

# Fuel Integrity Monitor FIM-06



**Fuel integrity monitor FIM-06 is designed to carry out continuous gamma-spectrometric monitoring, in particular, to detect a developing defect of fuel elements cladding integrity, or to detect primary to secondary coolant leak.**

## Purpose

The fuel integrity monitor FIM-06 is designed to carry out continuous gamma spectrometric monitoring of the primary circuit coolant, in particular, to detect a developing defect of fuel elements cladding integrity, or, eventually, to detect primary to secondary coolant leak.

The shielding and collimation unit makes it possible to change the sensitivity of the system according to the activity of the medium.

## Description

The FIM-06 monitor is composed of the following main parts:

- HPGe detector with cooling and multi-channel analyser (MCA);
- Shielding and collimation unit – rotating lead cylinder with two exchangeable collimation apertures;
- Supporting frame with a detector holder, worktable holders and a switchboard.

The gamma-spectrometric HPGe detector is located in a vertical position in the rotating lead cylinder. The cooling system of the detector can be located right under the detector, or on one of two removable worktables.

The structure of the shielding and collimation unit makes it possible to measure two pipes with a liquid sample separately. The collimation unit can be set in 6 positions either electromechanically, or optionally manually, see the table below. The basic positions of the collimators are measurements of each pipe with a sample with high or low sensitivity. There are two positions, using a high- or low-sensitive collimator, for calibrations (and/or regular inspections) of the detector via the built-in source. Apertures of the collimators are designed to optimize sensitivity of the monitor with respect to the selected detector and activity of the monitored medium.

The supporting frame supports the installed parts. Up to three worktables can be fastened to the frame.

## Main Advantages

- Two points of measurement - possibility of measurement of two different pipes with liquid sample
- Collimation unit with two collimation apertures (high and low sensitivity)
- Exchangeable collimation apertures for optimization of the system sensitivity
- Exchangeable detector
- Integrated radiation check source



***Monitor with electromechanical rotation of the collimation unit***

## Description



Exchangeable collimator of high sensitivity



Exchangeable collimator of low sensitivity

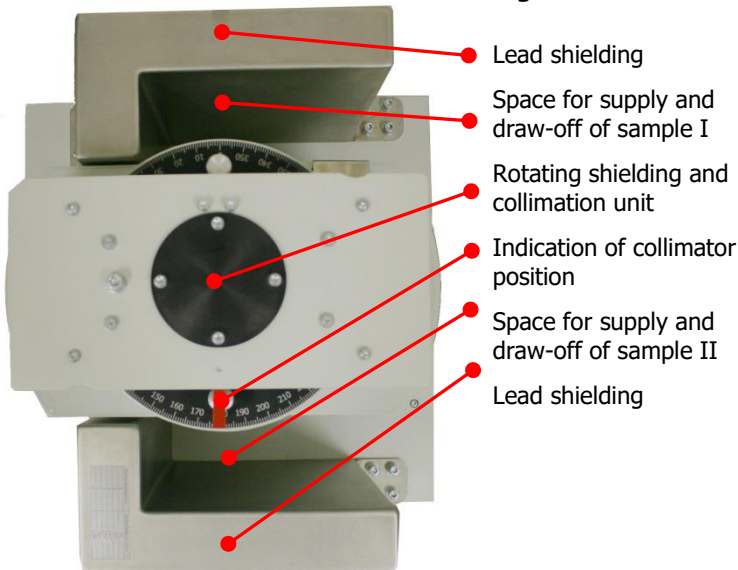


Full shielding (calibration position)

### Positions of the shielding and collimation unit

0°	Measurement of sample I - collimator of low sensitivity
90°	Measurement of sample I - collimator of high sensitivity
180°	Measurement of sample II - collimator of low sensitivity
270°	Measurement of sample II - collimator of high sensitivity
49°	Calibration position – collimator of low sensitivity
139°	Calibration position – collimator of high sensitivity

### Legend



- Lead shielding
- Space for supply and draw-off of sample I
- Rotating shielding and collimation unit
- Indication of collimator position
- Space for supply and draw-off of sample II
- Lead shielding

Shielding and collimation unit – top view

## Common Specification

Detector type	HPGe
Efficiency (typically)*	40%
MDA for background 0.1 µGy/h at 600 s measurement	
▪ Low sensitivity	5 000 Bq/l
▪ High sensitivity	1 200 Bq/l
MDA for background 10 µGy/h at 600 s measurement	
▪ Low sensitivity	50 000 Bq/l
▪ High sensitivity	18 000 Bq/l
MDA for background 0.1 µGy/h at 3600 s measurement	
▪ Low sensitivity	2 000 Bq/l
▪ High sensitivity	500 Bq/l
MDA for background 10 µGy/h at 3600 s measurement	
▪ Low sensitivity	30 000 Bq/l
▪ High sensitivity	10 000 Bq/l
Shielding of pipes with samples	50 mm (2 in) Pb
Rotation of collimation unit	Electromechanical / Manual (optionally)
Collimation positions	6
Accuracy of setting	± 1°
Aperture for detector	
▪ diameter	90 mm (3.5 in)
▪ depth	243 mm (9.5 in)
Dimensions (H x W x D)	(1523 x 1315 x 505) mm (60 x 52 x 20) in
Weight	approx. 420 kg (926 lb)
Ingress protection rating	IP 54
Power supply	230 V

\* various types of detectors can be supplied on customer's request.

## Models and Accessories

Model	Description
<b>K1534</b>	Fuel Integrity Monitor FIM-06



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