PACKAGE MONITORING SYSTEM
(For Radioactive contamination)
TYPE: PMS 1009

Technical Data

PACKAGE MONITORING SYSTEM Type: PMS 1009 manufactured by NUCLEONIX has been primarily designed to detect Low level of Radioactive contamination (RaC) in baggages/packages.

This system could be used to detect radioactive contamination present in a package comprising of steel / alloy finished goods, automotive component / part / other precision machained parts, Engineering components etc., meant for exports.

Inspection of outgoing packed boxes, for radioactive contamination, could be carriedout, at the final QA floor shop/dept.

Package Monitoring System. Type: PMS 1009 is offered as a following configurations for steel industry.

(a) Twin gamma detector pillar arrangement (1.5 mtr Ht)

The gamma detection system essentially comprises of a single large volume of plastic scintillation detector housed inside each detector pillar. A large PVT detectors having a active volume of 10000cc are housed inside each detector pillar.

Each gamma detector is provided with necessary lead shielding to minimize the background and to enhance the MDA of the system.

The gamma assembly is housed inside a low Z material based detector pillar.

Two such detector pillars are placed along either side of the passage where the package is going to pass. This installed monitor automatically detects the presence of radioactive material in the package if it exceeds preset levels. The monitoring system does this by measuring the radiation level taken while package occupies detection area and comparing this level to the background radiation level that is measured and updated while detection area is unoccupied.

The background radiation levels are continuously measured and automatic adjustment of alarm thersholds enables a constant statistical false alarm rate to be maintained during the system use. Occupancy sensors are used to detect the presence or absence of packages as it passes through the monitor to know when to monitor the background and when to monitor the package.

The sensitivity of detectors is dependent upon the closeness of the detector and source as well as the slowness with which they pass each other. For packages two detector pillars are recommended and maximum distance between pillars is 2m. Additionally barriers not obstructing the view of the monitor are to be installed to protect monitor from being damaged by forklifts.

The performance and effectiveness of the installed instrument is strongly dependent on its ability to measure radiation intensity over the search area of interest. As such based on this requirement detector volumes, geometry and dimensions have been adopted.

Alarm indications and displays are available locally and are clearly visible to the officers manning the inspection point and are also available remotely at the central monitoring PC.

This system could be installed at various entry/exit points of the installation and can be under the supervision of security officer.

SPECIFICATIONS

(A) GAMMA DETECTION SECTION

Detectors Type: High sensitivity PVT detectors coupled to PMT detector

No. of detectors per pillar: 1 no.

Volume of each detector : 10000cc

Dimensions of each detector: 1000 x 250 x 40mm

Energy range: 30 KeV to 5 MeV

Sensitivity of each detector: 250 CPS/μR/h (Approx)

Shielding : Suitable thickness lead shielding is provided on all sides of detector except the measuring face to suppress background radiation and to enhance MDA.

High voltage and front-end electronics: High voltage and front-end electronics are all housed together in each of the detector pillar.

(B) RADIATION DETECTION PILLAR :

(i) Each radiation detection pillar comprises of a single 10000cc large volume plastic scintillation detector along with lead shielding of suitable thickness form part of the gamma detection system (As described in section A)

ii. No. of detector pillars per system: 2

iii. Distance separation between detector pillars: 2m

iv. Height of detector pillar: 1.5m

(C) MEASUREMENT & ALARM UNIT:

This unit essentially comprises of advanced electronic circuits with embedded code built-in to receive data from the gamma detector assembly and correct for background levels and generate audio/visual alarms in the event counts due to package monitoring exceed the preset levels set.

Alarm data is automatically transferred at the end of monitoring to the central PC for further investigation by the duty personnel.

Background Updation: Automatic background measurement by sensing the detection area is unoccupied by using occupancy sensors.

Alarm Setting Adjustment: Automatically adjusted based on the current background level.

No. of monitoring channels: 2

Display: 20 x 4 LCD display

User Interface: Front panel keypad (password protected) or through PC

Measurement Unit: CPS or CPM

Measurement Range: 0 to 99999 CPS or 0 to 999999 CPM.

Alarm Range: 0 to 99999 CPS or 0 to 999999 CPM.

Occupancy Sensing: Using IR/proximity sensors to detect vehicle presence.

Detection Area & Performance criteria:

Vertical : 0 - 1.5m

Horizontal : 0 - 2m (Parallel to the direction of movement)

Audio/ Visual Alarms: Hooter and sounder have been provided for the purpose of generation of audio/visual alarms.

Package Identification (optional): Images /Photographs of all the packages scanned for radioactivity are captured automatically by a camera and stored along with the corresponding readings.

(D) COMPUTER SOFTWARE & PC CONFIGURATION:

The data acquisition and control application software running on the host PC with a WINDOWS XP OS will communicate with the processing electronics through RS232/Ethernet port. This software facilitates remote configuration of paramters, live acquisition of data and analysis of profile for localization of any contamination.

The software is extremely flexible allowing the user to easily configure the system general operations like adjustment of detector parameters and accessing of database of all the individual vehicle scans. The software is so designed that it does not require the duty personnel to understand physics to operate the equipment.

PC Configuration:

Standard PIV configuration with WINDOWS XP/2000 operating system (PC not within scope of supply)

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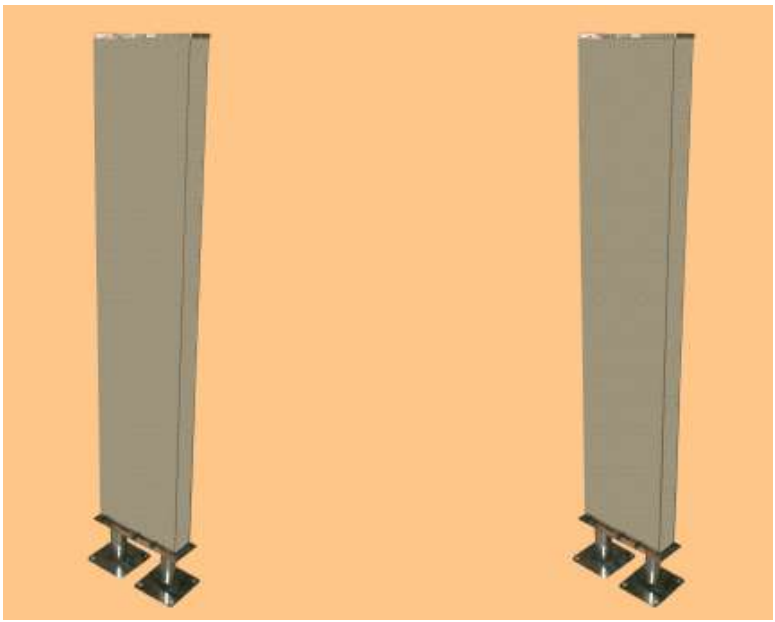

Large volume plastic scintillator based detector pillars
(Size : 1.57mtr.height, 300 mm width, 70mm length)