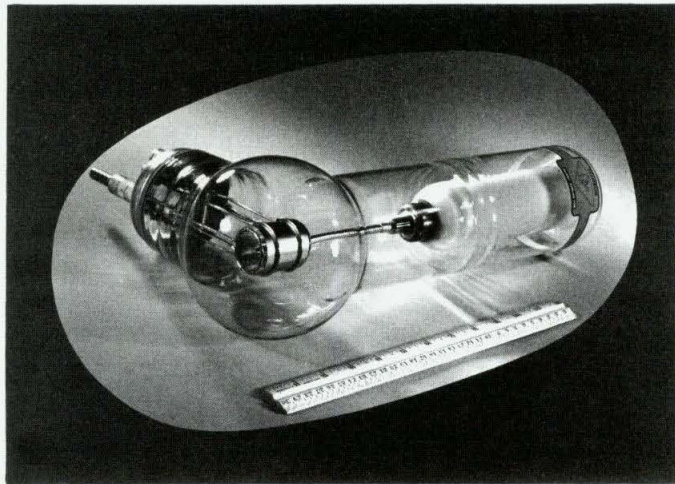


FEXITRON

FLASH X-RAY TUBE*

1200 MEGAWATT

MODEL 506



FEXITRON Flash X-ray tube
Model 506, T-600-2000-0.2



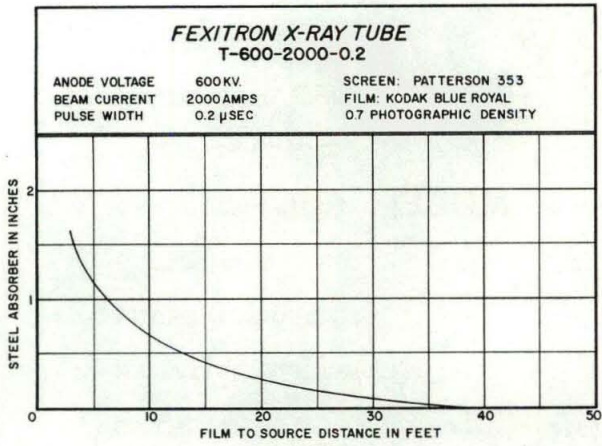
FIELD EMISSION CORPORATION

611 THIRD STREET
McMINNVILLE, OREGON

The FEXITRON flash x-ray tube, Model 506, Type T-600-2000-0.2, is designed for flash radiography where high intensity radiation from a small source is desired. Stop-motion pictures of high speed events in opaque media can be obtained at velocities up to 20,000 ft/sec (6×10^6 mm/sec). The Model 506 tube provides a film density of 0.7 through 6 1/2 inches of aluminum at a film-to-source distance of 4 feet, and shadow-graphs in air at distances up to 39 feet. An x-ray dosage rate of 2×10^8 R/sec is provided at the tube envelope.

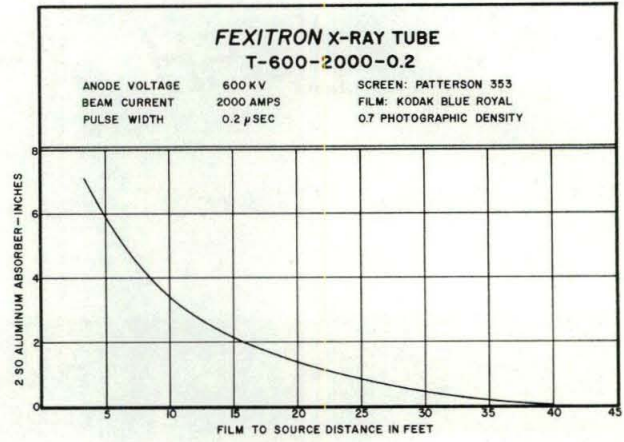
FEXITRON flash x-ray tubes use the newly developed T-F emission electron source (Phys. Rev. 95, 325, 1954) in which current is a consistent, reproducible function of voltage and temperature; the vacuum arc source employed by earlier flash x-ray tubes is not used. When the FEXITRON tube with the T-F source is used with a square wave voltage pulse, spectrum and resolution are maximized since optimum anode power is provided for a given x-ray yield. Maximum life, reliability, and reproducibility are provided on a pulse-to-pulse basis. The Model 506 tube has an effective x-ray source size of 9.4 mm diameter, and an envelope size of 5" diameter x 16 1/4" long. A peak power of 1200 megawatts is generated and dissipated in a beam volume of 3.5 cc (600 kv, 2000 amps, 0.2 μ sec).

PERFORMANCE DATA



STEEL PENETRATION - 600 KV; 0.2 μs

Figure 1



ALUMINUM PENETRATION - 600 KV; 0.2 μs

Figure 2

DIMENSIONAL DRAWING

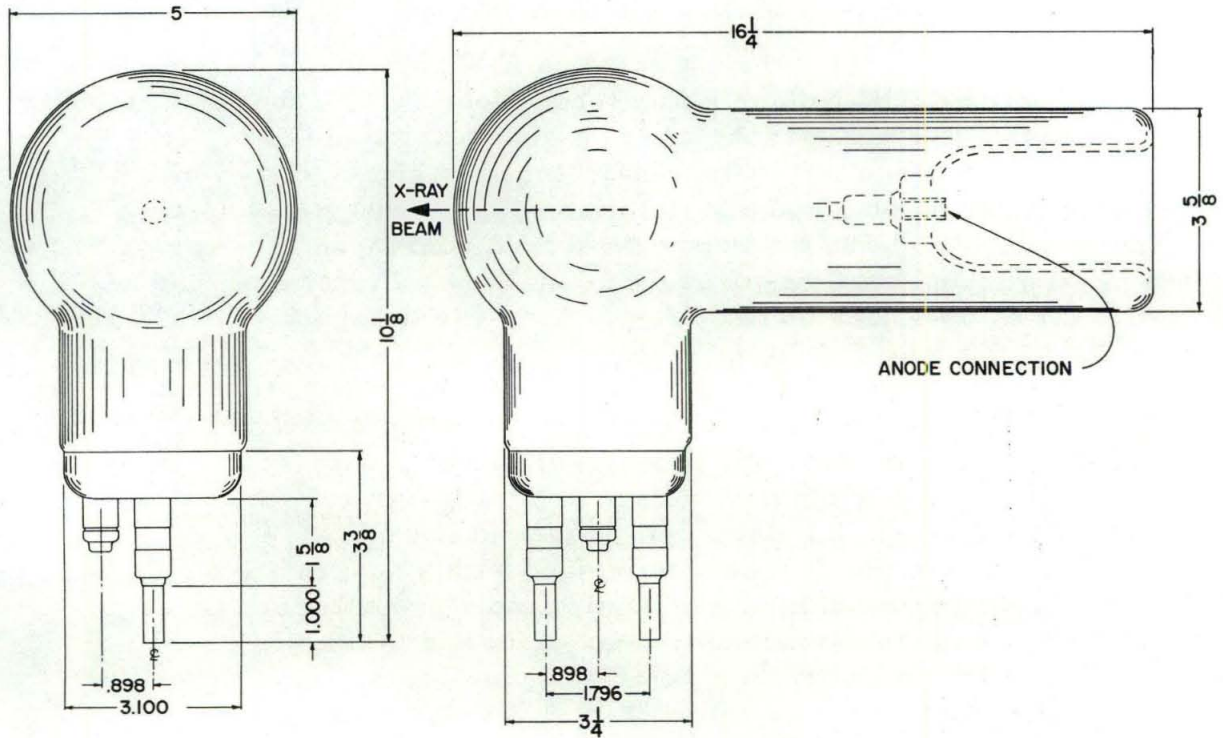


Figure 3

PERFORMANCE RATINGS

	<u>MAXIMUM RATINGS</u>	<u>TYPICAL OPERATION</u>
PEAK POWER:	1200 megawatts at 0.2 microsecond	1020 megawatts at 0.2 microsecond
ANODE:	Tungsten	Tungsten
ANODE TEMPERATURE:	3000° K	2000° K
ANODE VOLTAGE:	600 kv	550 kv
BEAM CURRENT:	2000 amperes	1850 amperes
PULSE DURATION:	0.2 microsecond	0.2 microsecond
PULSE OVERSHOOT:	Maximum 5%	Up to 5%
NEGATIVE OVERSHOOT:	Maximum 10%	Up to 10%
CATHODE:	T-F emission, Tungsten	T-F emission, Tungsten
CATHODE VOLTAGE:	9 volts ac, 50-60 cps	8.5 to 9 volts ac
CATHODE CURRENT:	180 amperes	160 to 180 amperes (pulsed for 1 sec.)
X-RAY SOURCE SIZE:	9.4 mm dia.	9.4 mm dia.
DOSAGE RATE:	2×10^8 R/sec at 3"	

CHARACTERISTICS

BEAM DIRECTION:	Parallel to anode axis
COOLING:	Air circulation not required.
RESIDUAL PRESSURE:	10^{-12} mm of Hg.
LIFE:	Cathode life is determined by evaporation and therefore is a function of current and power level at which the tube is operated; general experience with FEXITRON tubes at typical operating voltages indicates an average life of several hundred pulses - see FEXITRON Operating Instructions for methods of extending tube life.
TIME INTERVAL BETWEEN PULSES:	Nominally 3 minutes; for more rapid repetition rates see special tube bulletin.
DURATION OF FILAMENT CURRENT:	The filament operating time should be restricted to not greater than 3 seconds per x-ray pulse (see auxiliary equipment data sheet on FEXITRON Sequential Timer).
TUBE PERFORMANCE:	The performance of FEXITRON x-ray tubes is shown in Figures 1 and 2. All tubes are individually tested at full ratings.
BASE CONNECTIONS:	The anode end of the FEXITRON x-ray tube terminates in a female receptacle with inside diameter of 0.277" suited for use with a giant banana plug (Johnson No. 108) and the cathode end is provided with 3/8" diameter copper base pins.
PHYSICAL DIMENSIONS:	Length: 16-1/4" Diameter: 5" inches (see outline drawing)
PRICE:	\$980 Discounts available on quantities over 40 tubes; write for schedule.



COLT .45 AUTOMATIC PISTOL: BULLET IN FLIGHT

Flash x-ray picture taken with FEXITRON PS-600-2000-0.2 system. Film-to-source distance - 12 feet; 500 kilovolts, 1300 amperes, 0.2 microsecond pulse. Pistol hand held; 220 grain bullet stopped in flight just before exit from barrel.

FIELD EMISSION CORPORATION

McMINNVILLE, OREGON