

iXRAY Technology Thinking in Solutions

X-ray technology is a robust and highly precise measuring instrument. It is used in wall thickness and diameter measurement for single and multi-layer pipes and hoses as well as cables and rubber applications.

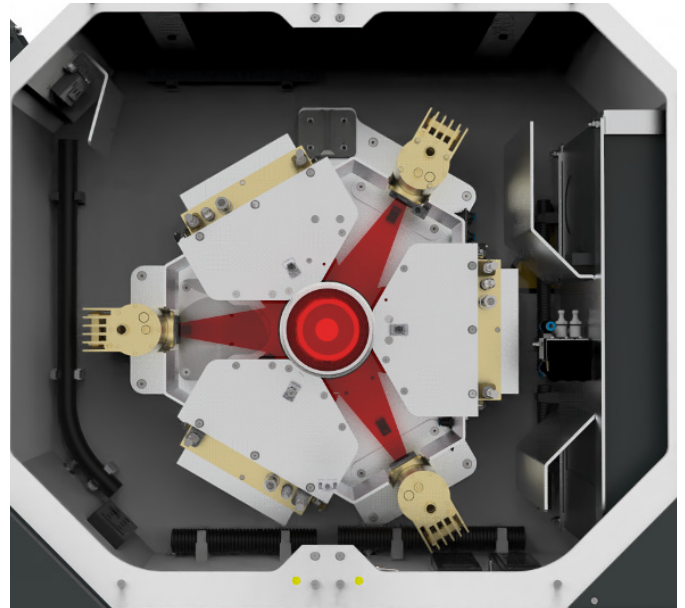
In addition to our proven dosing and measurement technologies such as gravimetric, radar and ultrasonic, the X-ray measurement technology has complemented the product portfolio of iNOEX GmbH. Since the product presentation at the K-show 2019, the iXRAY has already been successfully implemented in various product lines.

The iNOEX iXRAY series uses X-ray radiation with the latest X-ray detectors and long-life X-ray tubes for dimensional measurement and data acquisition. The technology provides an μm -accurate reproducibility of the products. Therefore, the scope of application is wide - it is used for multilayer pipes such as aluminium composite tubes, pressure hoses with fabric inserts, rubber hoses, foamed products, medical hoses, and tubes as well as cables.

Especially in combination with our gravimetric systems, the iXRAY offers various process control options like mass throughput-, weight per meter or thin point control. For the customer, this results in high potential for material savings, increased productivity, and process transparency. It is available in three series (iXRAY 16, 32 and 63) within a diameter range of 1 - 63 mm.

The Measuring Principle

A very narrow, fanned X-ray beam is generated in the encapsulated X-ray tube, which hits a scintillation layer on the detector. The X-rays are absorbed in this scintillation layer and converted into visible light. The underlying photosensitive chip detects the intensity of the visible light. If there is a pipe or cable to be measured placed in the beam path, the X-ray radiation is partially absorbed by the measurement object. Due to these changes in the absorption, we can measure wall/layer thickness distribution, interior and exterior diameters, ovality and eccentricity.



3-Axis Measuring Principle

The 3-Axis System

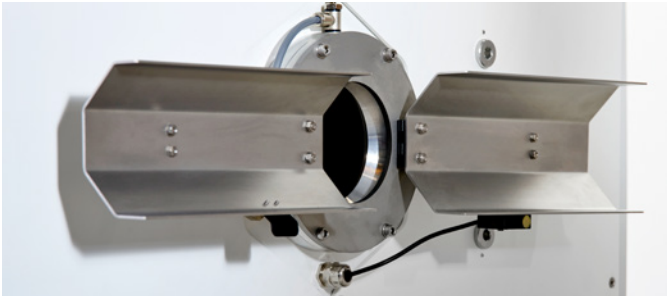
The pipes and hoses produced in the extrusion process are not perfectly round, but usually have an elliptical shape. In addition to wall thickness, outer and inner diameter, the ovality and eccentricity are of particular importance for the pipe, hose and cable producer. To be able to determine ovality and eccentricity with sufficient accuracy, X-ray systems with 3 measuring axis should be used. A 2-axis measurement system only has limited sufficient measured values. Because oval tubes and perfectly round tubes can have the same wall thickness measurement on two axis. In contrast to that a 3-axis system can provide an accurate measurement of ovality.

System Features

The iNOEX iXRAY is equipped with exceptional safety features and adheres to high safety standards. Compliance with all national and international standards.

Foldable radiation protection tubes

The radiation protection tube can be opened on both sides for easier threading of the product. The safety switch in connection with the safety PLC switches off the radiation when open.



Foldable Radiation Protection Tubes

Hermetic sealing

Hermetic U-shaped seal separating the product and measuring area. This prevents dirt or dust from getting to the actual measuring technology. Easy cleaning is ensured by opening the foldable radiation protection tubes and blowing out the product passage.

Narrow X-ray beam

The adjustable aperture gap leads to a narrow X-ray beam. The narrow beam lowers the radiated tube volume, which correlates with the released scattered radiation. Thus, the scattered radiation is reduced to a minimum.

Pipe support

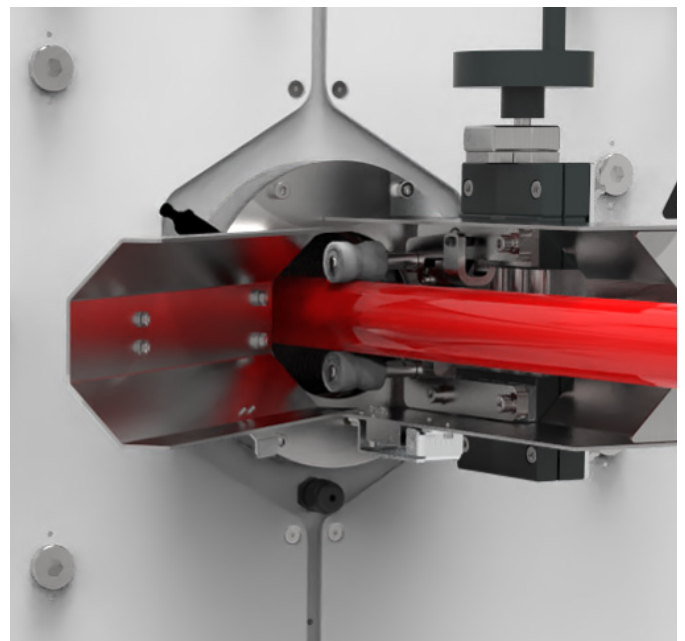
Optimal pipe support is provided by double guide rollers with manually adjustable spacing. Pipe guidance through the center of the measuring chamber minimizes pipe movement and increases measurement quality. There is also an integrated safety mechanism for unexpected thick spots on the pipe.

Enclosure Cooling Unit

The enclosure cooling unit is optional and available in two versions (240 V or 115 V). The temperature is set from a small control panel. In addition, the measurement chamber cooling circuit is hermetically sealed to prevent contamination of the measurement components. Our technology helps to improve the quality and efficiency of production.

User-friendly and safe system

The iXRAY series is user-friendly. The line operator only has to select the pipe, hose or cable recipe to start the measurement. Product specific recipes can be implemented by the customer or technical recipes are created by iNOEX for customer specific use-cases. Furthermore, the X-ray units do not present any hazard to the operator. The radiation output is far below the permitted legal limits and other safety aspects ensure safe use. Thanks to the intuitive and easy-to-use interface, the line operator always has an overview of the most important production parameters, the wall thickness distribution over the circumference and the display of the eccentricity. This enables quick intervention in the production process at any time. Process automation can be achieved by combining the system with gravimetric solutions from iNOEX.



Pipe Support

iBA GmbH represents one of our successful partnerships with our customers. The company uses iXRAY systems in their PE-Xa lines to monitor their production process to ensure the highest quality standards. Martin Deters, Managing Director of iBA GmbH, emphasizes the importance of the absolute measurement as well as the decent measurement processing that iXRAY provides.



Arno Neumeister (left) and Martin Deters (right) in front of the iXRAY terminal in one of iBA's PE-Xa extrusion lines.

He explains: "[...] the PE-Xa pipes of iBA GmbH are produced in a highly precise and stable process that has been refined through decades of research in process engineering". The iXRAY system plays a crucial role, as it enables us to accurately measure ovality, eccentricity and wall thickness during the extrusion process.

As PE-Xa pipes are often used in underfloor heating systems, their ovality is particularly important for compatibility with different fitting systems and global standards. In particular, the 3-axis measurement ensures that the ovality of the pipe is accurate. In addition to high accuracy, the iXRAY system can be seamlessly integrated into the production line. The simple and intuitive plug-and-play solution is a major advantage for Martin Deters. In addition, the iXRAY has a user interface that is easy to operate and provides all important process key figures in a clear presentation.

There is another feature of the iXRAY system that the Managing Director is enthusiastic about: "The iXRAY system can be easily integrated into the extruder control system via the VNC connection. The circle diagram, for example, gives the line operator an overview of the wall thickness distribution. In addition, all other necessary quality data, such as trend data and eccentricity view, are directly visible on the operator terminal. This allows the operator to immediately make the necessary adjustments, such as centering the pipe, based on the measured values."

Potential variations in the production process are therefore immediately visible and can be mitigated. "The iBA GmbH, such as all of its customers, are very delighted about the effortless implementation of the iXRAY system in our product lines. Therefore, the iXRAY system is our standard inline measurement system. We are looking forward to further years of successful cooperation with iNOEX GmbH", Martin Deters concludes.



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