CV 2418

MINISTRY OF SUPPLY - RRE

Specification NOS/CV2418/Issue 1 Dated 5/5/57.	SECURITY	
	Specification	Valve
To be read in conjunction with K1001	UNCLASSIFIED	UNCLASSIFIED

TYPE OF VALVE - Hydrogen Thyratron
CATHODE - Directly heated.
ENVELOPE - Glass
PROTOTYPE - VX3222

MARKING

See K1001/4

			Note
Filament voltage	(V.AC)	2.5±7½%	A
Reservoir voltage	(V.AC)	2.5±7½%	A
Filament current	(A)	40	
Reservoir current	(A)	2.65	
Max. Peak Anode Voltage	(KV)	18	
Max. " " Current	(A)	700	
Max. mean anode Current	(A)	1.25	B
Max. ½ x V_A x I_A x p.p.s.	(Mw c/s)	5000	B
Max. rate of rise of pulse current	(A/us)	5000	
Max. (peak current x rate of rise)	(A^2/us)	2×10^6	
Max. pulse length	(us)	5	
Max. p.r.f.	(pulses per sec)	2500	
Max. Jitter	(mus)	30	C
Ambient temperature range	min °C	-25	
Ambient temperature range	max °C	+70	
Min. heating time filament and reservoir before application anode voltage	(sec)	240	
Min. time to reach max. anode voltage from application of anode voltage	(sec)	60	

BASE

See Drawing Fig. I
Note D

CONNECTIONS

Flying Leads

Black : Cathode and filament
Yellow : filament
Red : reservoir
Brown : "
Blue : baffle
White : grid
Top connection: anode

NOTE

A. It is recommended that cathode and reservoir be supplied from separate transformers since no pulse voltages must be applied to the reservoir circuit.

B. The temperature of the glass to metal seal of the anode must not exceed 140°C. This can be achieved by cooling the anode with an air stream of about 2 inches water head, depending on the inlet air temperature.

C. To achieve this jitter the following trigger arrangements must be provided.

(a) Grid drive.

D.C. bias	100 volts negative.
Min. trigger pulse	500 volts

Rate of rise of grid drive to be between 2000 and 4000 volts/usec.
Trigger pulse duration 1 usec. to 3 usec.
Source impedance of pulse generator 250 to 500 ohms.
Max. D.C. resistance grid to cathode. 2000 ohms.

(b) Baffle drive.
As grid drive but with zero bias, and preceding the grid trigger pulse by 1.0 ± 0.25 us.

The jitter may be sensibly reduced by increasing the grid and baffle drive to 1000 volts.

A simpler method of triggering which results in increased jitter (of approx. 0.2 usec) is shown in Fig. 2.

D. The supporting clamp must be insulated from earth.

TESTS

To be performed in addition to those applicable in K1001

	Test Conditions			Test	Limits		No. Tested	Notes
	Vf volts	Vr volts	Va kV		Min.	Max.		
a	2.5	2.5		If (A)	36	44	100%	1
b	2.5	2.5	Raise to 18	HT. Run up time (mins)		1	100%	2.3.
c	2.5	2.5	18	Operational test. Time of trip-free operation (mins)	10		100%	2.4. 9.
d	2.7	2.7	18	Operational test. Time of trip-free operation (mins)	5		100%	2.5. 9.
e	2.3	2.3	18	Rate of rise (A/us)	4000		100%	2.6. 9.
f	2.5	2.5	18	Jitter (usecs)		.03	100%	2.7. 8.9.
g	2.5	2.5	18	Life (hours)	2000		TA	2.10.

NOTE

1. The filament voltage should be measured at the tag end of the cathode leads after 10 minutes heating time.

2. The valve must be tested in the circuit shown in Fig. 3.

3. This test to be made after a cathode and reservoir heating time of four minutes.

4. This test to immediately follow test (b).

5. This test to immediately follow test (c).

6. The filament voltage to be reduced immediately after test (d) and the rate of rise to be measured five minutes thereafter.

7. This test to be made at least fifteen minutes after reaching full H.T.

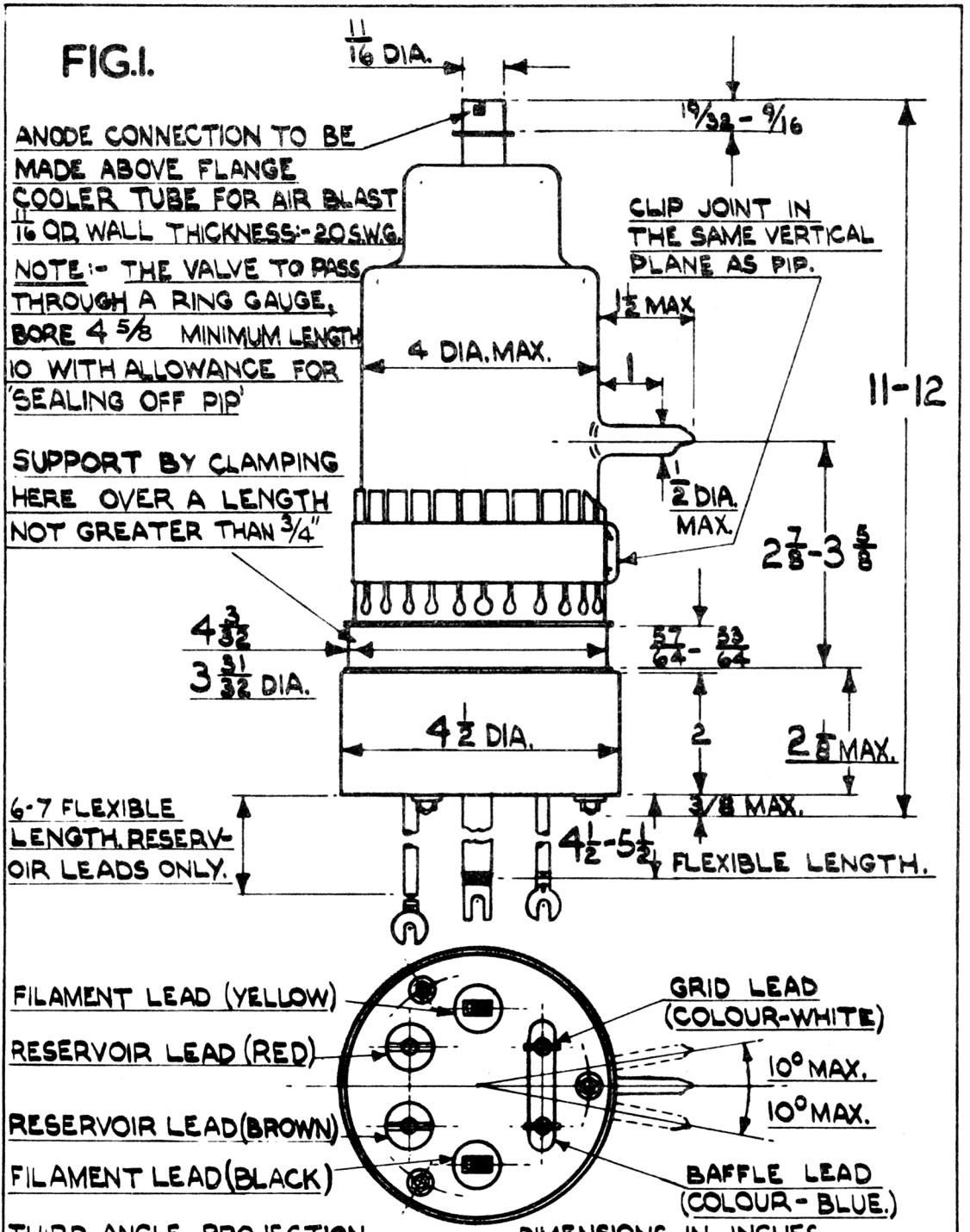
8. The jitter to be measured under conditions specified in note C. The frequency of the filament supply shall be between 45 and 60 cycles/sec.

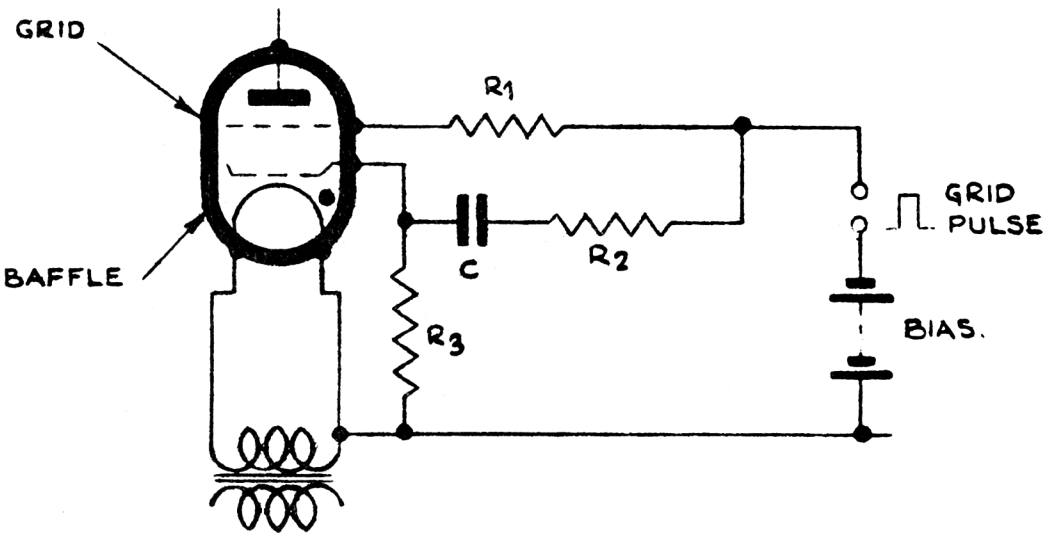
9. In tests (c), (d), (e) and (f) together a total of one trip is permitted. A trip shall be deemed to have occurred if the valve loses control for a period longer than 0.1 sec.

10. The valve shall be considered to have reached the end of life when, under the conditions of test (d) or (e) it trips four or more times in a period of five hours, or catastrophically fails.

CV 2418

FIG.1.


11/16 DIA.
19/32 - 9/16
ANODE CONNECTION TO BE MADE ABOVE FLANGE
COOLER TUBE FOR AIR BLAST 11/16 OD WALL THICKNESS:- 20 S.W.G.
CLIP JOINT IN THE SAME VERTICAL PLANE AS PIP.
NOTE:- THE VALVE TO PASS THROUGH A RING GAUGE, BORE 4 5/8 MINIMUM LENGTH 10 WITH ALLOWANCE FOR 'SEALING OFF PIP'
1½ MAX.
4 DIA. MAX.
1
11-12
SUPPORT BY CLAMPING HERE OVER A LENGTH NOT GREATER THAN ¾"
½ DIA. MAX.
2 7/8 - 3 5/8
4 3/32
3 31/32 DIA.
57/64 - 53/64
4½ DIA.
2
2⅛ MAX.
6-7 FLEXIBLE LENGTH. RESERVOIR LEADS ONLY.
⅜ MAX.
4½ - 5½ FLEXIBLE LENGTH.
FILAMENT LEAD (YELLOW)
RESERVOIR LEAD (RED)
RESERVOIR LEAD (BROWN)
FILAMENT LEAD (BLACK)
GRID LEAD (COLOUR-WHITE)
10° MAX.
10° MAX.
BAFFLE LEAD (COLOUR - BLUE.)
THIRD ANGLE PROJECTION.
DIMENSIONS IN INCHES



C = 0·005 μF

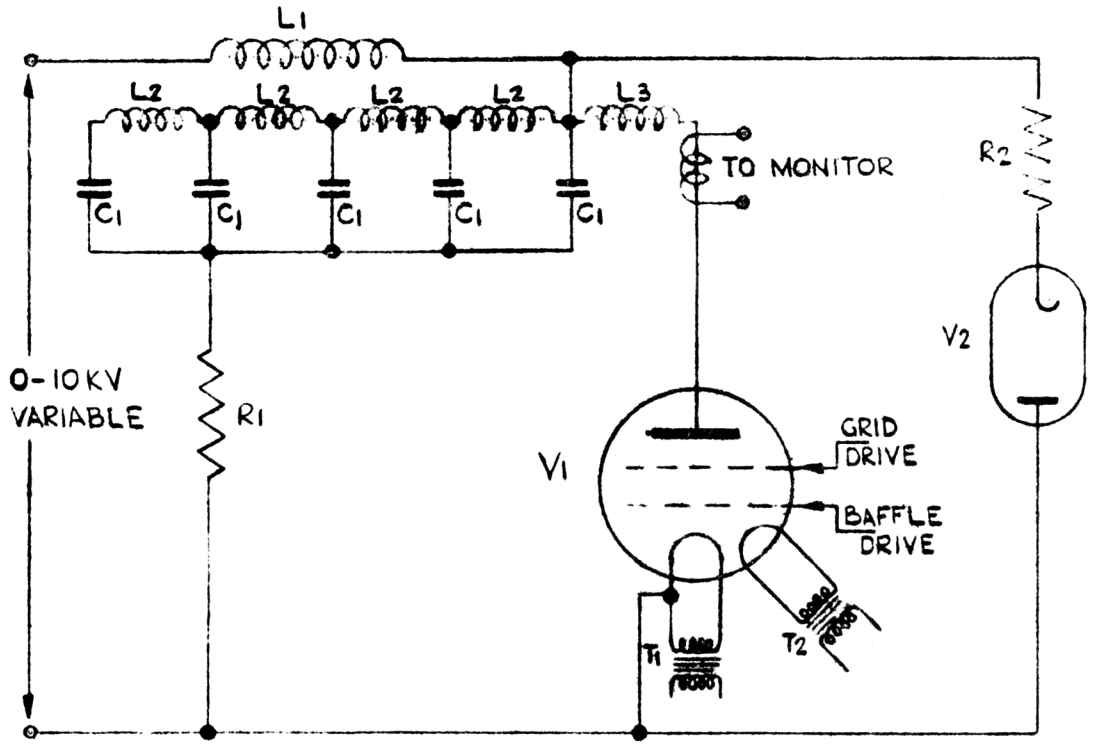
$R_1 = R_2 = R_3 = 500\ \Omega$

GRID PULSE AS DEFINED IN NOTE C SECTION (a)

FIG 2

GRID AND BAFFLE TRIGGERING CIRCUIT

CV 2418



V1 = CV
V2 = SUITABLE REVERSE DIODE
Zo = 12·85Ω
PULSE LENGTH = 1·8μ SEC.
P.R.F. = 800 CYCLES.
MEAN CURRENT = 1 AMP.
RATE OF RISE = 5,000 A/μ SEC.
HOLD OFF VOLTAGE = 18 KV.
PEAK CURRENT = 700 AMPS.

R1 = 12·85Ω ± ·25Ω
R2 = 250Ω
L1 = 2·8 H
L2 = 2·28μH
C1 = ·0138μF
L3 IS ADJUSTED TO GIVE 5000 A/μ SEC. WITH AN APPROVED SAMPLE VALVE
T1 = FIL TRANSFORMER.
T2 = RES. TRANCFORMER.

FIG 3
RECOMMENDED TEST CIRCUIT