



Trusted
radiation
protection.

875

High Range Containment Monitor

The 875 High Range Containment Monitor consists of a detector, readout, and cable (in metallic tubing) connected through a sealed penetration in the containment wall. The detector walls are thick enough to withstand loss of coolant accident (LOCA) pressures, but thin enough to provide full response to ^{133}Xe (80 keV). The system measures a seven decade range from 10^0 to 10^7 R/h. Conditions in containment that could produce 10^8 Rad/h (surface dose) (NRC Regulatory Guide 1.97, paragraph C3a) of mixed radiation are characterized by an effective measurement of less than an exposure rate of 10^7 R/h (photons above 60 keV). The system operates with a detector/readout spacing up to 500 feet and greater distances are possible. Normally, redundant detector/readout combinations are utilized. To assure the integrity of the detector/cable/readout system, an electronic check

source automatically initiates every 17 minutes. A successful check keeps the green front panel Fail indicator illuminated. An unsuccessful check initiates a relay closure (failsafe), and turns the green Fail indicator off. The channel TEST button on the readout injects a signal to test operation of the alarm lights and relays. If a battery is connected to the readout, the system automatically switches to this supply in the event of failure of the AC input.

Detector (877)

The 877 detector is a hermetically-sealed stacked parallel plate, three-terminal-guarded ionization chamber operated in the saturated mode. For in-containment use, all external surfaces are 316 stainless steel. A stacked plate construction eliminates the need to pressurize the ion chamber, and the associated loss of sensitivity if the pressurization is lost. A stainless steel mounting



Key features

- Unattenuated, in-containment detector location. Responds fully to ^{133}Xe (80 keV) and other fission products with photon energies as low as 60 keV
- Monitor designed and tested to meet NRC Reg. Guide 1.89 (class 1E qualifications) and NRC Reg. Guides 1.29/1.100 (seismic qualification)
- Permits continuing in-containment post-LOCA radiation assessment
- Detector and cable designed and tested to meet IEEE 323 (1974) for operation in containment. Readout meets IEEE 323 (1974)



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bracket is provided. Electrical connections are brought out through two hermetically-sealed welded connectors. An 878-1-9 Radiation Resistant Cable (in stainless steel tubing) is used between detector and containment penetration.

Readout (876A)

The readout presents a seven-decade logarithmic range on a mirrored four-inch panel meter. Each readout contains its own independent power supply, dual independent radiation alarms—each of which can be set anywhere across the scale—and a failure alarm held off by the electronic check source. The alarm circuits actuate Form C five-amp failsafe relay contacts. A popular mode of operation is to set the low-radiation alarm set point at minimum scale to initiate the operation of an optional external recorder when the radiation level in the containment exceeds 1 R/h. The radiation alarms are available in either the manual or automatic reset mode. The display can be expanded by a selection switch to show any three consecutive decades across the full scale. Up to two readouts may be mounted in the 876-1-55 chassis, which fits a standard 19-inch opening.

Technical specifications

Detector (877)

Radiation detected
Photons above 60 keV

Range
1 R/h to 10⁷ R/h. Corresponds to over 10⁸ R/h of surface tissue dose from mixed radiation.

Typical energy dependence
± 20% from 80 keV through 2 MeV

Sensitivity
Nominal 7 x 10⁻¹¹ A/R/h

Calibration
60Co at one calibration point in each of the first five decades.

Design criteria
Fulfills NRC Reg. Guide 1.97; meets NRC Reg. Guide 1.89/1.100 and IEEE 323 (1974). Test report available.

Construction
Hermetically sealed, stainless steel outer surfaces. Contains no active electronics. Ion chamber filled with 1 atmosphere of air.

Dimensions (including mounting bracket) (w x d x h)
9 in x 10 in x 12.5 in (22.86 cm x 25.4 cm x 31.75 cm)

Weight
18 lb (8 kg)

Shipping weight
35 lb (16 kg)

Total integrated dose
2 x 10⁸ rads + 10% margin

Readout (876A)

Meter
Seven decade, mirrored logarithmic scale, panel mounted. 4 in (10 cm) span, 90° arc.

Range
Function switch allows choice of all or any three consecutive decades of operational range to be displayed.

Design criteria
Fulfills NRC Reg. Guide 1.89/1.100 and IEEE 323 (1974). Test report available.

Connectors
All back-panel mounted. Signal input from detector, type BNC. High-voltage output to detector, type BNC. Alarm output, 26 pin military style (MS) type. Recorder output, computer output, battery input, 10-pin MS type. AC power input, 3-pin MS type.

Alarm functions
Two separate radiation alarms plus a failure alarm, each with an associated front-panel light and Form C, 5 amp AC normally energized relay output. Radiation alarms offer choice of manual or auto reset. Each radiation alarm is set from behind the front panel, at any point on the range. Depressing radiation alarm indicator light causes meter to indicate setpoint.

Test functions

Electronic check source (ECS) test may be manually initiated by pushing the ECS button and is automatically initiated every 17 minutes by ECS circuitry. Checks electrode integrity and electrical operation of the detector, cable, voltage, and detector output measurement function. Each successful check illuminates the green Fail light until next check. Unsuccessful test extinguishes the green Fail light and initiates failure relay state change. Channel TEST pushbutton allows user to inject a signal greater than full scale into the meter/alarm circuit. Tests alarm actuation, relays, panel lights, and meter circuit.

Recorder output

0 to 1 V dc

Computer output

0 to 5 V dc

Power requirements

120 V ac, 60 Hz, 0.2 A.
240 V ac, 50 Hz is available on special order. 22 V to 32 V dc auxiliary power, 0.6 A max can be optionally connected to the unit and will be utilized when AC power is not present.

Dimensions (w x d x h)

8.5 in x 15.5 in x 5.25 in
(21.6 cm x 39.4 cm x 13.4 cm)

Weight

20 lb (9 kg)

Shipping weight

35 lb (16 kg)

Ordering information**Model**

875: High Range Containment Monitor



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