COMPENSATED IONIZATION CHAMBER TYPE 8105

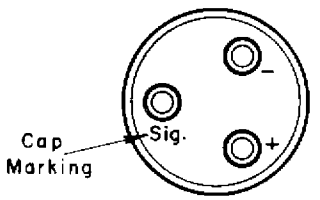
The 8105 is a compensated ionization chamber designed to detect thermal neutrons in the presence of relatively high gamma radiation fields. The chamber is a fixed, electrically compensated type and it should find wide application in critical core research and low and high power reactor facilities. The use of stabilized polystyrene and the rugged, guard-ring design minimizes signals due to electrical leakage.

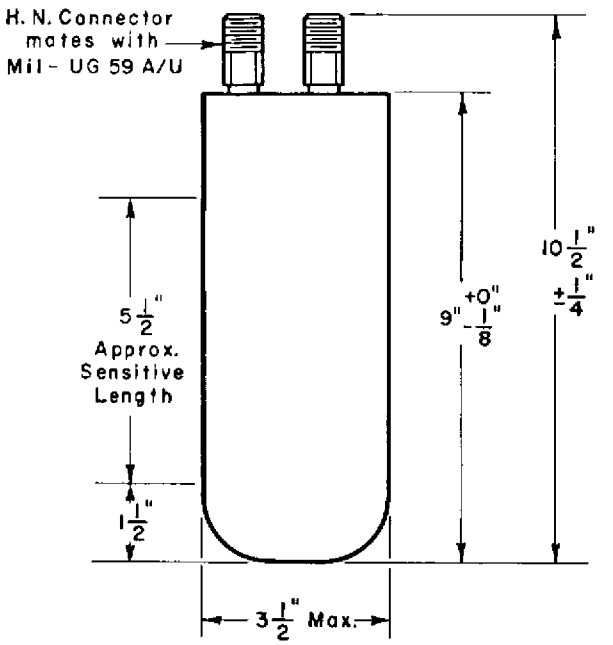
The chamber is constructed of high purity aluminum in the electrodes, case, and major support structures to minimize handling problems and shift in compensation due to activation.

The thermal neutron sensitivity of the 8105 is approximately 2×10^{-14} amperes/neutron/cm^2/second. The gamma sensitivity, when operated uncompensated, is approximately 5×10^{-12} amperes/R/hr.

MECHANICAL:

Maximum Diameter	3-1/2	Inches
Maximum Over-all Length	10-3/4	Inches
Approximate Sensitive Length	5-1/2	Inches
Net Weight	3-3/4	Pounds
Shipping Weight	12	Pounds





MATERIALS:

Outer Case	Aluminum
Electrodes	Aluminum
Insulation	Stabilized Polystyrene
Neutron Sensitive Material:	
Content	Boron Enriched in B-10
Thickness	1 mg/cm^2
Gas Filling	Nitrogen

IMPEDANCE:

Resistance: (Note 1)		
Signal-to-case, Minimum	10^{13}	Ohms
H.V.-to-case, Minimum	10^{12}	Ohms
Compensating-to-case, Minimum	10^{12}	Ohms
Capacitance: (Note 2)		
Signal-to-case, Approx.	130	$\mu\mu$f
H.V.-to-case, Approx.	140	$\mu\mu$f
Compensating-to-case, Approx.	75	$\mu\mu$f

MAXIMUM RATINGS:

Voltage Between Electrodes (dc)	1000	Volts
Temperature	175	°F
External Pressure (Note 3)	180	PSI
Thermal Neutron Flux	5×10^{11}	nv

TYPICAL OPERATION:

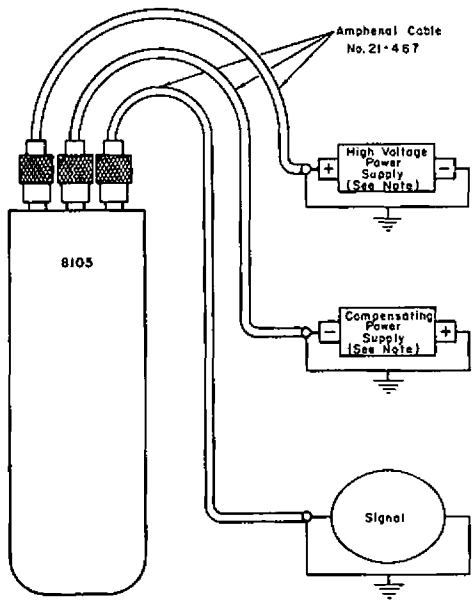
Typical Connections	See Figure 1	
Operating Voltage	300 to 800	Volts
Compensating Voltage	less than −200	Volts
Thermal Neutron Flux Range	2.5×10^{2} to 2.5×10^{10}	
Thermal Neutron Sensitivity	2×10^{-14}	Amperes/nv
Gamma Sensitivity:		
Compensated	2.5×10^{-13}	Amperes/R/hr
Uncompensated	5×10^{-12}	Amperes/R/hr

NOTES

1. The detector may not be immersed directly in water, and high humidity environments should be avoided as they will impair performance.
2. Capacitance is measured between an electrode and the case, with all other electrodes grounded to the case.
3. The pressurizing atmosphere must be dry and non-corrosive.

from JEDEC release #3476, Nov. 6, 1961,
& JEDEC release #3476A, April 19, 1965

TYPICAL CONNECTION DIAGRAM



Note: Permissible power supply regulation and ripple will depend upon the particular application. See Section entitled "Ionization Chamber Operation."

CG-A1762

FIGURE 1

TYPICAL COMPENSATION CHARACTERISTIC
AT
LOW GAMMA LEVELS

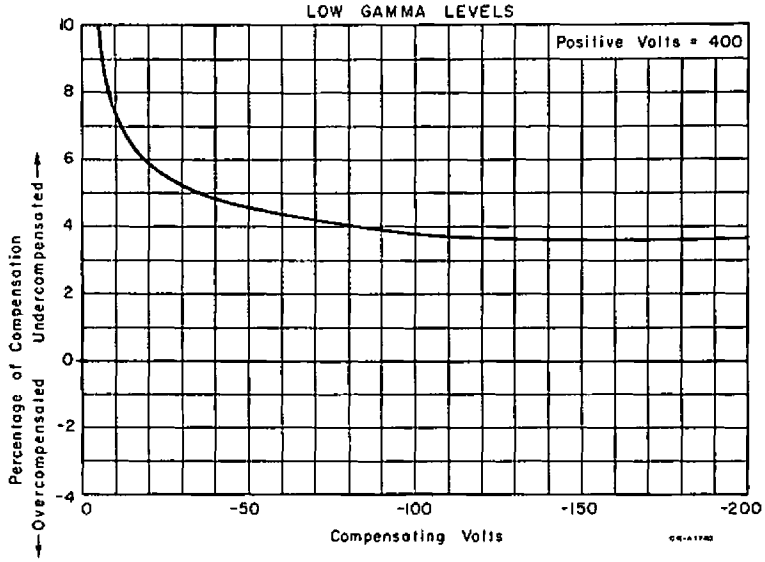


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FIGURE 2

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3476A
4-19-65

Westinghouse Electric Corporation

Electronic Tube Division Box 284, Elmira, New York

April 2, 1965

*Mr. G. F. Hohn, Manager
EIA Engineering Laboratories
32 Green Street
Newark 2, New Jersey

Dear Mr. Hohn:

The following proposed re-registrations are hereby requested.

ITEM	AS REGISTERED	AS PROPOSED
Tube Type: 8073		
Rel. No. 3310		
Under Mat'ls:		
Neut. Sens. Mat'l.		
Total Quantity	1.72 Grams	1.68 Grams
Tube Types: 8105 8137 8214		
Ret. No. 3476 3522 3822		
Under TYP-OPER.		
Gamma Sens. (8137 only)	5×10^{-12} A/R/hr.	3.5×10^{-12} A/R/hr.
Un-Comp.	5×10^{-12} A/R/hr.	3.5×10^{-12} A/R/hr.

Thank you.

Very truly yours,

J. A. Scott
Commercial Engineering

JAS/cb