

Farmer-Type Radiation Therapy Waterproof Ionization Chamber

Victoreen® Model 580-006-WP



- Stable, reproducible absolute dosimetry measurements
- In-air calibration of brachytherapy sources
- Precision machined thimble for flat energy response
- Hemispherical electrode design, no electrical field distortion
- Rugged replaceable PMMA thimble, 0.5 mm thick

Introduction

The Model 580-006-WP Radiation Therapy Ionization Chamber is modeled after the traditional 0.6 cm³ Farmer-type chamber used for absolute dosimetry measurements of medical linear accelerators and ⁶⁰Co machines. Each chamber includes an energy response for M-80, M-100, M-250, and ⁶⁰Co for both linear accelerator and brachytherapy applications as illustrated in the table below. Also supplied with each chamber is a PMMA ⁶⁰Co buildup cap, a convenient low noise one meter cable with triaxial BNC connector and a Victoreen custom carrying case.

Applications

This chamber is equivalent to a 0.6 cm³ acrylic walled chamber with the following published values of k_Q for accelerator photon beams as a function of %dd(10)_x for cylindrical ion chambers commonly used for clinical reference dosimetry.

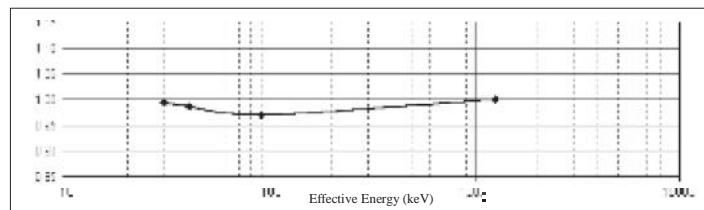
	%dd(10) _x					
	58.0	63.0	66.0	71.0	81.0	93.0
k _Q	1.000	0.996	0.992	0.984	0.967	0.945
k _{eecal}	0.897					

(See AAPM's TG-51 Protocol for Clinical Reference Dosimetry of High Energy Photon and Electron Beams, Table I, PTW N30001 0.6 cc Farmer.)

Typical Energy Dependence

NIST technique	kVCP	Added filter		HVL	Energy	Typical calibration factor
		Al (mm)	Cu (mm)	(mm Al)	keV	(Gy/C)
M-80	80	2.6	0.0	2.9	50	4.96E+07
M-100	100	5.0	0.0	5.02	40	4.92E+07
M-250	250	5.0	3.2	18.5	90	4.83E+07
⁶⁰ Co					1250	4.99E+07*

* With supplied build-up cap.



Features

- Completely waterproof, does not require protective sleeve
- Pure aluminum electrode 1 mm in diameter, 20.0 mm long
- Fully guarded up to the collection volume
- Vented to air
- Compatible with existing phantoms

Specifications

Volume 0.61 cm³

Sensitivity 2.0 x 10⁻⁸ CGy⁻¹

Leakage < 4 x 10⁻¹⁵ A

Optimum polarizing voltage + 300 VDC

Maximum polarizing voltage 500 VDC

Minimum exposure 0.04 Gy

Ion collection time

300 V 0.14 ms

400 V 0.11 ms

500 V 0.09 ms

Wall material PMMA (C₅H₈O₂)_n acrylic with graphite layer

Wall density 1.19 g/cm³ (PMMA), 1.78 g/cm³ (C)

Wall thickness 0.203 mm (PMMA), 0.279 mm (C)

Wall area material density 73.8 mg/cm²

Electrode Pure aluminum, 1 mm Ø, 20.0 mm long

Cable 1.6 m with triaxial BNC connector

Cable leakage < 10⁻¹² CGy⁻¹ cm⁻¹

Temperature range + 10° to + 40°C

Relative humidity 20 to 75%

Buildup cap PMMA for ¹³⁷Cs - ⁶⁰Co

Weight 4.4 oz (125 gm)

Case Custom foam lined

Vent tubing material Polyethylene-lined ethyl vinyl acetate tubing

Saturation behavior

Maximum dose rate at continuous irradiation

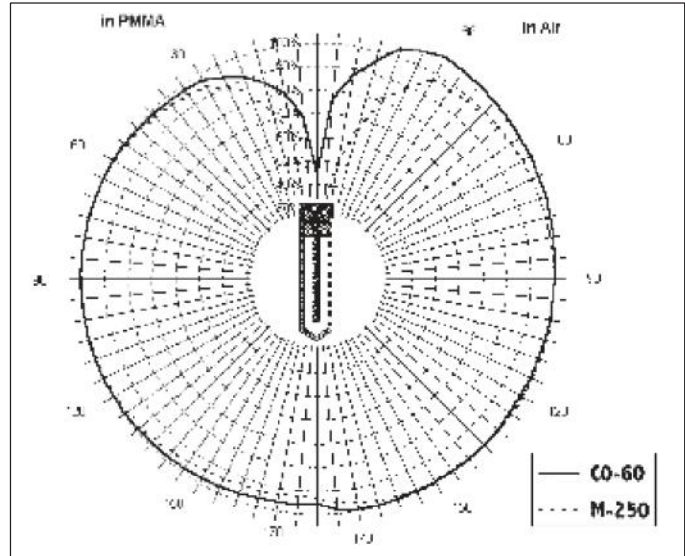
Polarizing voltage	99% saturation	99.5% saturation
500 v	6.0 Gys ⁻¹	3.0 Gys ⁻¹
400 V	10.7 Gys ⁻¹	5.3 Gys ⁻¹
500 V	16.6 Gys ⁻¹	8.3 Gys ⁻¹

Saturation behavior (cont)

Maximum dose rate per irradiation pulse

Polarizing voltage	99.0% saturation	99.5% saturation
300 V	0.6 mGy	0.3 mGy
400 V	0.8 mGy	0.4 mGy
500 V	1.0 mGy	0.5 mGy

Directional dependence



Optional accessories

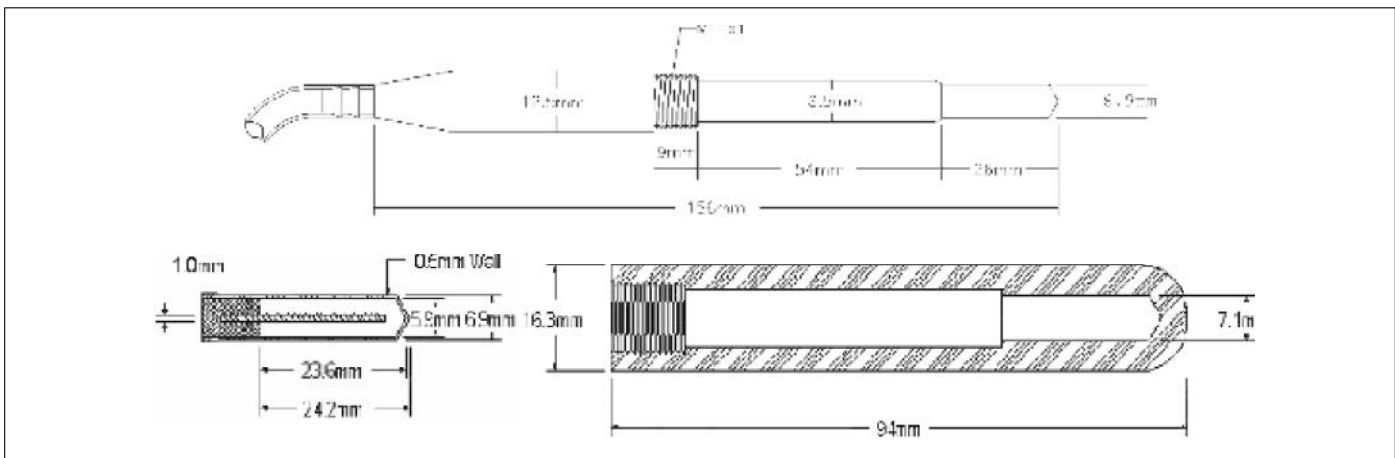
Extension Cable, 33 ft (10 m), Triax BNC plug to BNC jack (Model 86133)

Acrylic Buildup Caps (M11x1 Thread): available upon request

Waterproof Kit (Model 580-006-1)

Available model(s)

580-006-WP Farmer-Type Radiation Therapy Waterproof Ionization Chamber



For more information or to receive our full product catalog, contact **Fluke Biomedical** at 440.248.9300 or www.flukebiomedical.com/rms.

Specifications are subject to change without notice.

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