

ROSPEC-2***SIMPLE, EASY, HIGH RESOLUTION NEUTRON SPECTROSCOPY***

Six (6) detectors cover neutron measurement from the thermal region to 4.5 MeV. System includes four spherical proportional counters with appropriate gas fill for neutron measurements from 50 keV to 4.5 MeV, and two ^3He detectors for the thermal and epi-thermal region.

An optional scintillation system (SSSTM) extends measurements to 16 MeV.

ROSPEC-2 is a user friendly, unique rotating neutron spectrometer designed specifically for the spectral measurement of degraded fission neutrons, which may be encountered in nuclear power and fuel processing plants, weapons-related military facilities and accelerator laboratories. Introduced in 1992, ROSPEC-2 has a proven operational record with a program of continued performance upgrades.

ROSPEC-2 is simple to operate so that even non-specialists can easily characterize neutron fields that may pose a health threat. It will generate very accurate spectral and dosimetric data simply and routinely in minutes or hours, in contrast to previous methods that could take weeks or months of a specialist's time.

Data analysis is via a laptop computer, with on-line display of individual or all counter pulse height distributions, and an unfolding program for generation of neutron spectra. Kerma, maximum dose equivalent and ambient dose equivalent $H^*(10)$ and dose rate are calculated, and data storage is to hard disk. The rotating platform carries all detectors and electronics.

- **Generates spectral data simply and routinely in minutes/hours**
- **Calculates dose (fluence) and dose rate in kerma, maximum dose equivalent (NCRP) and the ambient dose equivalent ($H^*(10)$), from thermal to 4.5 MeV**
- **On line display of individual/all counter pulse height distributions**
- **Turn-key system includes counters, associated electronics, cabling, laptop, UPS battery backup and all software**
- **Specified in NATO operational manual for military alliance research**
- **Units are at work in Defence Departments in Canada, Germany, France and the USA, at US DOE sites, major fuel fabricator/reprocessors in Europe and Japan and standards labs (NIST, JAERI, CEA) around the world**

ROSPEC-2

Technical Specifications

(Visit www.bubbletech.ca for more information)

NEUTRON DETECTORS:

Type: Spherical, Gas Proportional
Size: 1 of 15 cm (6") diameter, 5 of 5 cm (2") diameter
Energy Range: Thermal to 4.5 MeV (16 MeV with SSS option)
Resolution: <10% @ 1.0 MeV
Min/Max. Fields: Background to 100 mrem/hr (1 mSv/hr)
Gamma Rejection: >100:1

ELECTRONICS:

Amplifiers:

Type: Charge sensitive
Shaping TC: 10 msec

ADC:

Type: 100 MHz Waveform digitizers
Non-linearity: <0.003%
No. of channels: 256 per detector

HV Supplies:

Voltage: 1.5 to 4.0 kV (detector dependent)
Ripple: <20 mV p-p

DATA ACQUISITION:

Type: Laptop computer (provided)
Operating Systems: Windows 10
Communications: Ethernet
Distance: 23 m (75 ft.) cable provided

SYSTEM POWER:

Input: 24V DC
Battery backup: UPS (provided), ~1 hour
Power Consumption: 50 Watts (rotating), 40 Watts (not rotating)

MECHANICAL CONFIGURATION:

Rotating platform carries detectors and all electronics
Weight: Approximately 23 kg/50 lbs (excluding laptop)
Size: 41 cm (16") diameter x 60.5 cm (23.75)

ENVIRONMENTAL:

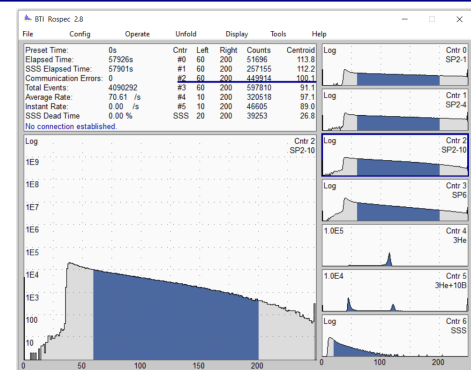
Operating Temperature: 5 to 35 C
Storage Temperature: -10 to 50 C
Operating Humidity: 0-80% relative, non-condensing
NOTE: This equipment is intended for indoor use only.

CALIBRATION:

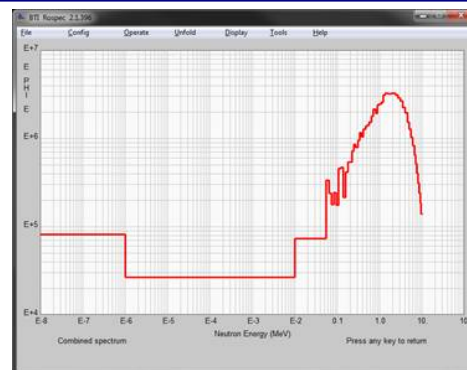
Internal calibration is provided with NIST traceable sources. An optional NIST calibration is available.

ISO QUALITY ASSURANCE:

BTI maintains a quality management system that has been registered by BSI Group Canada to the ISO 9001:2015 International Standard, Quality management systems – Requirements.



ROSPEC-2 data acquisition and analysis program user interface



Unfolded spectrum of a bare Cf-252 source

SSS

The Simple Scintillation Spectrometer (SSS) is a neutron spectrometer intended to complement the spectral range of ROSPEC-2 allowing measurements from 4 to 16 MeV. The SSS detector is an array of small plastic scintillators coupled to a photomultiplier tube. The dimensions of these scintillators are selected to optimize the neutron response functions of the detector while at the same time minimizing the sensitivity to gamma radiation.

The SSS consists of the neutron detector, a photomultiplier, a high voltage supply, and an analyser module similar to the ones used for the gas counters.

Like ROSPEC-2, the SSS produces raw data which is, to a first approximation, the integral of the neutron spectrum. This data is input to the standard ROSPEC-2 program to generate accurate neutron spectra and dosimetry up to 16 MeV.