



TECHNICAL SPECIFICATIONS

bSCAN- a compact and advanced TLC Radio Chromatograph Instrument



INTRODUCTION

The bSCAN is a compact and advanced instrument designed to perform Thin Layer Radio-Chromatography (TLC). Radio-chromatography is an analytical technique that allows the identification and quantization of different compounds in a radioactive mixture. Particularly, Radio TLC is a well established technique in Nuclear Medicine laboratories for fast and accurate measurement for quality control (QC) of the radioactive pharmaceuticals used in nuclear medicine procedures. The technique is also widely used by the labeling laboratories and radiopharmaceutical producers.

The in-vivo behavior of the radiopharmaceuticals is dependent upon their quality, which today demands high standards of “**radio nuclidic**”, “**radiochemical**” and “**chemical purity**” or particle sizing of the suspensions in the labeled compound. Radiopharmaceuticals must comply with both: radiation and pharmaceutical standards to warranty their efficacious use, the imaging quality while minimizing the radiation hazard to the patients.

Using this single instrument, laboratories can test for two parameters of the QA/QC process, namely the **radiochemical** and **radio nuclidic purity**.

The bSCAN comes with an advanced, intuitive and modern software. The software guides the user to perform both analyses in an easy and natural way.

bSCAN instrument is compact in size and contains state-of-the art components, like a fully-digital multichannel-analyzer (MCA) and a well-shielded NaI(Tl) detector, which provides superior energy resolution and therefore better radionuclide identification. The instrument uses USB digital data communication with the PC.

COMPONENTS

The bSCAN instrument is composed by the following components:

- The scanner instrument integrates:
 - A fully programmable displacement unit—scanner
 - A NaI(Tl) scintillator detector, typical 1 x 1 inch crystal size. The detector is placed into a properly shielded scanning head with a detachable set (2) of collimators.
 - A compact and digital multichannel analyzer (MCA)
- The bSCAN software
- A controlling computer or PC (optional)

HARDWARE COMPONENTS

The bSCAN is a fully-programmable and therefore controllable scanner. Its main function is to sweep the detector across the chromatogram strip using a preset speed, as well as to accurately position the detector head at any point above the strip. The scanning motor allows a wide range of speeds. Therefore the scanning speed can be set automatically from the desired scanning time. The routine instrument functions like parking, advance to start-up position and return are done automatically without user intervention. A reset button is provided on the front panel of the instrument allowing manual abort and reset operations at hand and at any time.

The place that holds the strip-holder is engraved 5 mm deep into the base plate of the scanner. The engraving place has 50 mm width and is 220 mm long, accepting therefore any strip-holder within these dimensions. A ruler is conveniently fixed along the scanning path of the instrument for providing quick distance references.

In the side of the front panel a few controls and buttons are provided for fast and simple operations of the instrument. One for the On/Off switch operation. This switch has a built-in LED that shows the power status. Two other buttons are also placed on the front-plate: a button for Manual scan and a reset button.

Using the Manual scan button the scanner can be operated “manually” without the needs of a controlling device or PC. In this case the scanning speed is fixed to approximately 0.5 cm/sec.

Additionally on the front-panel a built-in blue LED signalizes the status of the scanner—busy or idle.

FEATURES

- Performs both: radiochemical and radionuclidic purity analysis using a single instrument
- TLC measurements using pre-defined Protocols
- Implements radio-TLC and energy spectrum acquisition and analysis
- Compact instrument with sizes of H 75 mm x D 55 mm
- Uses a NaI(Tl) detector properly shielded with two sets of collimators. A plastic detector can be used as well for PET radiopharmaceuticals
- Variable and automatic scanning speeds.
- Modern and intuitive software for performing both analysis and setting or checking the status of the instrument
- Automatic saving spectrum for convenient latter review
- Automatic energy spectrum analysis with nuclide identification
- Software can be set to user preferences and conveniences
- Colorful and customizable measurement reports

Detector

The bSCAN is standardly offered with a NaI(Tl) scintillation detector which provides higher energy resolution compared to similar instruments in the market. The typical detector crystal size is of 1x1 inches (2.54 x 2.54 centimeters) which is ideal for high counting efficiency and not so high background. The detector is mounted on a well collimated head. The detector shielding is machined in lead (Pb) and has thickness of 10 mm (0.4 inc.) on its thinner parts. On the bottom part (front of the detector) a collimator shielded piece is placed. Two collimation pieces are provided. One with aperture of ~ 1 mm (0.04 inches) and the other with 3 mm. (0.12 inc.). The collimators can be easily detached and exchanged using a set of screws. Other types of scintillators, such as BGO, CsI(Tl) or plastic for beta emitters) can be used as replacement or simply added as additional detection to the instrument.

MCA

The bSCAN integrates a compact and yet very powerful multichannel analyzer (MCA) for the analysis of all electronic pulses originated from the scintillator detector. The MCA is integrated into the instrument itself, this arrangement also reduces the number of connecting cables and therefore minimizes parasite noise signals. The MCA is digital and provides superior signal processing capabilities, improving energy resolution and spectrum stabilities in terms of long standing operations and high count rates.

The MCA operates in both modes: Multichannel scaling (MCS) used for TLC data acquisition and also in pulse height analysis (PHA) which is used for the energy spectrum analysis. The bSCAN software makes full use of both modes and provides superior possibilities like easy energy calibration or narrow-window TLC counting.

The MCA can be set to acquire spectrum of up to 4k channels (4096 channels) for both acquisition modes. Each acquisition mode (PHA or MCS) can have its own independent spectrum storage length.

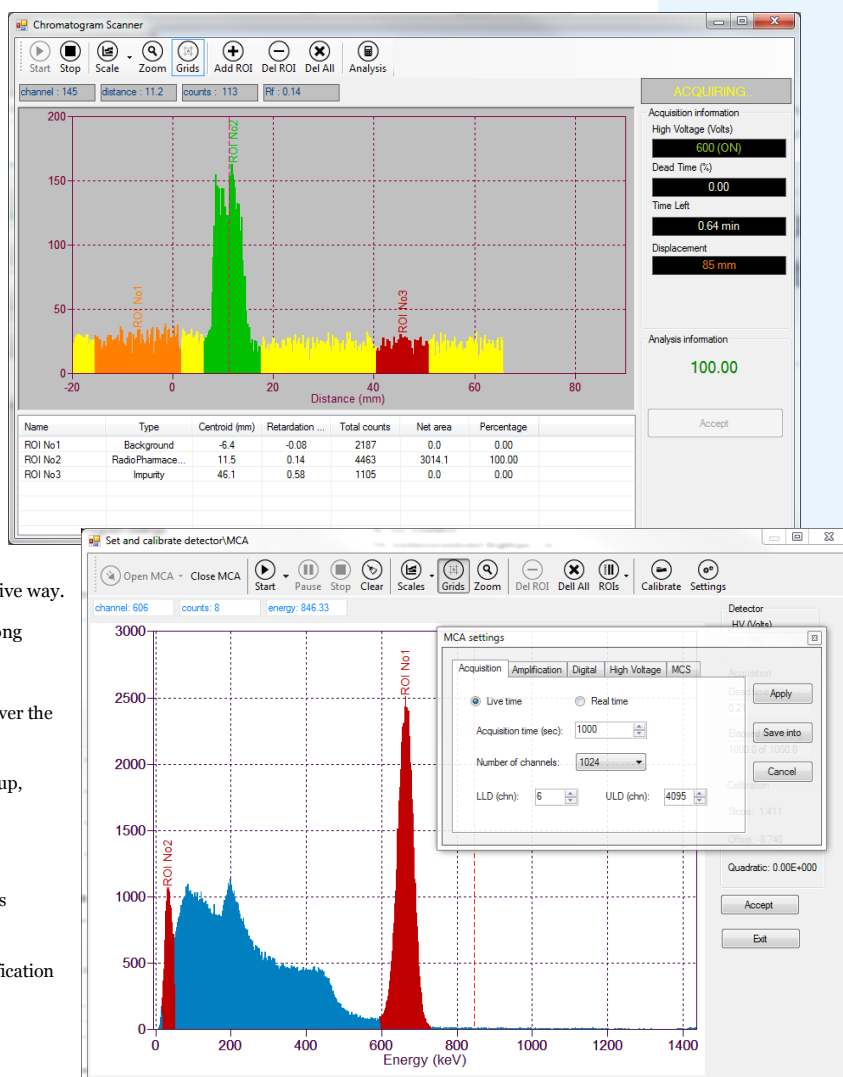
SOFTWARE DETAILS

An important part of the instrument is its software. The bSCAN software allows to carry-out all the complexity of both radiopharmaceutical analyses in a fast and intuitive way.

To summarize the following basic functions, among many, are performed via the bMCA software:

- Control of the displacement of the detector over the sample (strip) at a selected speed.
- Instrument (and individual components) setup, including energy calibration of the detector
- Data acquisition of Chromatogram (TLC)
- Data acquisition for energy spectrum analysis
- Spectrum visualization and analysis for both acquisition modes. Automatic nuclide identification of the energy spectra.
- Automatic spectrum storage into files
- Automatic HTML-compatible report generation
- User-defined setup, GUI and operational parameters
- Reanalysis of stored files

The software is MS Windows compatible for both 32-bit or 64-bit processors.



BRIGHTSPEC

is a dynamic engineering company providing novel designs and innovative solutions in the field of nuclear electronics and software development for radiation detection.

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TECHNICAL SPECIFICATIONS

TLC Scanner

- ◆ MODEL: bSCAN-V3
- ◆ DIMENSIONS (WxHxD): 38 x 35 x 25 cm (15 x 13.7 x 9.8 in.)
- ◆ WEIGHT: 16.5 kg (36.4 lb)
- ◆ POWER SUPPLY: External AC\DC power adaptor for 120-220 Volts provided.
- ◆ FUSES: 250 V T2A soldered fuse
- ◆ SCAN AREA: Strips of max 50 x 220 mm (2.0 x 8.7 in.)
- ◆ SCAN SPEED:
 - Automatic, from 0.1 to 2 cm/sec.
 - Fixed to ~ 0.5 cm/s (0.2 in/s) when using Manual scan mode
- ◆ SCANNER CONTROL: via USB connection. USB-B port connector on the back of the instrument.
- ◆ STRIP CARRIER: standard supplied with two plastic strip holders.
- ◆ FRONT SWITCHES AND INDICATORS:
 - On-Off switch with LED power-on indicator
 - Manual scan push-button
 - Reset push-button for scan reset operation.
 - Blue LED signaling BUSY state
 - Red LED for detector\MCA High Voltage On.
- ◆ BACK CONNECTORS:
 - Ac-De convertor plug-in connector.
 - USB-type B connector
- ◆ SHIELDING: Detector head providing 10 mm (minimum) of lead (Pb) around the detector

Detector

- ◆ TYPE: (standardly) NaI(Tl) scintillator detector with photomultiplier
- ◆ DETECTABLE RADIATION: Photons, Gammas and X-rays
- ◆ DETECTOR CRYSTAL DIMENSIONS: Typically 1x1 inches. Other sizes can be delivered upon request.
- ◆ TYPICAL ENERGY RESOLUTION: 7 to 8 % at 662 keV

- ◆ COLLIMATION: Set of two (2) of 20 mm-thick (0.8 in.) lead (Pb) with apertures of 1 mm (0.08 in) and 3 mm (0.12 in.)

SPECTROMETER

- ◆ MCA TYPE: BrightSpec digital MCA—connected directly to the photomultiplier socket via a single cable (LEMO).
- ◆ ACQUISITION MODES:
 - PHA (from 256 up to 4098 channels)
 - MCS (from 256 up to 4098 channels).
- ◆ DWELL TIMES— From 0.1 s to 24 hrs with 0.1 s resolution
- ◆ DATA COMMUNICATION: USB (2.0)

Software

- ◆ bSCAN version 1.2 or higher compatible with MS Windows OS : Windows 7, Windows 8 and Windows 10 , 32 and 64-bits processors.
- ◆ Software supplied with the bSCAN instrument on a USB-flash memory with electronic (PDF) User's Manual

Standard packing contents:

- bSCAN scanner
- Two sets of collimators: 1 mm and 3 mm aperture
- Two plastic Strip holders
- One standard EU three-point power cord
- Standard 120-200 Volts AC\DC power convertor
- 2 meters long standard USB cable
- One NaI(TL) scintillator detector with photomultiplier. Typical crystal sizes of 1 x 1 in.
- Other type of crystal sizes and/or detector (e.g. plastic for PET analysis) can be supplied upon request.
- bSCAN software on a USB-flash memory key
- User's Manual

Optional

Desktop or Notebook PC running MS Windows 10, with 3 USB ports. Other specifics to be quoted.

Certifications

- ◆ The device is CE compliant

CE
CERTIFIED

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