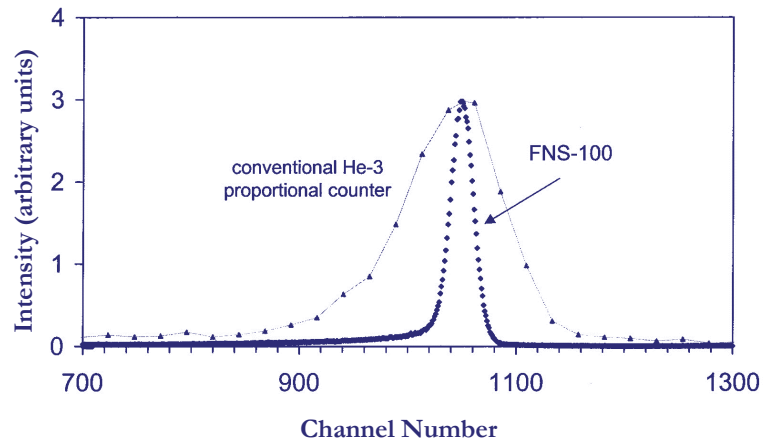


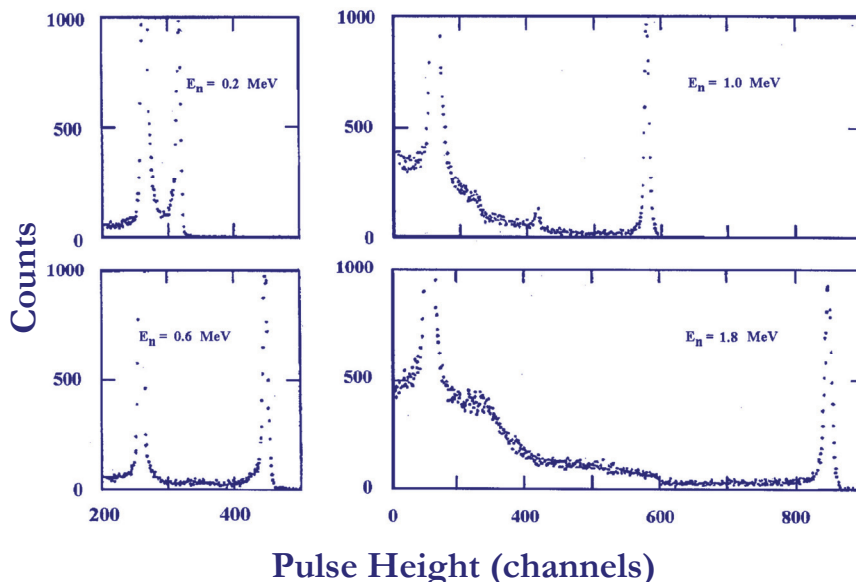
Thermal Neutron Peak in He-3 Counters



- Unsurpassed resolution < 20 keV (thermal peak)
- Matched preamplifier
- Notch filter for reduction of microphonics
- Compact, lightweight

The BTI FNS-100 is a high efficiency, high resolution fast neutron spectrometer. The detector is a multi-wire <sup>3</sup>He ion chamber with a dense quenching gas. The availability of both high efficiency and exceptional resolution in one instrument makes the FNS-100 useful for nuclear science and engineering, materials research and radiation protection.

The FNS-100 is supplied with an integral cadmium and boron shield to reduce its sensitivity to thermal neutrons. The residual thermal neutron peak is a convenient feature for energy calibration and stability monitoring. The FNS-100 spectrometer, as provided with custom preamplifier and notch filter, is fully compatible with standard spectroscopy electronics (not provided) like those used with Ge spectrometer systems.



# FNS-100™

## Technical Specifications

(Visit [www.bubbletech.ca](http://www.bubbletech.ca) for more information)

### PERFORMANCE

**Spectral Range:** 0.1-5.0 MeV

**Resolution: Thermal:** < 20 keV FWHM

**1 MeV:** < 30 keV FWHM

**Absolute detection efficiency at 1 MeV:**

$3 \times 10^{-4}$  peak counts per unit incident neutron fluence

### PHYSICAL SIZE

**Detector:** 6.4 x 57.4 cm (diameter x length)

(2.5 x 22.6 in)

**Effective Length:** 15 cm (5.9 in)

**Preamplifier:** 11.0 x 8.0 x 4.0 cm (4.3 x 3.1 x 1.6 in)

### POWER REQUIREMENTS

**Anode Bias:** +3000V

**Grid Bias:** +850V

**Preamplifier:**  $\pm 12$ V (NIM std)

### OUTPUT

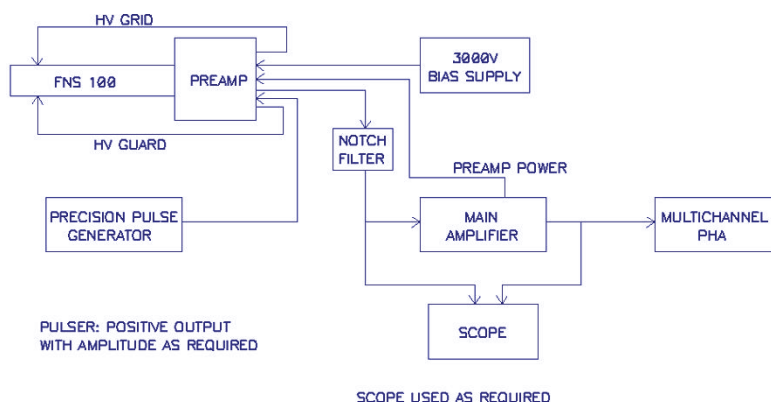
**Amplitude:** -50 mV/MeV

**Impedance:** 50  $\Omega$

**Risetime:** 0.2 to 5  $\mu$ s (10 to 90%)

**Falltime:** Approximately 1 ms

**Shaping:** 4  $\mu$ s Gaussian



**Typical measurement set-up**  
(only FNS-100, preamp, notch filter provided)

SCOPE USED AS REQUIRED  
MAIN AMPLIFIER GAIN AS REQUIRED  
SHAPING TIME CONSTANTS OF 4 OR 8 MICROSECS  
GAUSSIAN BIPOLAR.

### OTHER NEUTRON SPECTROMETERS:

#### BDS™\*

The BDS is a complete low-cost neutron spectrometer package consisting of 36 Bubble Detectors that have been specifically formulated with six different energy thresholds. Each spectral measurement can be made with 18 detectors (3 of each threshold supplied – 10, 100, 600, 1000, 2500, 10000 keV). A simple algorithm is included for “unfolding” the neutron measurement data. Detectors can be re-used through recompression in a pressure chamber (available from BTI).

#### MICROSPEC™ + N-PROBE™\*

This unique probe is one of several types of probes used with our MICROSPEC portable analyzer. The output of the N-PROBE is a 16 bin neutron spectrum coupled with accurate neutron dosimetry. The N-PROBE is intended for radiation monitoring applications and consists of a special scintillator (with gamma discrimination properties) for fast neutrons and a special <sup>10</sup>B – encased <sup>3</sup>He counter for thermal and epi-thermal neutrons. The N-PROBE is intended primarily for very accurate neutron dosimetry by deriving the neutron dose from the measured neutron spectrum (thermal to 20 MeV). While the quality of the neutron spectrum from the N-PROBE is not intended to be “standards-laboratory” quality, the derived dose-equivalent is by far the most accurate of all other “dosemeters” currently in use.

#### ROSPEC™\*

The ROSPEC (ROtating neutron SPECTrometer) is intended for “standards” laboratories and large nuclear establishments that need to characterize neutron spectra (thermal to fast) to the highest standard (energy resolution and absolute fluence) that is technically feasible. ROSPEC is used as a secondary standard to establish the reference neutron field for a variety of applications, including verification of neutron transport calculations.

ROSPEC is based on spherical counters filled with different pressures of hydrogenous gas (to cover different high energy regions) plus bare and <sup>10</sup>B - covered <sup>3</sup>He counters to span thermal and epi-thermal energies. ROSPEC is regarded by neutron experts as the premier spectrometer and is, in fact, the reference neutron spectrometer adopted by NATO scientists.

\*Detailed data sheets available

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