Brachytherapy Re-entrant Well Chamber

The rapid increase in oncology centers providing high dose rate brachytherapy treatments has prompted an intense interest in calibration procedures for high dose rate $^{192}\text{Ir}$ sources. Calibration of sources is necessary because some sources are delivered with $\pm 10\%$ specifications. One facility’s experience has shown a variation of $15\%$ in sources. Calibration with Farmer-type ion chambers requires a very time consuming procedure of 1 - 2 hours. For proper calibration, the jig and Farmer method requires multiple distance measurements which must be accurate to less than 1 mm. Scatter is produced by the jig apparatus which must be accounted for.

The HDR1000+ ion chamber, initially conceived by Professor Herb Attix, is designed specifically for use with high dose rate $^{192}\text{Ir}$ sources. A typical calibration time using the HDR1000+ ion chamber is 15 minutes. It eliminates any need for multiple distance measurements, therefore eliminating any chance of imprecision due to distance errors. All scatter is accounted for as part of its calibration factor. The HDR1000+ now offers a simple, reliable means to calibrate $^{192}\text{Ir}$ sources and to verify decay rates.

The HDR1000+ is supplied with a storage case.

**Features:**
- HDR and LDR Calibrations
- May be used with most any precision electrometer

**Specifications**

- Active volume: ............... 245 cc
- Nom. sensitivity: ............... $^{192}\text{Ir}$: 8.6 nA/Ci
- $^{125}\text{I}$: 5.4 nA/Ci
- Axial response: ............... $\pm 0.5\%$ over 25 mm at center of axis
- Accuracy: ...................... $\pm 1\%$
- Stability: ...................... 0.2% over 2 years
- Ion collection efficiency: ....... 0.9996 @ $>20$ Ci
- Leakage current: ............... $<$5 of A
- Typical bias: ..................... $\pm 300$ V
- Cable: ......................... 1 meter triaxial BNC (TNC optional)
- Well opening: ................. 3.5 cm dia., 12.1 cm deep
- Dimensions: .................. 10.2 cm dia. 15.6 cm high (4 x 6.1 in)
- Weight: ......................... 2.7 kg (6.1 lbs)

**Accessories:**

- 3BM-F10 10 m ................. triax extension cable, BNC male/female
- 70007 ......................... Wall-mount bracket for use with QA test tool insert
- 70008 ......................... QA Test Tool Insert
- Calibration HDR: ............... $^{192}\text{Ir}$
- LDR: ............................. $^{192}\text{Ir}$, $^{103}\text{Pd}$, $^{137}\text{Cs}$

**Source holders:**

- 70003 ......................... Source holder with 7.1 mm dia. aluminum catheter for cobalt sources and $^{137}\text{Cs}$ remote afterloading sources
- 70009 ......................... Source holder with 3 mm dia. acrylic coiled catheter for LDR $^{192}\text{Ir}$ ribbon seeds
- 70010 ......................... Source holder with 2.2 mm dia. aluminum catheter for HDR $^{192}\text{Ir}$ (this source holder is standard with HDR-1000+)
- 70016 ......................... Source holder with 1.2 mm dia. Teflon catheter for individual iodine or individual LDR seeds
- 70020 ......................... Source holder with 5 mm dia. aluminum catheter for $^{131}\text{Cs}$
- 70022 ......................... Source holder for LDR seed batch assay, up to 500 seeds and for iridium wire coil
- 70023 ......................... Source holder for RAPID Strand iodine seeds
- 70024 ......................... Source holder for MICK Cartridge
- 70026 ......................... Source holder for 5 and 10 cc Metastron syringes
- 70032 ......................... Source holder for Bard/Indigo Express cartridge

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1. Calibration and Quality Assurance, Ezell, Hicks, and DeWerd, International Brachytherapy, 1992