

FRM-24 Free Release Monitor



FRM-24 represents a complex monitoring facility which is used for activity monitoring and radionuclide analysis in waste material before its release into the environment.

Based on results it is possible to make a decision about the next waste management.

Purpose

The FRM-24 free release monitor is intended for radionuclide activity measurements in waste material, i.e. in normal operating waste, disposed technological parts, etc. before its release into the environment (clearance). Technology allows monitoring gamma radiation in the material which passes through a measuring tunnel. Material can be placed in standard packages, i.e. transport boxes, bag, and bar-shaped material.

Based on the activity concentrations and the radionuclide distribution measured, it is possible to make a decision if material can be released into the environment, decontaminated again, or stored as radioactive waste.

Description

Basic technological elements:

- The loading block consists of roller platform, scales (up to 100 kg, with the data output into the system) and a support frame
- The measuring block contains the following elements:
 - 2 spectrometric NaI(Tl) detectors (upper and lower);
 - 2 side plastic detectors;
 - 50 mm lead shield;
 - inner stainless housing (easy decontamination);
 - sliding belt with electric drive;
 - evaluation unit;
 - control box with keyboard and monitor;
 - optical input/output barriers (2 + 2);
 - bar code reader; label printer; scales display unit; and
 - optical signalling; safety STOP button

The unloading block consists of the roller platform and the support frame.

Main Advantages

- Detection and radionuclide analysis in the material for clearance;
- 2 scintillation NaI(Tl) detectors, 2 plastic detectors;
- Tunnel passage, semi-automatic mode;
- Automatic measurement evaluation; and
- Integrated auxiliary elements: bar code reader, label printer, and clearly arranged signals

Standards and Certification

ISO 11932 - Activity measurements of solid materials intended for recycling, reuse and storing as non-radioactive waste.

Act of National Council of SR no. 223/2001 Coll. (on waste) and its implementation regulations of Ministry of the Environment no. 283/2001 Coll. and no. 284/2001 Coll.



Description

The measurement process is managed and monitored from the control room using the push-button control (multi-functional and back illuminated) and a touch screen. Individual monitoring results are archived (usually in a master database system via Ethernet) and the appropriate documentation containing measurement results is printed. The bar code reader is used for reading input data from the labels of previously measured materials.

The detectors are provided with temperature sensors for the temperature compensation of output data.

All technological parts can be provided with transport wheels (optional).

Measurements:

- Initial system settings: background measurements (automatically measured during the idle period; the system corrects the measurement results accordingly), scales reset, detector functionality test (peak stability and response measurement) using a reference source (optional accessories), operator identification (password, card, chip);
- Loading the material to be measured on the loading block;
- Material identification (container) by means of bar code reader, or new material selection: material type, package, package filling (25%, 50%, 75%, 100%), radionuclide vector (RV) selection, etc.;
- Weighing the material measured (package weight correction);
- Detection limit evaluation against material density and background activity (based on the previous background measurement); and
- Gamma radiation measurement – two modes:
 - Static: material is not moving in the measuring tunnel; and
 - Dynamic: material passes through the tunnel on the belt, started manually or automatically by moving through the optical barrier;
- Measurement result display:
 - Specific activities for individual radionuclides of the RV used and their fractions compared to the clearance levels;
 - Total activity measured, specific activity, uncertainty
 - Informative activity inhomogeneity evaluation in material (dynamic mode); and
 - Fraction of selected short-term radionuclide activity in RV compared to the total activity;
- Automatic measurement evaluation, i.e. waste class specification:
 - 1 – Clearance possible;
 - 2a – Material unevenly contaminated, suitable for resorting;
 - 2b – Material evenly contaminated, higher short-term nuclide concentration, suitable repeated measurement after certain time elapsed;
 - 3a – Radioactive waste, no clearance;
 - 3b – Dangerous radioactive waste, safety measures needed.
- Printing labels, reports, etc...

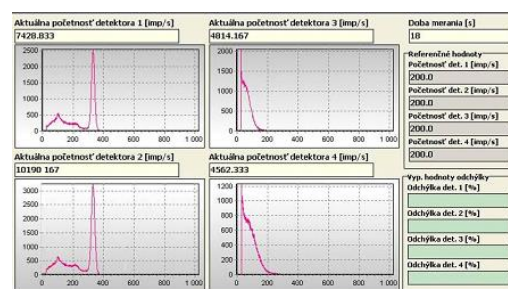


Specification

Model	K0906-01		K0906-02	
	mm	in	mm	in
Measuring tunnel cross-section (W x H)	510	20	630	24¾
	420	16½	420	16½
Measuring block dimensions (L x W x H)	1655	65	1695	66¾
	1450	57	1557	61¼
	1604	63	1629	64½
Roller platforms dimensions, max. (L x W x H)	1000	39½	1000	39½
	695	27½	841	33¼
	850	33½	840	33¼
Material weight	3 ~ 100 kg (6.6 ~ 220 lb)			
Measuring block w.	approx. 3000 kg (6600 lb)			
Belt speed	10 ~ 20 mm/s (¾ ~ ¾ in/s)			
Power	230 V, 50 Hz, max. 6A			
Operating temperature	5 ~ 40 °C (41 ~ 104 °F)			
Detectors				
Plastic, 2 pcs	300 x 300 x 50 mm (11¾ x 11¾ x 2 in)			
Scintillation, NaI(Tl), 2 pcs	100 x 100 x 400 mm (4 x 4 x 15¾ in)			
Energy range	60 keV ~ 2 MeV			
Minimum detectable activity (¹³⁷ Cs)	600 Bq			
Pb shielding thickness	50 mm (2 in)			

Models and Accessories

Model	Description
K0906-01	FRM-24, 510 mm tunnel width
K0906-02	FRM-24, 630 mm tunnel width
Optional Accessories	
<ul style="list-style-type: none"> ▪ Reference source (e.g. ¹³⁷Cs, up to 300 kBq) ▪ ID chip or card reader ▪ Transport wheels 	



Screen with detector test results

www.vf.eu

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