Westinghouse

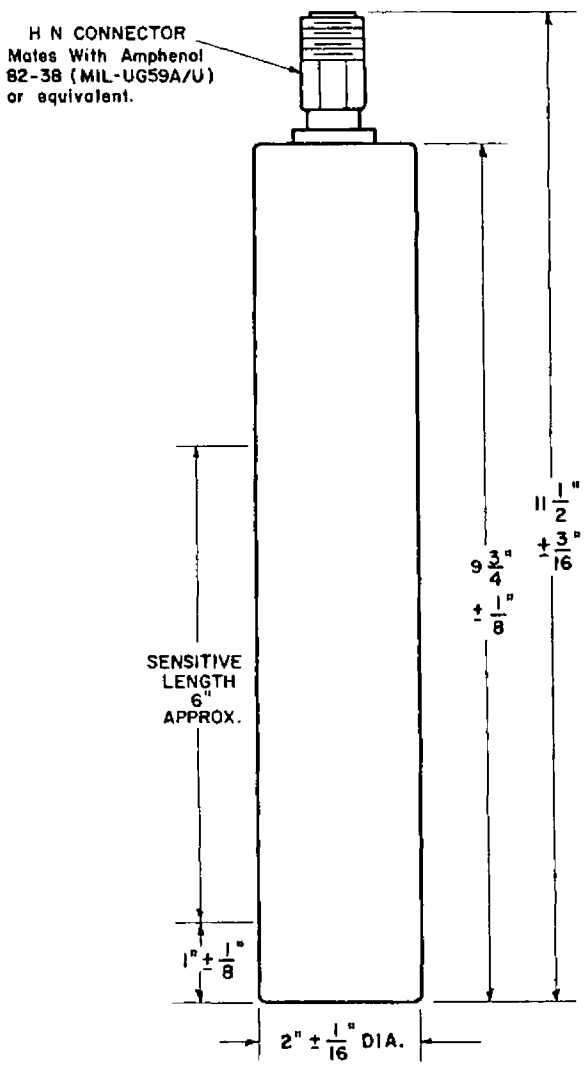
8073

May 15, 1961

DUAL RANGE FISSION CHAMBER TYPE 8073

The 8073 provides the instrumentation designer with a device which permits operation as a counter for low flux levels and as an ionization chamber for high flux, power range monitoring. The range as a counter is about 1.4 to 1.4×10^5 neutrons/cm^2/second; as a chamber, the range is approximately 5×10^5 to 1.4×10^{10} neutrons/cm^2/second.

The 8073 is of aluminum construction with high purity alumina insulation. The use of alumina thoughout the detector permits operation to 300°F and yields a design of extremely rugged construction with high resistance to deterioration due to radiation damage. Operated as a fission counter producing large pulses above background electrical and ground noise, the thermal neutron sensitivity is approximately 0.7 counts/neutron/cm^2. Operation as an ionization chamber yields a thermal neutron sensitivity of approximately 1.4×10^{-13} ampere/neutron/cm^2/second and a gamma sensitivity of approximately 4.2×10^{-11} amperes/R/hour.



MECHANICAL:		
Maximum Diameter	2-1/16	Inches
Maximum Overall Length	11-11/16	Inches
Approximate Sensitive Length	6	Inches
Net Weight	1-3/4	Pounds
Shipping Weight	12	Pounds
MATERIALS:		
Outer Case		Aluminum
Electrodes		Aluminum
Insulation		Alumina Ceramic
Neutron Sensitive Material:		
Content	U_3O_8 Enriched to more than 90% in U-235	
Thickness		2 mg/cm^2
Total Quantity		1.72 Grams
Gas Filling		Argon-Nitrogen Mixture
Gas Pressure		76 cm of Hg
IMPEDANCE:		
Resistance (minimum)	10^9	Ohms
Capacitance	190	$\mu\mu$f
MAXIMUM RATINGS:		
Voltage Between Electrodes	1000	Volts
Temperature	300	°F
External Pressure (Note 2)	180	Pounds/Inch^2
Thermal Neutron Flux	3×10^{10}	nv

from JEDEC release #3310, June 19, 1961

TYPICAL OPERATION AS A COUNTER: (Note 1)

Operating Voltage	300	Volts
Operating Voltage Plateau (See Figure 2)	200 to 800	Volts
Thermal Neutron Flux Range	1.4 to 1.4 x 10^5	nv
Sensitivity (Note 1)	0.7	CPS/nv
Output Pulse Characteristics:		
Amplitude (unloaded)	2 x 10^{-4}	Volts
Inherent Rise Time (average)	2 x 10^{-7}	Seconds

TYPICAL OPERATION AS A CHAMBER:

Operating Voltage (Note 3)	300 to 1000	Volts
Saturation Characteristics:	See Figure 3	
Thermal Neutron Flux Range (Note 4)	5 x 10^5 to 1.4 x 10^{10}	nv
Thermal Neutron Sensitivity	1.4 x 10^{-13}	Amperes/nv
Gamma Sensitivity	4.2 x 10^{-11}	Amperes/R/hour

1. The sensitivity is 0.7 counts/neutron/cm^2 when the alpha background counting rate of the naturally radioactive uranium is adjusted to 5 counts/second. By varying the pulse height selector on the associated circuitry other sensitivities are available. See Figure 1 and the section entitled "Fission Counter Operation".
2. The pressurizing atmosphere must be dry and non-corrosive.
3. The minimum voltage required for saturation is dependent upon the incident neutron flux level. See Figure 3.
4. The lower limit of operating range is determined by an inherent alpha background current of approximately 1.6 x 10^{-8} amperes.

COUNTER SENSITIVITY AS FUNCTION OF PULSE HEIGHT SETTING

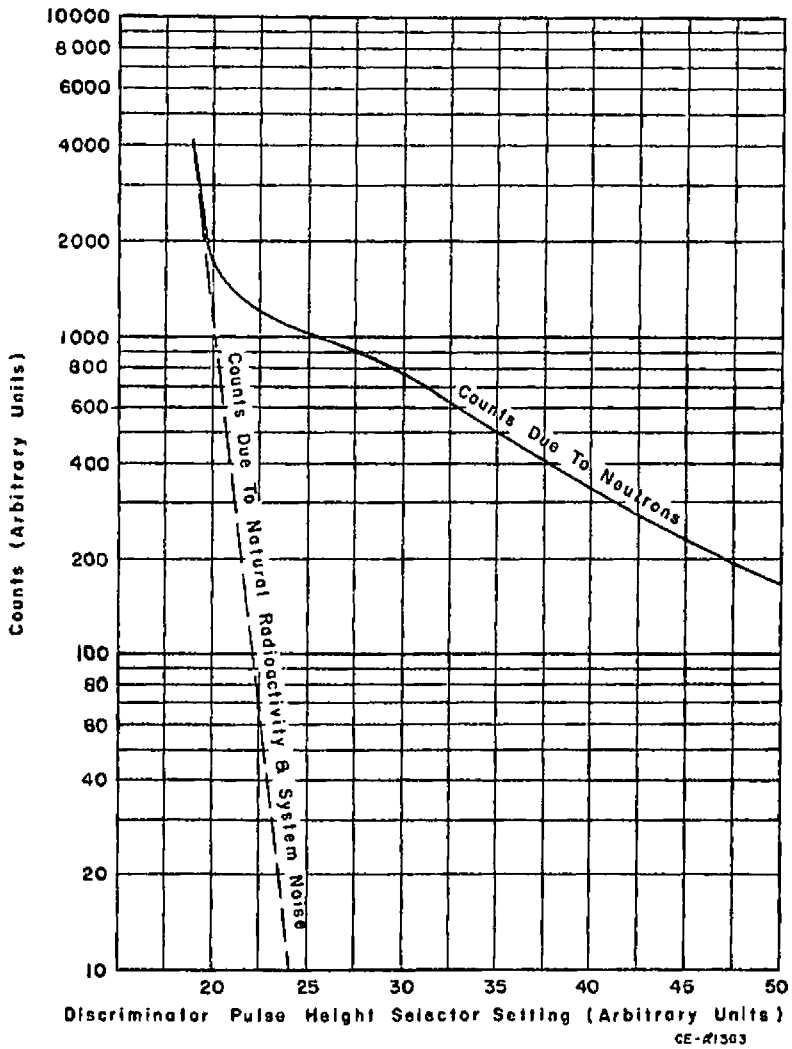


FIGURE 1

COUNTING RATE CHARACTERISTIC

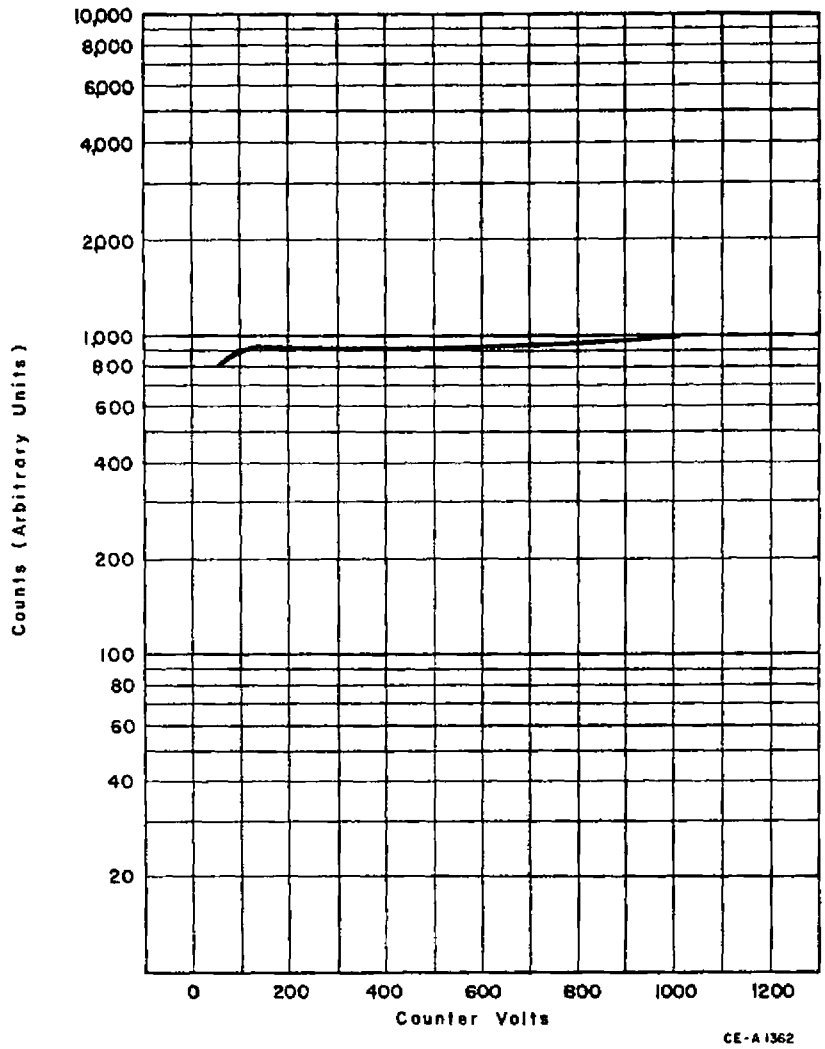


FIGURE 2

TYPICAL SATURATION CHARACTERISTICS
Ion Chamber Operation

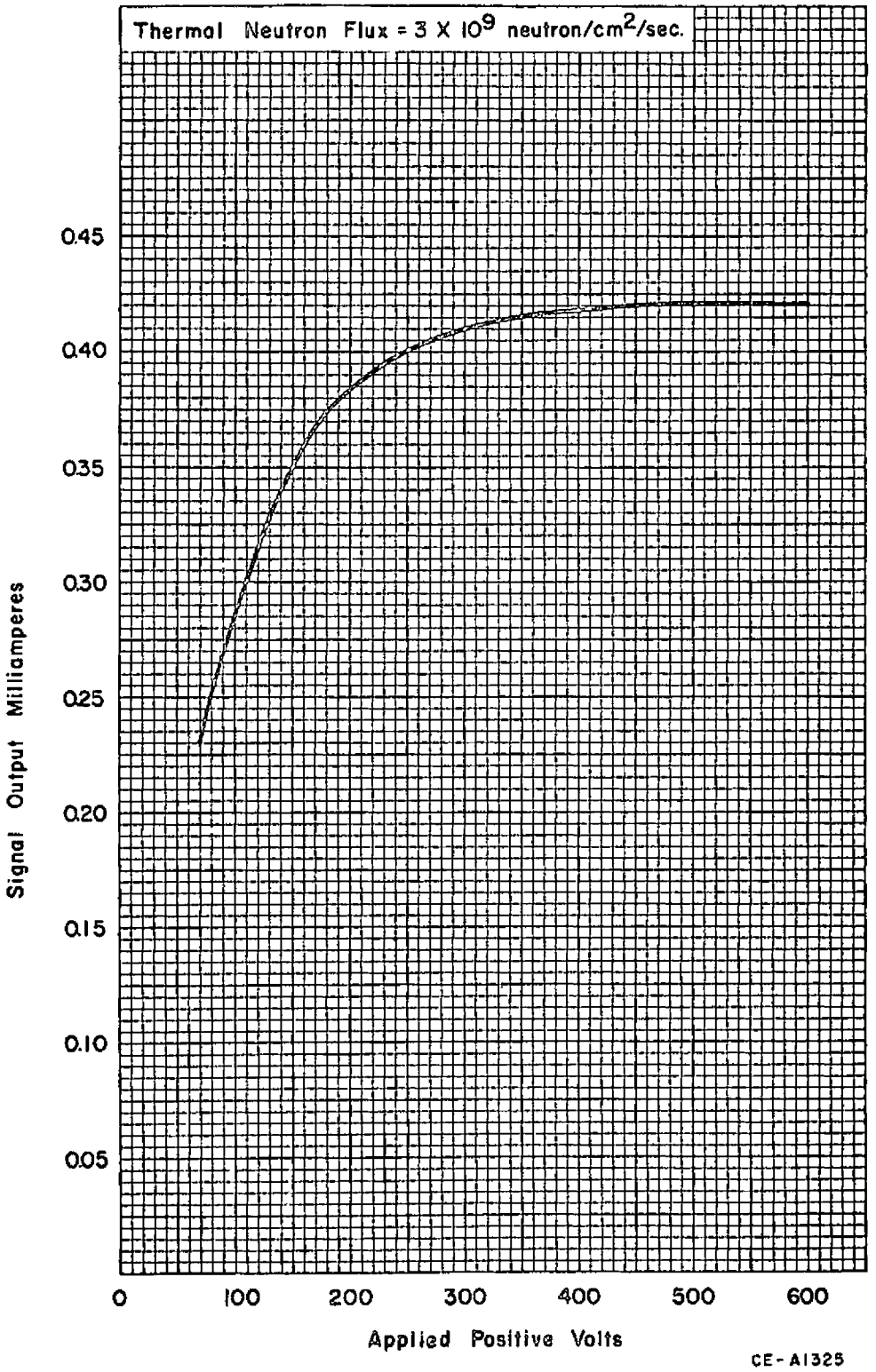


FIGURE 3

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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