Tape filter Aerosol System
AMS02T

Profile: Measuring of radioactive aerosols, especially artificial nuclides

AMS02T is a Tape filter type version of the AMS series of Bitt Technology. The AMS02T is a step-band filter equipment. The step-band unit has simple maintenance free mechanic and high nuclear sensitivity – low limit of detection at measuring Alpha, Beta, Gamma aerosol, elementary Iodine and beta noble gas in one unit. The AMS02T is having one or two or three radiation detectors. By using the one detector system a PIPS detector is always inserted for the alpha and the beta (radon) measurement using a glass fibre filter.
At a two detector system we build in additionally a 'NaI(Tl)' scintillation detector or $LaBr_3$(Ce) scintillation detector for Aerosol gamma and elementary Iodine measurement.
The third detector can measure beta noble gas by a plastic scintillation detector
The unit has two filter tapes. The upper one is a 60mm wide glass fibre band for collecting aerosol, the lower one is a 60mm wide active carbon impregnated (charcoal) filter band for retention of elementary iodine. The lower band for iodine can be left. See the orderable options below.

The NaI or LaBr3 detector is continuously automatic energy calibrated. Checking the efficiency calibration is possible by an optional Cs137 and Pu239+Sr90/Y90 source.

Filter-band and driver
The filter tape driver steps the filter forwards every 1-2-3 days (settable) in Normal measure mode. In case of an emergency (in case of irregular spectrum or alarm situation), the filter step occurs every hour. In normal situation one filter roll lasts for about one year use.

Lead shielding
The sampling and measuring chamber housed in a lead shielding block. External gamma-ray background attenuated by at least one order of magnitude.

Air flow pump
The nominal volume rate of the maintenance-free pump is 3.5 m^3/h. The flow-rate is measured indirectly by pressure sensors and a temperature sensor.

Computer
All detectors are autonomous working intelligent detectors with continuously automatic energy calibration by embedded 1k channels MCA (MultiChannelAnalyser) controlled by a microcontroller. All of these intelligent detectors communicate trough a RS422 communication bus connected to a PC or to a notebook by a single USB cable. The main control and evaluation programs and data processing and storing, communication (AutoFTP client or server) are running on this PC under Windows.

Communication, Data central (Optional)
It is possible by LAN, Internet, GSM, VPN for sending data to a central or use remote maintenance.
For data central and visualising data BITT-SCADA a SQL based central program can be used.

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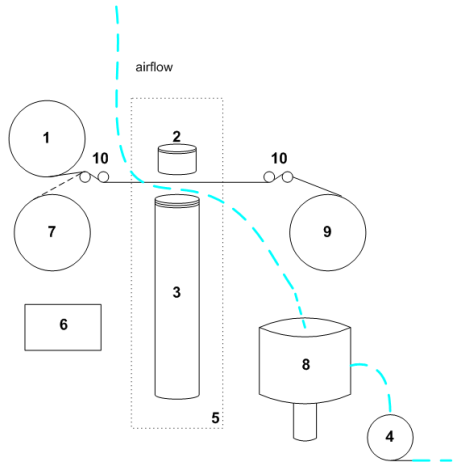

The equipment consists of the following units (fig. at left):

1. Aerosol filter-tape
2. PIPS-detector
3. NaI(Tl) or LaBr3 detector
4. Air flow pump
5. Lead shielding
6. Control unit
7. Carbon tape
8. Gas chamber with plastic detector

See the orderable options left below.

Description

This AMS02-T unit placed in a 19” rack. It can be used as a fixed housing, a wall mounted version or smaller as a mobile solution (e.g. in a car) without an air-conditioned container, only placed in a free-air sunshine-radiation protected, thermo isolated box or in a smaller.
Optionally a meteorology station can be connected to the system (Temperature, Humidity, Air pressure, wind speed, wind direction, solar radiation, and rain quantity).

Sensitivity

The smallest detectable radioactivity was calculated and determined for all detectors of the system, considering only realistic sampling and measurement situations. The table below is given in Bq/m³. They relate to the detector types, source-to detector geometry and - last but not least - to the data processing subroutines applied in the AMS02 system only.

Isotope	Filter/detector	LD(Limit of detection) after 5 min	1 h	12 h
α-activity ^{239}Pu	aerosol/PIPS	1.5	0.5	0.05
β-activity ^{90}Sr(β)	aerosol/PIPS	3.5	1.5	0.15
^{131}I	aerosol/NaI	5.6	2.6	0.2
^{137}Cs	aerosol/NaI	4.8	2.2	0.15
^{85}Kr	noble/Plastic	100	100	100

Orderable types:

AMS02-T-x1-x2-x3

Without xi option it is only equipped with PIPS detector for alpha-beta
Where x1:
N for alpha-beta and aerosol gamma with NaI detector
L for alpha-beta and aerosol gamma with LaBr3 detector
Where x2 or x3
I double filter band system for measuring atomic iodine
P plastic detector for measuring beta radiated gas

Technical Data:

Size: 700mm x 700mm x 1950mm

Weight: < 100 kg

Power: 230 V AC / 50 Hz / < 200 VA

Environment:
Temperature -10°C + 40°C
Relative humidity: 0 - 90 % not condensing

Units:

Detectors:

- PIPS 1700 mm²
  resolution ≅ 55 keV (α 241Am)
- 2“ x 2“ NaI(Tl)
  resolution < 8 % (137Cs 662 keV)
  background ~ 4 cps
- 1.5“ x 1.5“ LaBr3(Ce)
  resolution < 3 % (137Cs 662 keV)
  background ~ 40 cps
- -20100 mm² Beta Plastic (optional)
  5500cm³ chamber
  background ~ 1,6 cps

Pump:
Nominal flow rate > 3.5 (normal) m³/h
for optional order 8 m³/h external one

Filters:
60 mm wide glass fibre filter tape
60 mm wide iodine filter tape

Technical modifications are subject to change

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