

IonSens[®]: 208 Large Item Monitor

- Accurate measurement of the exposed surfaces of complex items such as process equipment and bent pipe work for alpha contamination.
- Accurate measurement of the external surfaces of solid items such as bricks and ingots for alpha contamination.
- Short measurement times for complex items.
- Classification of material as Free Release or LLW.
- Well proven, non-intrusive measurement technique.
- Accommodates wide range of item sizes.
- Automatic background and standardization measurements performed to maintain confidence in system performance.
- Measurement service option can be provided by our highly trained personnel.
- Can be adapted for automated feed.

Features

- Classifies metallic waste items with dimensions up to 1.0m x 1.0m x 0.8m.
- Other geometries of measurement chamber available.
- Items can be rotated on a turntable to improve measurement accuracy.
- In-built standardization source is a key component of measurement control.



- Air inlet module and detector head module are the same as those used in other BNFL Instrument's IonSens[™] systems. These modules can be re-calibrated for use with any IonSens[™] system.
- Robust design for industrial environment.
- User friendly Windows based software.
- Near real time analysis and display of contamination levels for complex or solid items.
- Archived measurement data.

Modular design allows for:

- Ease of maintenance.
- Replacement of components.
- Ease of decontamination.
- Transportability.
- Accessibility.
- Future system upgrades.



Applications

IonSens 208 facilitates the efficient and reliable monitoring of complex or solid items, permitting the categorization of the material as either low level waste (LLW) or suitable for Free Release. This will enable the operator to reuse, or dispose of the material in the most efficient and cost effective manner.

The IonSens 208 would normally be used by plant operators or decommissioning teams as part of their quality plan to confirm that material is suitable for Free Release.



Technique

At present, alpha contaminated material is monitored using techniques which are sensitive to alpha particles directly. Due to the short range of alpha particles in air, these detectors need to be close to the potential source of contamination, to achieve consistent results. This is a severely limiting factor when attempting to monitor all exposed surfaces of complex items. IonSens 208 overcomes these limitations by remote detection of the ions produced by alpha particle interactions in the air around the entire item. Thus a single measurement is sensitive to contamination located on all exposed surfaces of an item. This provides an operator with an immediate cost effective solution to the classification of a wide variety of complex and solid items prior to final disposal.

System Configuration

The basic configuration comprises the following main modules:

Air inlet module: Air is drawn into the main measurement module through an air filter. This removes particulates and dust, as well as removing ions from the outside environment.

Measurement module: The standard measurement module consists of a front loading chamber. Other geometries of measurement module are available. All items are placed in these air tight measurement modules.

Detection head module: This module contains the ion detector, HEPA filter, Fan unit, Data processing electronics and Control PC.

System Operation

During initialization IonSens 208 performs a variety of diagnostic routines to confirm the correct operation of the instrument hardware. During a routine measurement, items are loaded into the measurement chamber by the operator who then initiates the measurement sequence from the control PC. The total alpha contamination is measured, compared against the free release classification criteria specified by the operator and both the total alpha activity (Bq) and item classification are displayed. All measurement data are stored on the PC hard disk, and if desired, cross-referenced to a unique serial number which the operator may enter at the beginning of each item measurement.

Standardization

At regular intervals the operator is prompted to perform a background measurement. Both environmental conditions and internal contamination of the instrument may contribute to the background result. If this is above a preset limit IonSens 208 will inhibit any further item measurements. The instrument also prompts the operator to perform a standardization measurement at regular intervals.

These measurements confirm the correct operability of the instrument hardware. An invalid standardization inhibits further item measurements.

Software and Electronics

The software runs under Microsoft Windows™ NT, and is written to provide the operator with a familiar and user friendly interface. The software includes comprehensive error handling functions and diagnostic facilities to aid system maintenance. Password protection is provided to allow controlled access to system manager functions such as system constants.

Operator Interface

All measurement and control functions are controlled by the operator from the PC. The software guides the operator through background, standardization and item measurement routines. IonSens 208 therefore is easy to use by non technical personnel. Item measurements are only allowed to proceed if IonSens 208 has valid background and standardization results, and all diagnostic checks are satisfactory. The instrument display panel shows the system status. During measurements the time remaining and the instantaneous activity are displayed.

BNFL Instruments

Pelham House
Calderbridge
Cumbria CA20 1DB, UK
Tel: +44 (0) 19467 85017
Fax: +44 (0) 19467 85019
Web: www.bnflinstruments.co.uk
Email: bi.sales@bnfl.com

BNFL Instruments Inc

4001 Office Court Drive, No. 800
Santa Fe, NM 87507 USA
Tel: 505 424 6660
Fax: 505 424 1109
Web: www.bnflinstruments.com
Email: dheath@bnflinstruments.com

Performance specification

| | |
|--|--|
| Measurement Time: | 100 sec |
| Measures to better than the UK and USA alpha activity levels for Free Release and IAEA limits for surface alpha contamination i.e. | UK 0.4Bq cm ⁻² USA 100DPM per 100cm ² IAEA 0.04Bq cm ⁻² |

