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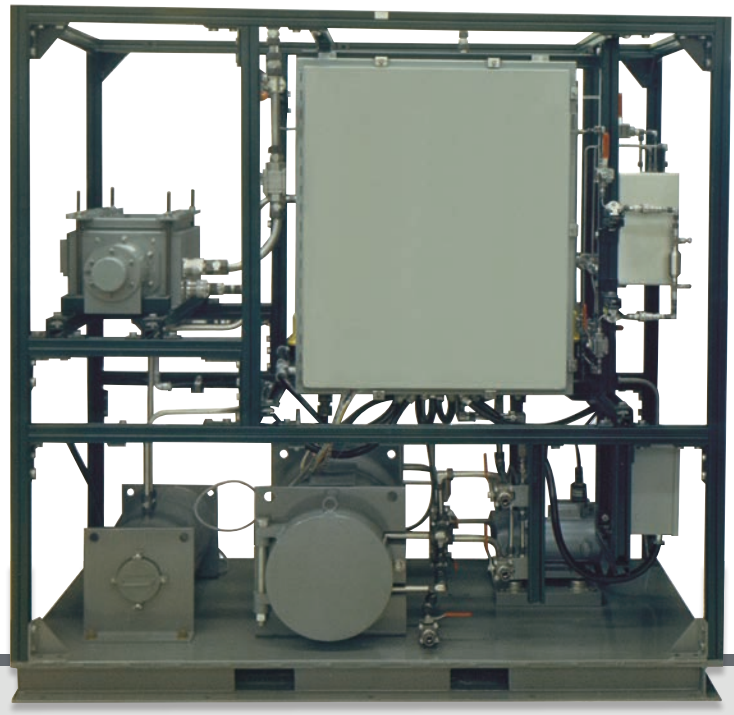
Technical Data

940-1

Off-Line Airborne Effluent Monitor

The 940-1 Off-Line Airborne Effluent Monitor assures radioactive materials within airborne effluents do not exceed maximum permissible concentrations (MPC) by alarming when safe levels are exceeded, protecting personnel from possible exposure to excessive radiation.

The Code of Federal Regulations requires any effluent that could possibly contain radioactivity be monitored, and the 940-2 Off-Line Liquid Effluent Monitor meets the guidelines set forth in the United States Nuclear Regulatory Commission (USNRC) radiation protection standards. Off-line gas monitors are frequently used in conjunction with particulate monitors. This is particularly the case with a stack or duct where effluent is released into the environment. Used in this manner, the particulate monitor serves as a pre-filter for the gaseous monitor and also as a monitor for airborne radioactive particulates. Where an off-line gas monitor is used independently, without the aid of a particulate monitor, a separate filter assembly is installed to prevent contaminated particulate buildup inside the sensitive volume. The off-line effluent monitor incorporates its own pumping system to ensure a positive displacement of the effluents being monitored. Off-line effluent monitoring is normally utilized where optimum geometry is desired to gain maximum sensitivity. Scintillation detectors are used because of their sensitivity and reliability.



Key features

- Universal Digital Ratemeter with dynamic range up to 10^7 CPM
- Scintillation type detectors
- Optimized sampling geometry for maximum sensitivity
- Rugged open frame skid construction for ease of maintenance
- Positive displacement type pumping system
- Automatic pressure compensation for gas density
- Class 1E qualification available
- Off-line airborne effluent monitoring skid
- Measures and reports airborne radioactive releases from stacks and ducts
- Quantifies airborne particulate, radioiodine and gaseous effluents
- Compatible with the 943 Series Detectors and the 942A Series Digital Ratemeters or the 960 Series Electronics

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The sample is drawn from the process stack/duct via isokinetic nozzles (when required), through customer's sample line to the inlet of the sampling skid. The sample passes through the particulate and iodine filters, then through the gas sample volume to the pumping system and back to the process stack/duct. The sample flow is controlled by a manual set point, or ratioed to stack/duct flow for isokinetic requirements.

The detector output signal is transmitted to the Universal Digital Ratemeter. The particulate ratemeter displays gross particulate counts, the iodine ratemeter displays iodine counts as determined by the preset window of the single channel analyzer, and the gas ratemeter displays gross noble gas counts, compensated for changes in pressure at the volume chamber. These ratemeters also provide output alarm contacts for Alert, High Radiation, Channel Fail, and when required Rate Of Rise for fixed filter application. A Low Flow alarm is also available for the sample stream. Check source actuation is manual from the ratemeter, with alarms muted when in the check source mode.

Technical specifications

Power requirements
120 V ac, 50/60 Hz, 1 phase

Sample flow rate
1 to 4 SCFM

Sample temperature limit
50 °F to 122 °F (10 °C to 50 °C)

Sample inlet
1 inch OD stainless steel tubing, compression fitting

Sample outlet
0.75 inch OD stainless steel tubing, compression fitting

Maximum internal pressure
10 psig

Dynamic count range
10 to 10^7 CPM

Gas sample volume
3000 cc

Skid weight
3000 lb (1360.8 kg)

Particulate filter paper
Hollingsworth & Voss #LB-5211-A-0 with a collection efficiency of 97 % for particles 0.3 micron and larger

Iodine filter
Charcoal cartridge

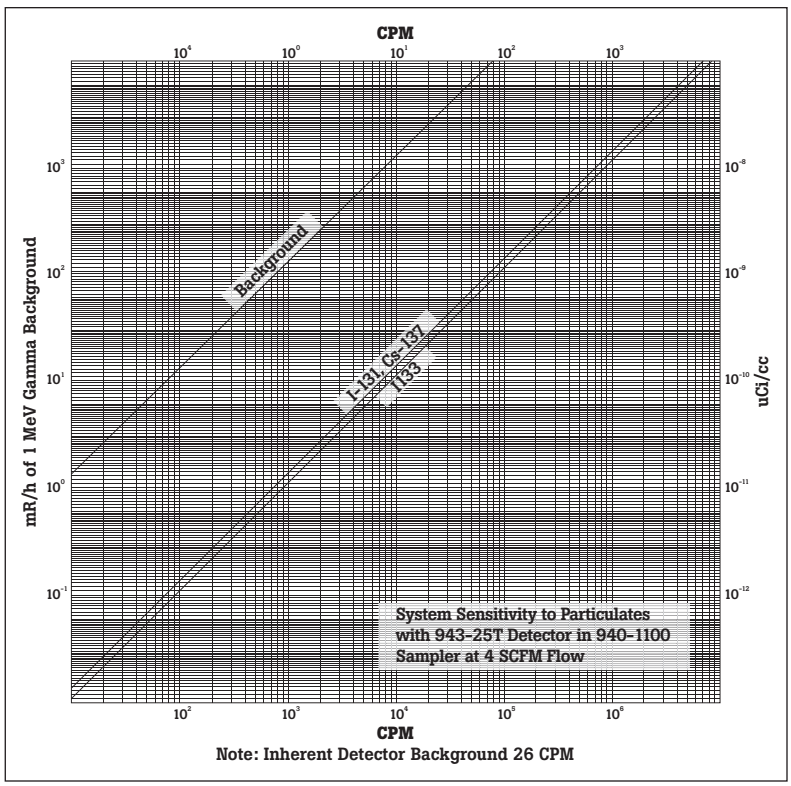
Compatible detectors
943-25T Beta and 943-36 Gamma Scintillation Detectors

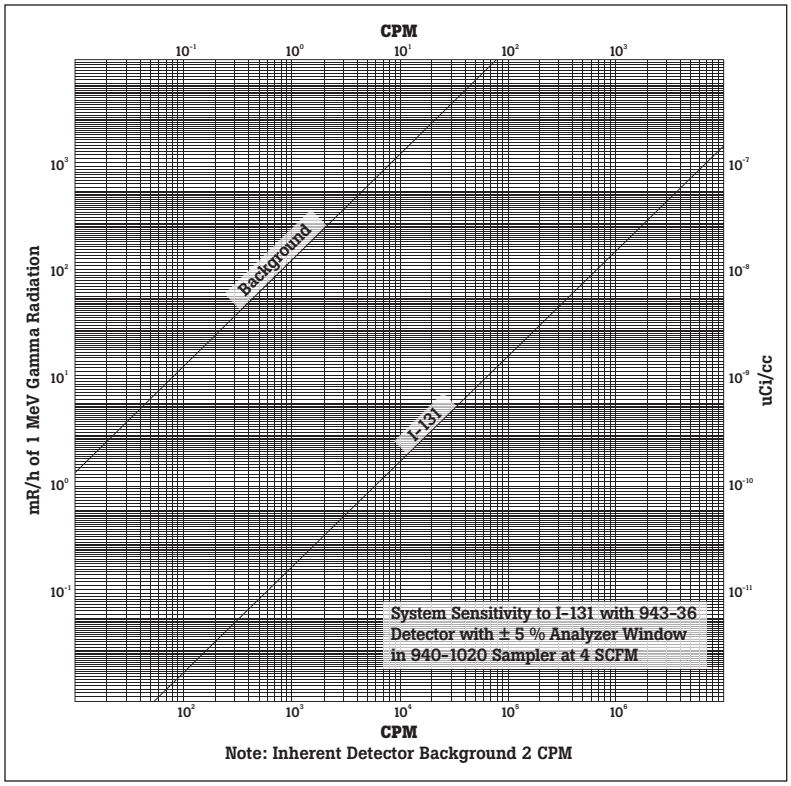
Note: Optional grab sampling capability available for particulate, iodine, noble gas and tritium.

The off-line airborne effluent monitor consists of the following components:

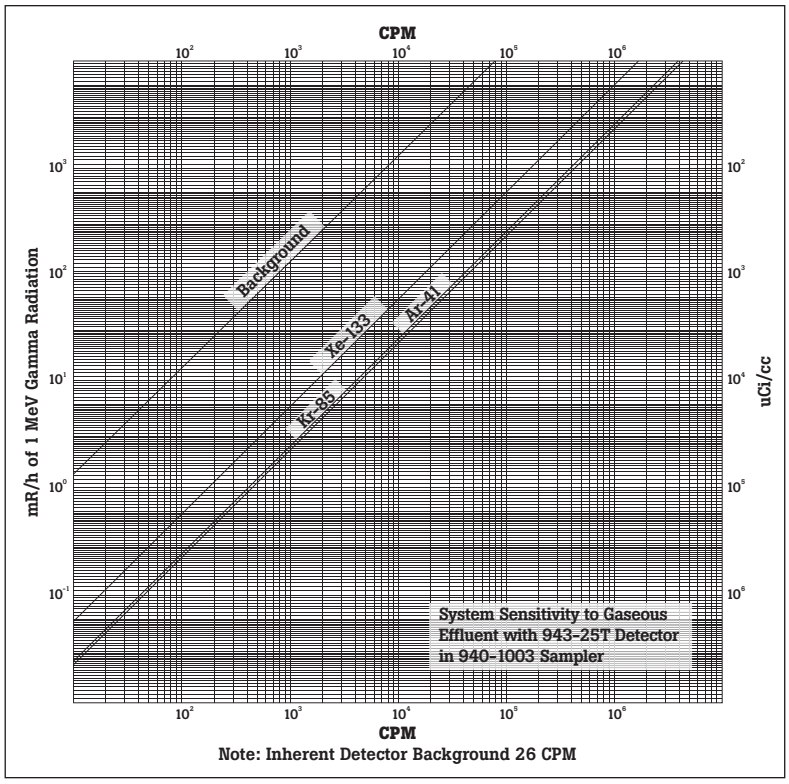
Open-frame sampling skid, with the following components mounted, plumbed and wired:

- Gas sampler, fixed volume, with 4 pi lead shielding, 841-334
- Particulate/Iodine samplers, as required, with 4 pi lead shielding
- Scintillation type detectors, as required
- Pressure transmitter upstream of gas sampler for automatic compensation of count rate for gas density
- Mass flow controller for isokinetic sample flowrate control
- Positive displacement pumping system
- Valving and plumbing, as required
- Isokinetic gas nozzle assembly for the stack/duct (when required)
- Universal Digital Ratemeters, local or remote mounting





Note: Inherent Detector Background 2 CPM



Note: Inherent Detector Background 26 CPM

Ordering information

Model

940-1: Off-Line Airborne Effluent Monitor

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