



Schematic illustration of PTB's mobile X-ray measuring device

### Advantages

- on-site detection of X-ray radiation leaks
- $4\pi$  sterad profiling range
- easily transportable due to modular construction

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## Mobile X-ray Measuring System

During development, certification and intermittently during operation, X-ray sources often have to be characterized. Especially unwanted leakage of radiation is a crucial parameter for the certification of X-ray tube assemblies.

PTB has constructed for its own regulatory task of type testing a mobile X-ray measuring device, to perform reliable on-site dose rate measurements at a fixed distance of 1 m from the focal spot of a X-ray tube.

### Technical description

The X-ray measuring device can be disassembled and transported in a normal van. Erected on the three pillars, as shown in the picture, the device becomes a highly precise tracking instrument for the measurement of X-rays. It consists of four sensors riding in the vertical direction on a track, that is slightly larger than a semi-circle. This track can also be rotated horizontally. Vertical and horizontal scans are under the control of an embedded microprocessor.

Thus more than  $2\pi$  steradian is accessible in one scan. Rotating the X-ray device under test (DUT) by  $180^\circ$  results in a full and overlapping  $4\pi$  steradian leakage test of the DUT.

The track-segments are connected with highly accurate mechanical interfaces, thus safeguarding low measurement uncertainties. With this system, geometrical construction flaws of X-ray tube assemblies can be detected and located.

### Application

PTB has constructed for its own regulatory tasks the described scanning X-ray measuring device and plans to use it for mobile as well as for stationary dose rate measurements of the leakage radiation of X-ray tube assemblies.

### Economic significance

The investigation of X-ray sources as well as the detection of possible radiation leaks of the complete assembly is very important in medical, industrial and research applications.

### Development status

A first functional prototype of the mobile X-ray measuring device has been tested at PTB. Licenses for mechanical and electronic components are available.

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