



AMERICAN
FIRE AND SAFETY SOLUTIONS

CBRN DETECTION SYSTEMS



CBRN DETECTION AND FILTRATION AND SYSTEMS

CBRN Filtration Systems has the function of filtrating war and toxic gas agents so as to ensure healthy respiration of the crew against Chemical, Biological, Nuclear and Radioactive threats which are today's war methods.

CBRN Filtration Systems has 3 different usage options. These are CBRN Filtration Systems with Over Pressure, Masked Type CBRN Filtration Systems and Positive Pressure and Independent Masked CBRN Filtration Systems. These systems are used in civilian and military fields. CBRN systems are designed and qualified as per Nato AEP 54 standards.

CBRN Filtration Systems have 3 main structures. These are Control Units, CBRN Filters and CBRN Cabin. CBRN Filtration systems have successfully passed high temperature, low temperature, high humidity, shock-vibration and EMI/EMC tests as per MIL STD 810 and MIL STD 461 standards. Besides, CBRN systems produced by ARESFSS has the capability to be mechanically integrated to air conditioning system of the vehicle.

CBRN Filtration systems which heats the air by the heaters it includes, can provide conditioned air to the user according to present conditions and circumstances by integrating into vehicle air-conditioner for cooling the air. CBRN Filtration Systems produced by ARESFSS are used on military, civilian vehicles, safety facilities, command shelters at ships and planes and armoured vehicles of the armies of total 29 countries.



AFSS

FULL-SCOPE CBRN DETECTION, MEASUREMENT, ANALYSIS AND PREVENTION SYSTEM SOLUTIONS



- Detection at High Precision

- Capability to Detect Different Biological, Chemical Agents

- Automatic – Semi-Automatic Operation System

- LCD Display Support



BIOLOGICAL DETECTION SYSTEM

Biological Threat is a particular source of concern as especially most of the Biological agents are easy to be produced, carried and spread. Most of the diseases caused by Biological agents are quite contagious and in the meantime infected people continue to spread the disease and expand its scope further. As time is required for a biological attack to develop, it can be used as a destructive weapon with its spread.

Early warning, detection and identification of biological weapon attacks, are main biological defense components helping to lighten the consequences.

The main step for detection of a biological threat is "Potential hazard" warning. As a consequence of the warning, samples are collected and the hazard is identified. Identification system can be presented as automatic and manual integrated to air measurement device. After the warning of a potential threat, system sends the measured air in liquid form to test kit without exterminating the biological threat within it and biological agent is detected from the kit.

- Bacteria – Virus – Mould – Fungus biological particle detection and warning is ensured.
- It has Automatic and Semi-automatic instant sample collection and storage unit.
- It stands by 365 days and there is no need for intermediate loading.
- There is automatic instant detection system for 8 different biological agents.

Charbon (anthrax), plague, ricin (toxic biological agent), botulinum(paralysis), enterotoxin type B(stomach disease), brucella (animal disease- stomach disease), Tularaemia (rodent disease), orthopox (smallpox disease).

AFSS BioReader system offers automatic or manual options.

- AFSS BioReader-Manual Sampling Mode: Sampling is performed with the help of buffer solution cotton and tube, and the personnel should wear special outfit or take samples behind biological cabin so as not to be exposed to biological agent.
- AFSS BioReader-Auto Sampling Mode: On automatic mode of the device, the device compounds the sample it takes from the air or from the liquid by straw with buffer solution automatically within the closed tank, drips it on the strip itself, makes the measurement itself and completely decontaminates the strip and the tank itself after the measurement and prepares them for next measurement.

After the sample is collected, strips are loaded to the device and automatic lock mode of the device is activated and it is locked for 60 seconds, it records strip result value to memory with the camera and the results obtained at the strip are logged into the device by using image processing technology and IR-UV lighting features. ID number of the person using the device and real-time GPS location of the device are automatically recorded into the device.

Biological Detection System can log all biological and chemical and radioactive test measurement strips and papers and visual detectors, record measurement values in the sector.

OPTIONS

• NE-Z-29337	AYDES Integration
• NE-Z-42835	HAVELSAN Bridge Integration
• NE-Z-47756	GPS Coordinate System
• NE-Z-74844	Automatic Liquid Sampling and Cleaning System
• NE-Z-42822	Automatic Air Sampling and Cleaning System
• NE-Z-43747	User Authorization and Identification System (ID System)
• NE-Z-22827	System of Operation Up to 1 Hour with Changeable Battery

MATERIAL ORDER CODES

• NE-Z-1167	Manual Measurement System
• NE-Z-1276	Automatic Liquid Module
• NE-Z-1246	Automatic Air Module

ADDITIONAL ACCESSORY MATERIAL ORDER CODES

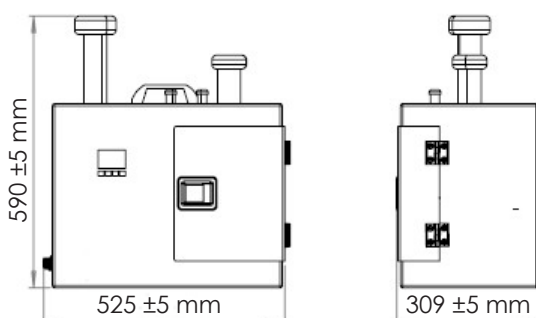
• NE-Z-2346	Electrical Air Sampling Kit
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CONSUMABLES MATERIAL ORDER CODES

• NE-Z-31755	Manual Liquid and Solid Sampling Kit
• NE-Z-31445	Manual Air Sampling Kit
• NE-Z-3271	Buffer Solution
• NE-Z-3228	Biological Waste Bag

MEASUREMENT KITS

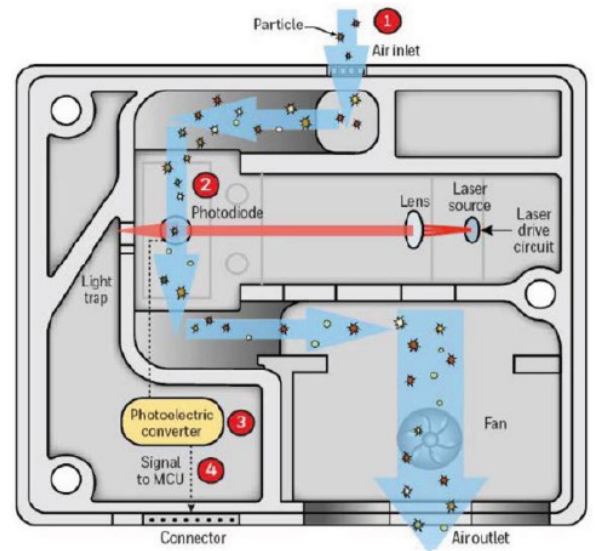
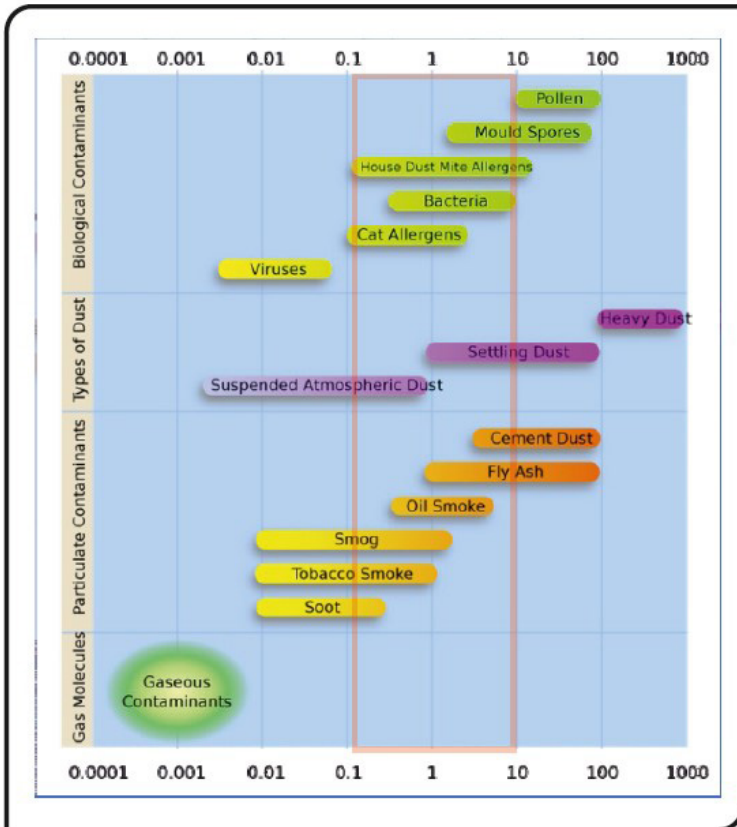
• NE-Z-4528	5 pack Biological Diagnosis Kit
• NE-Z-4828	8 pack Biological Diagnosis Kit
• NE-Z-41028	Buffer Solution
• NE-Z-3228	10 pack Biological Diagnosis Kit





AIR MEASURING DEVICE

AFSS Biological Detection System measures particles with a diameter between 0,3 and 10 m by using laser-based particle sensor. An LCD display, ensures settled visualization of PM1, PM2.5, PM4 and PM10 values. Detailed analysis of PM readings enables real-time particle size visualization. It measures the light radiated by separate particles carried within a sample air-flow by a laser beam. These measurements are used to determine particle size and concentration of the number of particles. Particle mass loads PM1 PM2.5 PM4 or PM10, are calculated from particle size spectrums and concentration data by assuming a particle concentration and refraction index (RI).



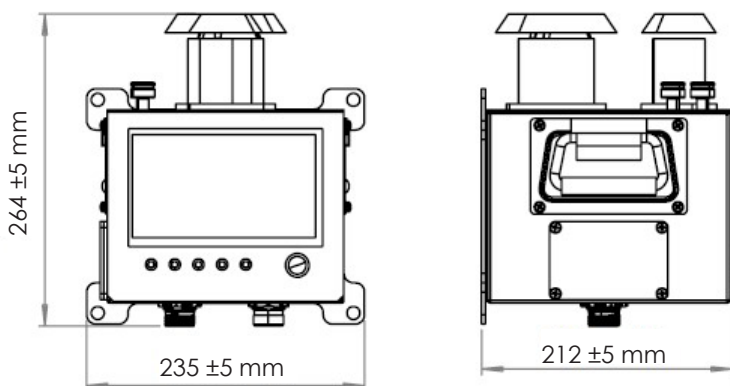
Sensor



Snail Fan

This diagram shows types of atmospheric particulate matter and size distribution in micrometer (SNAIL FAN µm).

SPECIFICATIONS	CONDITION	VALUE	UNIT
Mass Concentration Range	-	0 - 1000	$\mu\text{g}/\text{m}^3$
Mass Concentration Size Range	PM1.0	0.3 - 10	μm
	PM2.5	0.3 - 2.5	μm
	PM4	0.3 - 4	μm
	PM10	0.3 - 10	μm
Mass Concentration Sensitivity PM1 and PM2.5	0 - 100 $\mu\text{g}/\text{m}^3$	± 10	$\mu\text{g}/\text{m}^3$
	100 - 1000 $\mu\text{g}/\text{m}^3$	± 10	%
Mass Concentration Sensitivity PM4 and PM10	0 - 100 $\mu\text{g}/\text{m}^3$	± 25	$\mu\text{g}/\text{m}^3$
	0 - 1000	$\mu\text{g}/\text{m}^3 \pm 25$	%
Annual Sensitivity Loss	0 - 100 $\mu\text{g}/\text{m}^3$	$\pm 1,25$	$\mu\text{g}/\text{m}^3 / \text{year}$
	100 - 1000 $\mu\text{g}/\text{m}^3$	$\pm 1,25$	% / year
Sampling Duration	-	1 ± 0.04	second
Operating Voltage		24	VDC
Current Value Max.		2	A
Operating Temperature		-32, +49	$^{\circ}\text{C}$
Operating Humidity Range		0-96 %RH	%RH
Dimensions	widthxlengthxheight	212x235x264	mm
Weight		5	kg





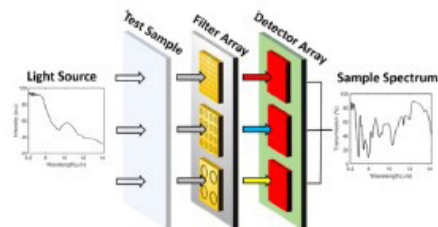
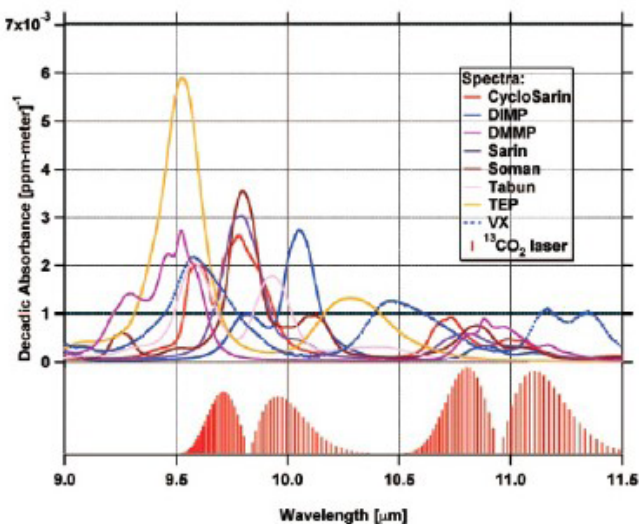
CHEMICAL DETECTION DEVICE

Optical spectroscopy, is a very powerful technic for toxic gas analysis. It enables measurements of light absorption, emission, scattering and rotation, significant structural data and chemical definition of these. Each element of an optical filter series transmits the filtered light to the matching element of a photodetector series. It uses a Fourier transform infrared microscope (FTIR) to record the optical power transmitted from each filter.

This data is transferred to an RLS algorithm estimating incident spectrum with transfer spectrums of this filter and reconfigures transfer spectrum and infrared light source spectrum of our FTIR. An algorithm is used for matching the spectrums recorded in the library, including common chemical war agents and toxic industrial chemicals. TICs (Toxic Industrial Chemicals) detector is designed to give alarm in cases of detection automatic control of NH₃, AsH₃, CS₂, HCN, HNO₃, HCN₂, PCI₃ and SO₂ amongst Toxic Industrial Substances and in case threshold values of hazardous substance concentrations are exceeded. CWA (Chemical War Agents) detector is designed to automatically control nerve gases (GA, GB, GD, GF, VX) and blister gases (HD ve L) amongst Chemical War Substances and warn the user in case threshold values of chemical agent concentrations are exceeded

Chemical Detector also gives warning for VOC**, VVOC*, LEL, Oxygen, sulphuredioxide and phosphate Gases.

Explanation	Boiling Point Range	Specific Sample Agents
Very volatile organic compounds (VVOC*)	<0 and 50-100	Propane, Butane, Chloromethane etc.
Volatile organic compounds (VOC*)	50 - 100 and 240-260	Formaldehyde, Limonene, Toleun,

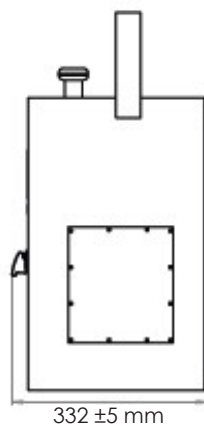
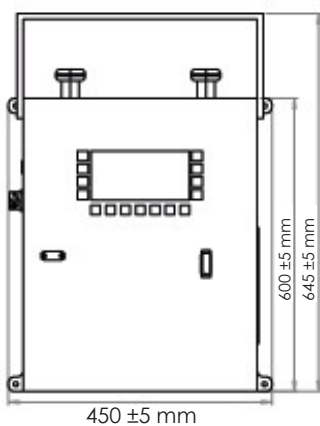


OPTION 1

Abbreviation	Gas Group
AC	Blood Agent Gases (Hydrogen Cyanide, Cyanogen Chloride)
H	Blister Gases (Mustard, Lewisite)
CG	Choking Gases (Phosgene, Chloropicrin)
G	Nerve Gases (Sarin, Soman, Tabun, VX)

Alarm Level	Nerve Gases				Blister Gases	
	GA (mg/m ³)	GB (mg/m ³)	GD (mg/m ³)	VX (mg/m ³)	HD (mg/m ³)	L (mg/m ³)
1st Level	0,3	1	0,8	0,015	1	1
2nd Level	1	2,0	1,5	0,030	3	3
3rd Level	2	2,4	2,2	0,050	8	8
4th Level	4	2,6	3	0,070	10	10
5th Level	6	2,8	3,8	0,090	18	18
6th Level	8	3	5	0,100	35	35
7th Level	10	3,2	5,5	0,110	45	45

Specification	Value	Unit
Weight	12	kg
Dimensions (WidthxLengthxHeight)	332x450x645	mm
Operating Temperature	+15 - +65	°C
Power Requirement	24	VDC
	2	A
Communication	CAN J1939	RS485



OPTION 2

#	Chemical	CAS #	Group	Phase*	PEL**** (OSHA)	REL*** (NIOSH)	IDHL*****
1	GA TABUN	77-81-6	1	Liquid	**	**	**
2	GB SARIN	107-44-8	1	Liquid	**	**	**
3	GD SOMAN	96-64-0	1	Liquid	**	**	**
4	GF CYCLOSARINE	329-99-7	1	Liquid	**	**	**
5	VX	50782-69-9	1	Liquid	**	**	**
6	CARBONYL SULFIDE	463-58-1	1	Gas	**	TLV-TWA 5 ppm	**
7	METHYL MERCAPTAN	74-93-1	1	Gas	C 10 ppm	0.5 ppm (1 mg/m ³)	150 ppm
8	HD HARDAL GAS	505-60-2	2	Liquid	**	**	**
9	L LEVIZIT	541-25-3	2	Liquid	**	**	**
10	HL HARDAL LEVEZIT MIX	UN:2810	2	Liquid	**	**	**
11	BROMINE	7726-95-6	2	Liquid	TWA 0.1 ppm	TWA- 0.1ppm STEL-0.3ppm	3 ppm
12	ACRYLONITRILE	107-13-1	2	Liquid	TWA 2 ppm C 10 ppm	Ca TWA 1 ppm C 10 ppm	85 ppm
13	ACETONE CYANOHYDRIN	75-86-5	2	Liquid	**	C 1 ppm	**
14	ETHYLENEIMINE	151-56-4	2	Liquid	**	**	100 ppm
15	CHLOROPICRIN PS	76-06-2	2	Liquid	TWA 0.1 ppm	TWA 0.1 ppm	2 ppm
16	AC HIDROJEN CYANIDE	74-90-8	3	Gas	**	**	**
17	SA ARSIN	7784-42-1	3	Gas	**	**	**
18	CK CYANOGEN CHLORIDE	506-77-4	3	Gas	**	**	**
19	CHLORINE	7782-50-5	3	Gas	TWA- 0.1 ppm	C- 0.5ppm	10 ppm
20	ETHYLENE OXIDE	75-21-8	3	Gas	TWA 1 ppm	TWA <0.1 ppm	800 ppm
21	FORMALDEHYDE	50-00-0	3	Gas	TWA 0.75 ppm	TWA 0.016 ppm	20 ppm
22	HYDROGEN CHLORIDE	7647-01-0	3	Gas	C 5 ppm	C 5 ppm	50 ppm
23	HYDROGEN FLUORIDE	7664-39-3	3	Gas	TWA 3 ppm	TWA 3 ppm	30 ppm
24	AMMONIA	7664-41-7	3	Gas	50 ppm	TWA 25 ppm	300 ppm
25	AC HYDROGEN CYANIDE	74-90-8	3	Gas	TWA 10 ppm	ST 4.7 ppm	50 ppm
26	HYDROGEN SULFIDE	10294-34-5	3	Gas	C 20 ppm; 50 ppm	C 10 ppm	100 ppm
27	NITRIC ACID	7697-37-2	3	Liquid	TWA 2 ppm	TWA 2 ppm, ST 4 ppm	25 ppm
28	CARBON DISULFIDE	75-15-0	3	Liquid	TWA 20 ppm C 30 ppm	TWA 1 ppm	500 ppm
29	SULPHUR DIOXIDE	7446-09-5	3	Gas	TWA 5 ppm	TWA 2 ppm, ST 5 ppm	100 ppm
30	ALLYLAMINE	107-11-9	3	Liquid	**	**	**
31	METHYL ISOCYANATE	624-83-9	3	Liquid	TWA 0.02 ppm	TWA 0.02 ppm	3 ppm
32	N-BUTYL ISOCYANATE	111-36-4	3	Liquid	**	**	**
33	NITROGEN OXIDE	10102-44-0	3	Gas	C 5 ppm	STEL 1 ppm	20 ppm
34	PHOSPHINE	7803-51-2	3	Gas	TWA 0.3 PPM	TWA 0.3 PPM - ST 1 PPM	50 PPM
35	CG FOSGEN-PHOSGENE	75-44-5	4	Gas	TWA 0.1 ppm	TWA 0.1 ppm	2 ppm
36	CX FOSGEN OKSIM	1794-86-1	5	Liquid	**	**	**
37	CHLOROSULFONIC ACID	7790-94-5	5	Liquid	**	**	**
38	DIMETHYLSUFATE	77-78-1	5	Liquid	TWA 1 ppm	TWA 0.1 ppm	7 ppm
39	METHANESULFONY CHLORIDE	124-63-0	5	Liquid	**	**	**
40	DIPHENYLMETHANE4*DIISOCYANATE	101-68-8	5	Liquid	P 0.02 ppm	TWA 0.005 ppm- C 0.020 ppm	75 mg/m ³
41	ISOPROPYL ISOCYANATE	1795-48-8	5	Liquid	**	**	**
42	TERT-BUTYL ISOCYANATE	1609-86-5	5	Liquid	**	**	**
43	TETRAETHYL PYROPHOSPHATE	107-49-3	5	Liquid	TWA 0.05 mg/m ³	TWA 0.05 mg/m ³	5 mg/m ³
44	TDI TOLUENE DIISOCYANATE	26471-62-5	5	Liquid	**	**	**
45	HN-1 NITROGEN IPERITBIS	538-07-8	6	Liquid	**	**	**
46	ED ETHYLDICLOARSIN	598-14-1	6	Liquid	**	**	**
47	1.2 DIMETHYLHYDRAZINE	540-73-8	6	Liquid	**	**	**
48	TERT-OCTYK MERCAPTAN	111-88-6	6	Liquid	**	**	**
49	ETHYL PHOSOHONOTHIONIC DICHLORIDE	993-43-1	6	Liquid	**	**	**
50	DP DIFOSGEN	503-38-8	7	Liquid	**	**	**
51	HN-2 NITROGEN IPERIT	51-75-2	7	Liquid	**	**	**
52	HN-3 NITROGEN IPERITTRIS	555-77-1	7	Liquid	**	**	**
53	PD PHENYLDICHLOROARCIN	696-28-6	7	Liquid	**	**	**
54	MD METHYLDICLOARSIN	593-89-5	7	Liquid	**	**	**
55	SULPHURIC ACID	7664-93-9	7	Liquid	TWA 1 mg/m ³	TWA 1 mg/m ³	15 mg/m ³
56	PHOSPHORUS TRICHLORIDE	7719-12-02	7	Liquid	TWA 0.5 ppm	TWA 0.2 ppm	25 ppm
57	PHOSPHORUS PENTALLURIDE	7647-19-0	7	Gas	**	**	**
58	SULFURLY CHLORIDE	7791-25-5	7	Liquid	**	**	**
59	ALLYL ISOTHIOCYANATE	57-06-7	7	Liquid	**	**	**
60	ARSENIC TRICHLORIDE	7784-34-1	7	Liquid	TWA 0.010 mg/m ³	0.002 mg/m ³	5 mg/m ³
61	CYANOGEN	460-19-5	7	Gas	**	TWA 10 ppm	**
62	ETHYL PHOSPHONOUS DICHLORIDE	1498-40-4	7	Liquid	**	**	**
63	PARATHION	56-38-2	7	Liquid	TWA 0.1 mg/m ³	TWA 0.2 mg/m ³	10 mg/m ³
64	PERCHLOROMETHYL MERCAPTAN	594-42-3	7	Liquid	TWA 0.1 ppm	TWA 0.1 ppm	10 ppm
65	SULFURLY FLOURIDE	2699-79-8	7	Gas	TWA 5 ppm	TWA 5 ppm - ST 10 ppm	200 ppm
66	METHLY HYDRAZINE	60-34-4	7	Liquid	C 0.2 ppm	C 0.04 ppm	20 ppm

* Phase state of the chemical at room temp.
** Data not given / Not in List / Value of Zero
*** NIOSH-REL recommended limit
**** OSHA-PEL allowable limit
***** IDHL Instant allowed limit



RADIATION MEASURING DEVICE

AFSS detection system CBRN threats detections use both detection technology together in accordance with the conditions included in NATO AEP-54 standard. System is developed on radiation detection sensitivity on detectable radioactive particles. The system is developed on radiation detection sensitivity with regard to detectable radioactive particles. AFSS Radiation Probe is a gamma dose rate detector with IP66 protection which can be mounted to upper structure. This detector provides data output on communication and can be directly integrated to IT system of any vessel.

Radiation Probe can be used at various applications including marine/air/land and critical infrastructure systems. There are , 0-100 R/h low level and 100 mR/h-1000 R/h high level detections at radiation detection system.

• Steel Body	• Dimensions: 150x150x85 mm
• IP67 protection level	• Digital interface for connection: RS485-CANBUS
• The energy gap to be detected is at; 60keV - 3MeV range	

ANALOG RADIATION MEASUREMENT UNIT

Analog Radiation Measurement Unit, is a radiation monitoring system which provides continuous and real-time radiation data about military vessels/vehicles. It provides detection and measurement. It shows digital measuring results of the data received from the sensors on vessel/vehicle.

Analog radiation measurement unit consists of below components: Analog Radiation Control Panel; enables central indication and alarm for all remote radiation detectors.

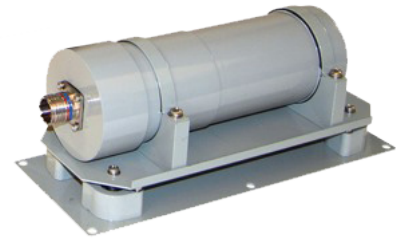
A separate display module for each detector, shows gamma dose rate at detector location. This unit is also used in cases of training.

Remote radiological detectors continuously transmit data about radiation existence and level to control panel.

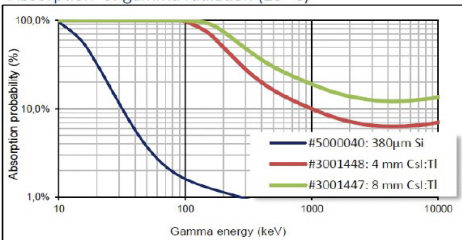
Analog Radiation Measurement Unit can use 10 detectors but different variations are also present in line with the requirements.

Control Panel Specifications

- It continuously monitors dose rate and alarm status for each detector in use.
- It shows separate dose persistence times for each channel
- Predetermination of level for alarm
- Visual and voice warning at adjusted alarm level
- Lightening on panel
- Vibration resistant assembly wedges

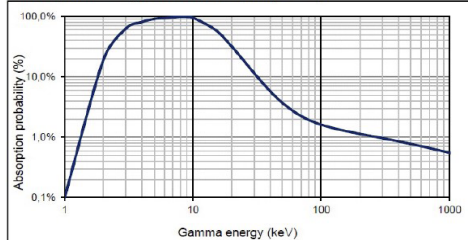


Absorption of gamma radiation (23 °C)



100mm2 aktif alana sahip kare PIN fotodiyot. CsI:TI sintilatörlü seramik taşıyıcı tipi 2 pimli(8 mm ; 4 mm)

Absorption of gamma radiation (23 °C)



100mm2 aktif alana sahip kare PIN fotodiyot. Işık bloke edici siyah epoksi kapsüllü seramik taşıyıcı tipi 2 pimli.