D) Button for moving the pallet to the entry position A4
- E) Button for moving the pallet with a sample to the position A8
- F) Emergency button for instant STOP of every device's mechanical parts movement
- G) Emergency button for STOP of every device's mechanical parts movement and for opening the controlling relays (controlling PLC stays powered)



# LIST OF CONTROLLING FUNCTIONS IN USER AND SUPERVISOR ACCOUNT RIGHTS

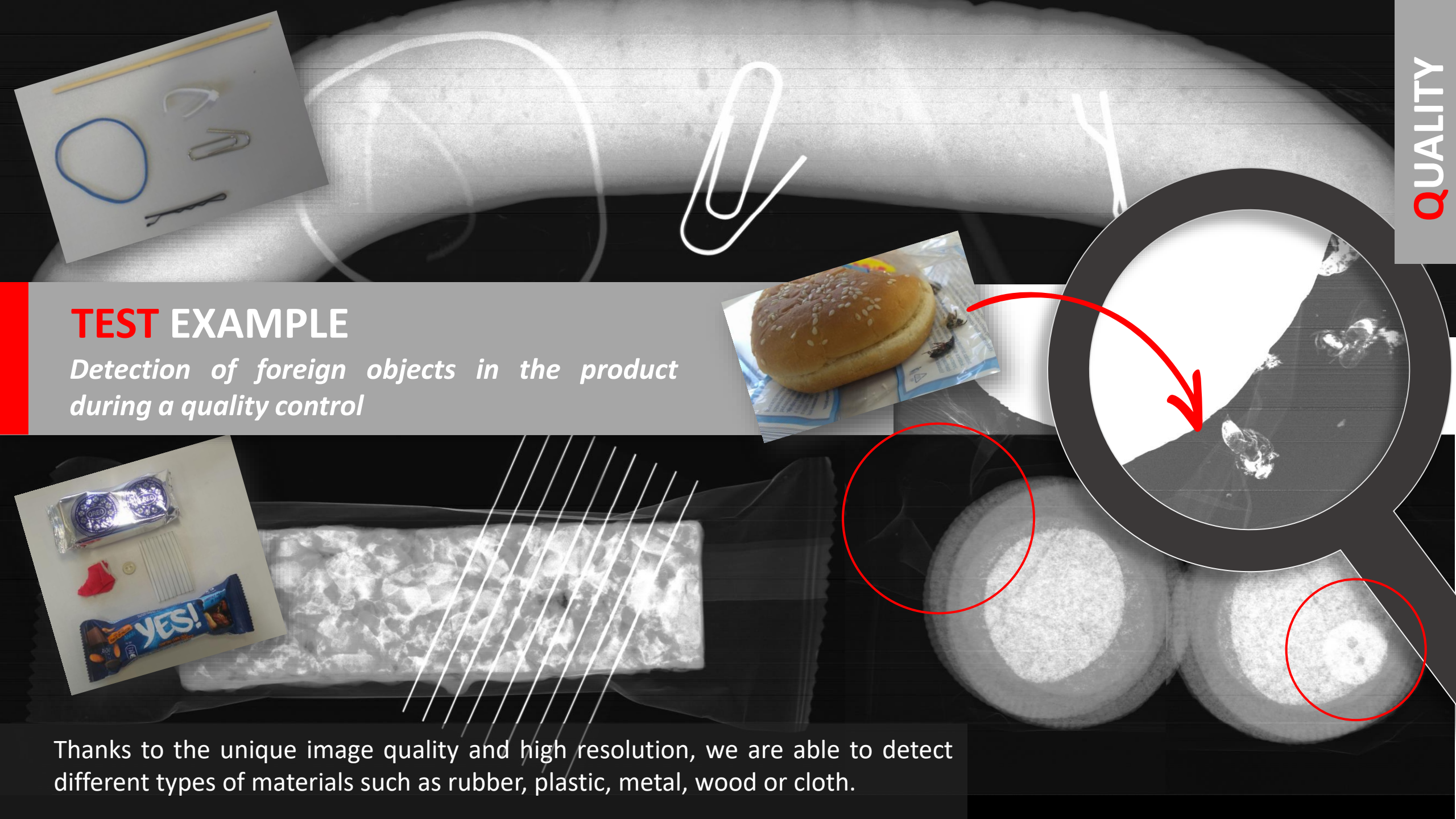
- H) Button for selection of operator's rights level (user, supervisor, servicing)
- I) Panel for image measurement progress with the button for saving of recently acquired image into the file, or for choosing the automatic saving in the selected folder
- J) Button for shutting down the acquisition computer
- K) Button for restart of the acquisition computer
- L) Button for START of the sample measurement





## TEST EXAMPLE

*Detection of foreign objects in the product during a quality control*

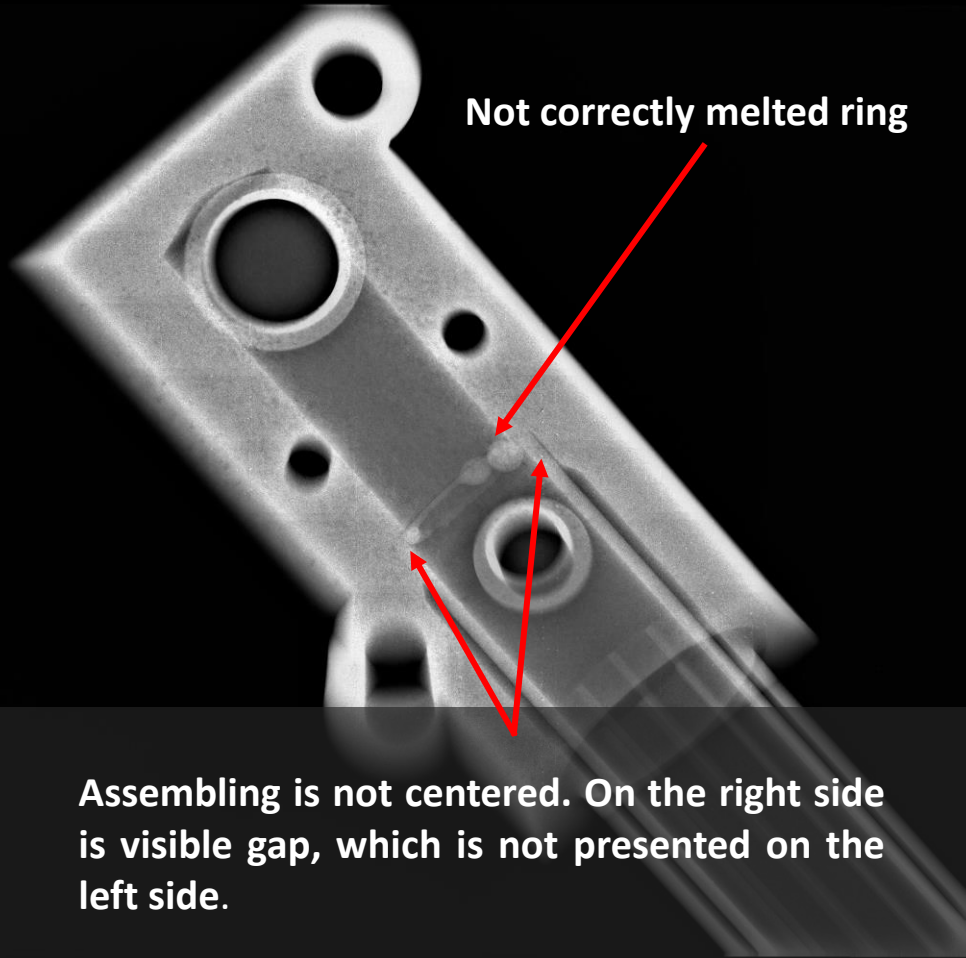


Thanks to the unique image quality and high resolution, we are able to detect different types of materials such as rubber, plastic, metal, wood or cloth.

# TEST EXAMPLE

# NOK

Not correctly melted ring



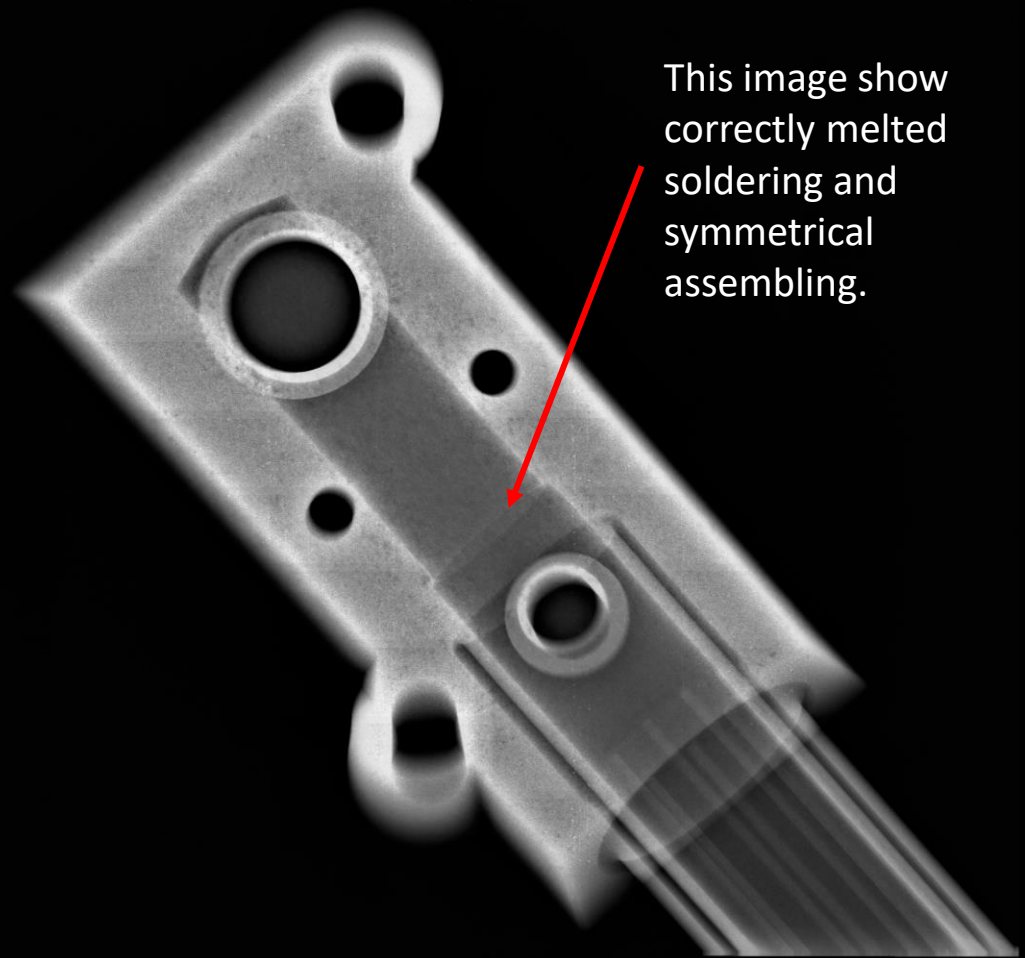
Assembling is not centered. On the right side is visible gap, which is not presented on the left side.



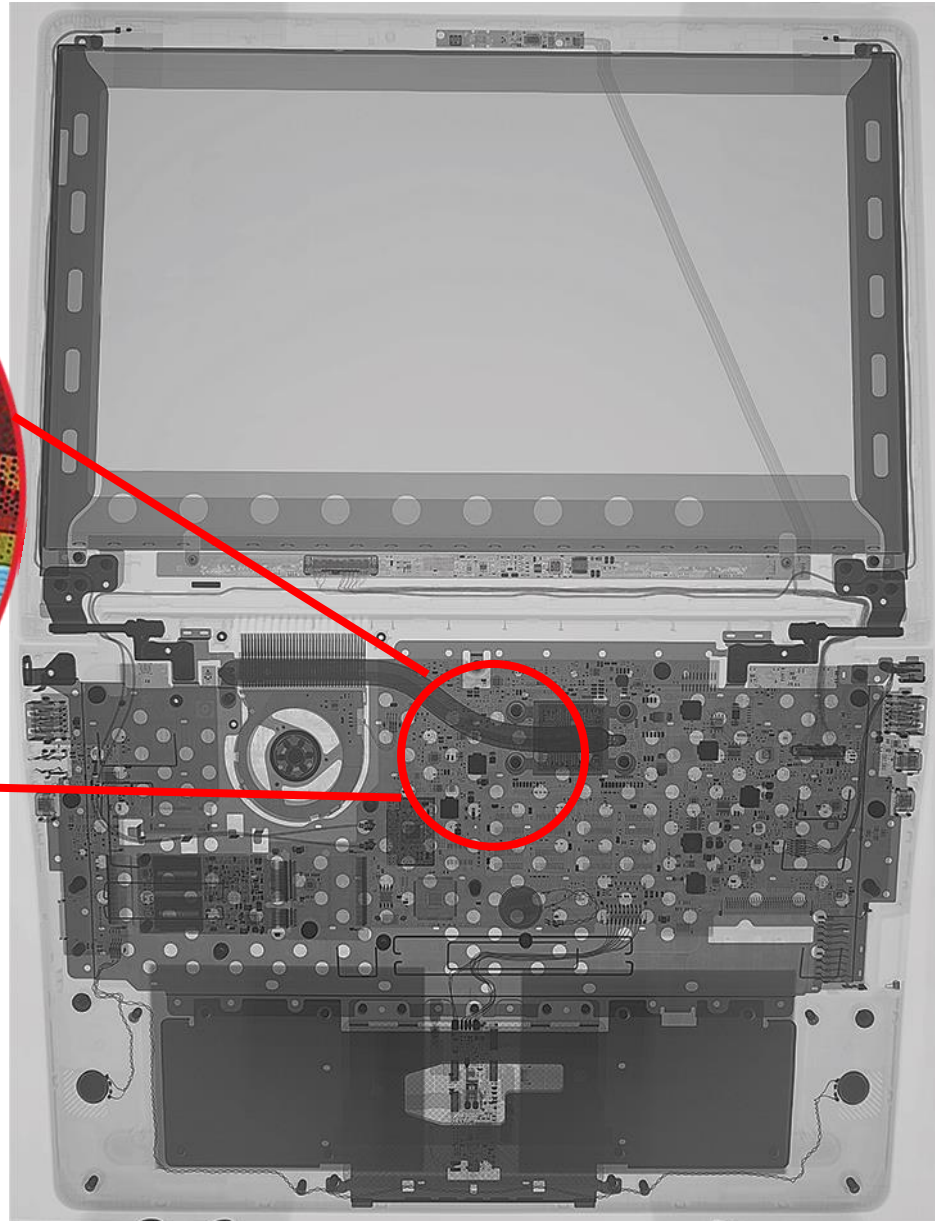
# X-Ray test of pipe soldering

# OK

This image show correctly melted soldering and symmetrical assembling.





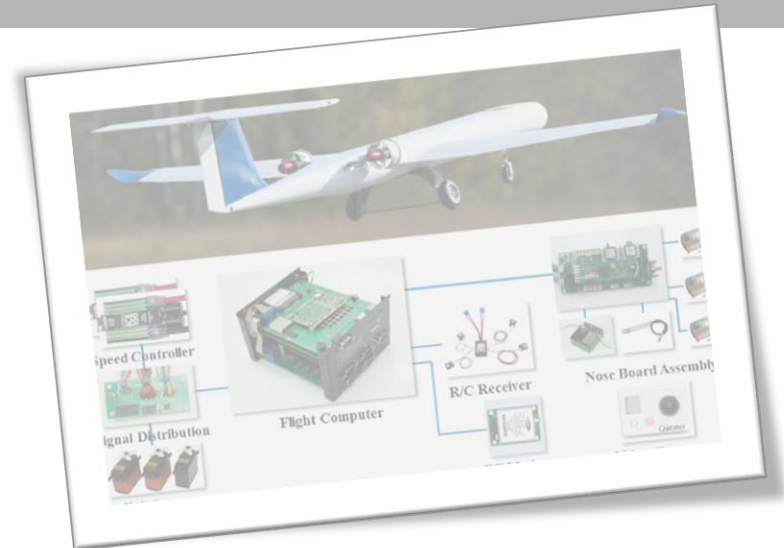


Different materials can be assigned different colors by spectral imaging, making it easier to identify materials in an image based on differences in their chemical element composition.



## SPECTRAL IMAGING THE UNSEEN

This can be used to detect undesirable materials or to better visualize the object for operator orientation.





# INDUSTRIAL **VISUAL INSPECTION** AND QUALITY ASSURANCE WITH POWERFUL AI

*In principle, it thinks like a man, but it works with the precision of a machine.*

- ✓ Unlimited number of areas
- ✓ Success rate up to 99%

## Benefits of using artificial intelligence in quality evaluation:

- 🏆 Ensuring flawless manufacturing.
- 📅 Timely and flawless deliveries.
- 👤 👤 👤 Savings in operating costs and resources.
- 🎯 Finding errors in the manufacturing process.
- 🕒 Time saving.
- 📊 Increased production efficiency.

AUTOMATIC X-RAY  
INSPECTION AND IMAGING DEVICE

BERKHOF CONSTRUCTION S.R.O.

AWARD WINNER IN THE CATEGORY OF BUSINESS  
INNOVATIONS (MICRO & STARTUP COMPANIES)



JANUARY 25<sup>th</sup> 2021

SAULI NIINISTÖ

PRESIDENT OF THE REPUBLIC OF FINLAND

QUALITY  
INNOVATION  
AWARD



**BERKHOF**  
**X-rad**

- After a few years Czech companies succeeded in the field of International competition with their innovations. Radalytica a.s. in cooperation with Berkhof Construction s.r.o. with their BERKHOF x-rad got award - **Award Winner in the International round of "Quality Innovation Award 2020"**.
- The Quality Innovation Award is an annual, international competition that enables innovators mainly to get professional assessment for their innovation, benchmark their innovation against others and increase the visibility of their innovation.



QUALITY  
INNOVATION  
AWARD

Oceněná organizace

MEZINÁRODNÍ  
CENA  
INOVAČÍ

Supported by Czech Society for Quality



- customer-tailored device offer

- measurements of test samples

- creating a case study

If you have a question or interest in our services...

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