

WESTINGHOUSE ELECTRONIC TUBE DIVISION

WL-6377

Sales Department: Elmira, New York

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Westinghouse RELIATRON® Tube  
WL-6377  
Compensated Ionization Chamber

The WL-6377 is a boron-lined ionization chamber for the detection of thermal neutrons. Gamma ray compensation provides an extended range of operation. It is filled to atmospheric pressure with nitrogen. The sensitivity of the chamber is approximately  $4 \times 10^{-14}$  amperes per unit neutron flux. The sensitivity to gamma rays when operated uncompensated is approximately  $4 \times 10^{-11}$  amperes per R per hour; when compensated, the gamma ray sensitivity is easily reduced by a factor of 100.

The WL-6377 is approximately 24 inches long overall and 3-1/8 inches in diameter; and it is constructed of a special high-purity magnesium alloy. Connections are provided by "HN" cable fittings. The tube is both shock-proof and non-microphonic, and it will operate continuously at a temperature of 80°C.

GENERAL DATA

Mechanical

Overall Length . . . . .	24" max.
Diameter . . . . .	3-1/8"
Sensitive Length . . . . .	14-1/16"
Body Material . . . . .	3% Al, 97% Mg.
Insulator Material . . . . .	Polystyrene
Neutron Sensitive Lining . . . . .	Approx. 1 mg/cm <sup>2</sup> of boron enriched to 96% B <sup>10</sup>
Filling . . . . .	1 Atmosphere of N <sub>2</sub>

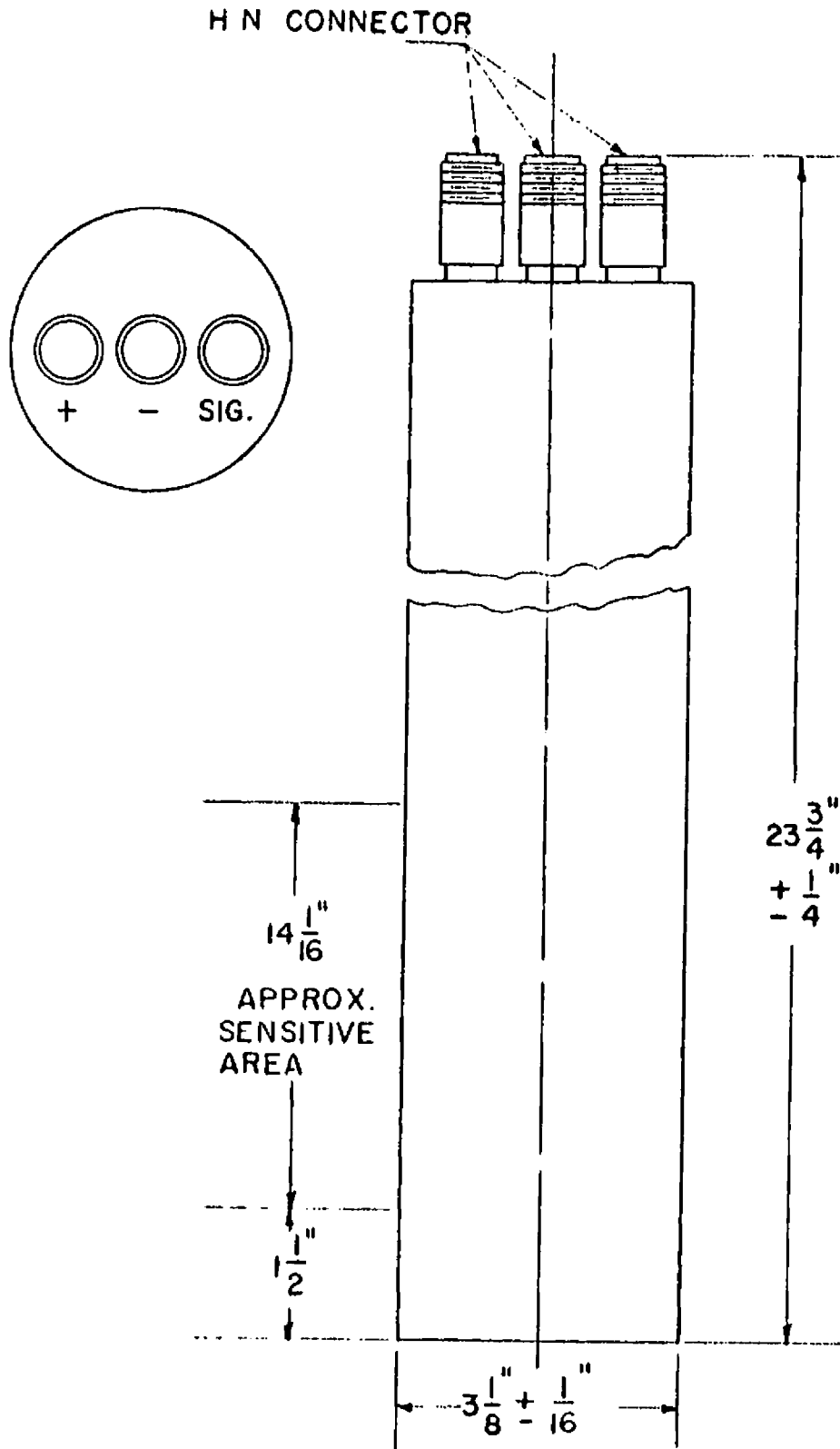
Operational:

Operating Voltage (Note 1)	+800	+300	volts
Maximum Saturated Output	$1 \times 10^{-3}$	$2 \times 10^{-4}$	amperes
Typical Compensating Voltage			
(Note 2)	-25	-25	volts

∅ Unit neutron flux equals one neutron per cm<sup>2</sup> per second.

Note 1: The operating voltage should be applied between the positive electrode and the signal electrode.

Note 2: The compensating voltage should be connected between the signal electrode and the negative electrode.



The 6376 and 6377 detectors have been qualified as meeting requirements of MIL-STD-167, Mechanical Vibrations of Shipboard Equipment. As defined in Section 1.3 of the specification, all detectors are classified as Type 1, equipment intended for shipboard use which may be capable of withstanding the environmental conditions which may be encountered aboard Naval vessels. The equipment to be used is optional with the manufacturer, providing it meets the conditional requirements for amplitude and frequency defined in the specification. The test procedure calls for an Exploratory Test to determine resonance frequencies, if any; a variable frequency test; and an endurance test. In each of the tests, the detectors must be vibrated in each of the three principal directions of vibration.

Exploratory vibration is conducted at an amplitude of 0.010 inches from 5 to 33 cps in 1 cps steps, remaining 15 seconds at each step.

The variable frequency test is conducted from 5 to 33 cps in 1 cps steps of 5 min. duration. The amplitude shall be 0.030 inches in the 5 - 15 cps range, 0.020 in the 16 - 25 range, and 0.010 in the 26 - 33 range.

The endurance test is run at the resonant frequencies determined in the exploratory test, or if none, at 33 cps for two hours in each position. The amplitude will be determined by the frequency of vibration as in the variable frequency test.

Acceptance is based upon satisfactory electrical and nuclear operation upon completion of the endurance test and ability to perform as indicated by noise generation measurement during the variable frequency and endurance tests.

The 6376 and 6377 detectors have been qualified as meeting the requirements of MIL-S-901, Shockproof Equipment, class HI (High Impact), shipboard application, tests for. As defined in Section 3.1.2 of the specification, all detectors are tested as type C which means that they are considered individual devices. For the purpose of test, the detectors are classified by weight and all detectors fall into the light category (250 pounds and below) per Section 1.2.1 Tests on equipment falling into the above-defined classes are tested on a lightweight shock-testing machine (BUSHIPS Drawing 10-T-2145-L) utilizing a 400 pound hammer. In the tests the detectors are subjected to three blows parallel to each of the three principal axes, the three blows for each direction to be with heights of hammer drop of one foot, three feet, and five feet. This gives a total of nine blows of the hammer. The degree of acceleration is determined by the characteristics of the equipment.

The prime criteria for acceptance is the ability to perform during or after the test; however, none of the parts shall become detached from the apparatus.