TABLE 4.VI. REFERENCE CONDITIONS RECOMMENDED FOR THE CALIBRATION OF IONIZATION CHAMBERS IN LOW-ENERGY AND MEDIUM-ENERGY X-RAY BEAMS IN STANDARDS LABORATORIES

Influence quantity	Reference value or reference characteristic	
	low-energy x-rays	medium-energy x-rays
Phantom material	PMMA or water-equivalent plastic	water
Phantom size	12 cm x 12 cm x 6 cm	30 cm x 30 cm x 30 cm (approximately)
Source-surface distance (SSD)	treatment distance as specified by the user [a]	treatment distance as specified by the user [a]
Air temperature [b]	20 °C [c]	20 °C [c]
Air pressure	101.3 kPa	101.3 kPa
Reference point of the ionization chamber	for plane-parallel ionization chambers, the centre of the outside of the front window (or the outside of any additional build-up foil)	for cylindrical chambers, on the central axis at the centre of the cavity volume
Depth in phantom of the reference point of the chamber	surface	2 g cm^{-2}
Field size at the position of the reference point of the chamber [d]	3 cm x 3 cm or 3 cm diameter	10 cm x 10 cm
Relative humidity	50%	50%
Polarizing voltage and polarity	no reference values are recommended but the values used should be stated in the calibration certificate	
Dose rate	no reference values are recommended but the dose rate used should always be stated in the calibration certificate. It should also be stated whether a recombination correction has or has not been applied and if so, the value should be stated	

[a] If more than one SSD is used, the greatest should be chosen for calibration.

[b] The temperature of the air in a chamber cavity should be taken to be that of the phantom, which should be measured; this is not necessarily the same as the temperature of the surrounding air

[c] In some countries the reference air temperature is 22°C.

[d] If these field sizes do not correspond to any of the user beams, then the closest field size to this that will be used clinically should be used.

TABLE 4.VII. QUADRATIC FIT COEFFICIENTS, FOR THE CALCULATION OF k_s BY THE "TWO-VOLTAGE" TECHNIQUE IN PULSED AND PULSED-SCANNED RADIATION, AS A FUNCTION OF THE VOLTAGE RATIO V_1/V_2 [76]

	Pulsed			Pulsed scanned		
V_1/V_2	a_0	a_1	a_2	a_0	a_1	a_2
2.0	2.337	-3.636	2.299	4.711	-8.242	4.533
2.5	1.474	-1.587	1.114	2.719	-3.977	2.261
3.0	1.198	-0.875	0.677	2.001	-2.402	1.404
3.5	1.080	-0.542	0.463	1.665	-1.647	0.984
4.0	1.022	-0.363	0.341	1.468	-1.200	0.734
5.0	0.975	-0.188	0.214	1.279	-0.750	0.474

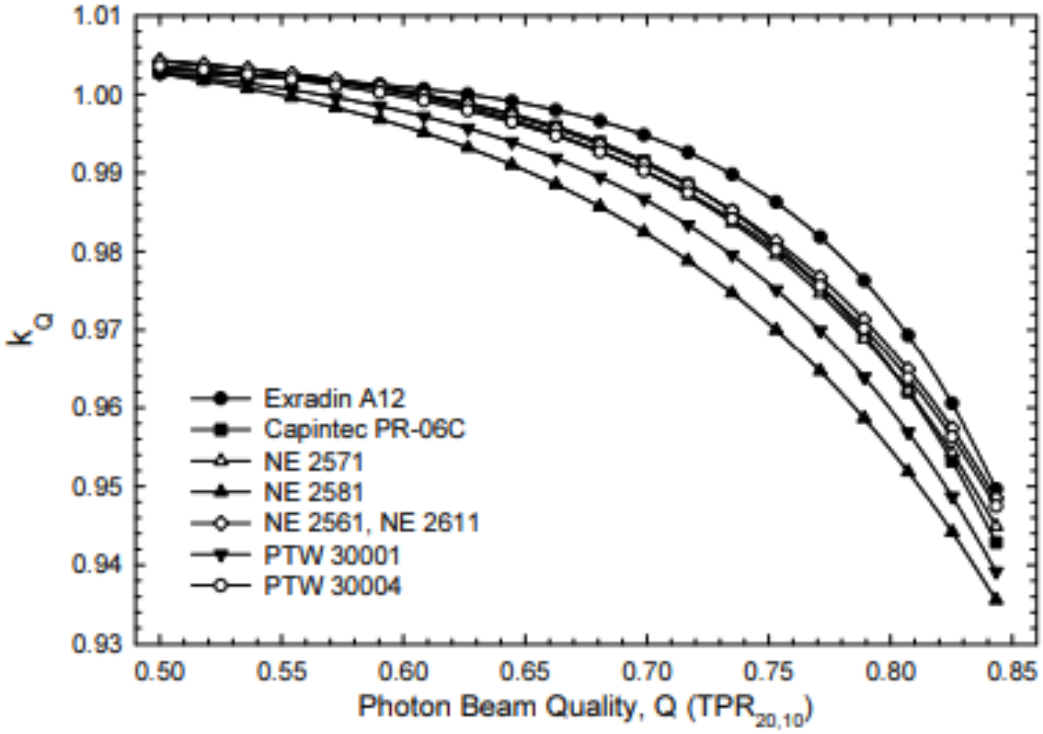


Fig. 6.2. Sigmoidal fits of calculated values of k_Q for various cylindrical ionization chambers commonly used for reference dosimetry, as a function of photon beam quality Q ($TPR_{20,10}$). Open symbols correspond to graphite-walled ionization chambers, solid symbols to plastic-walled chambers. Data from Table 6.III.

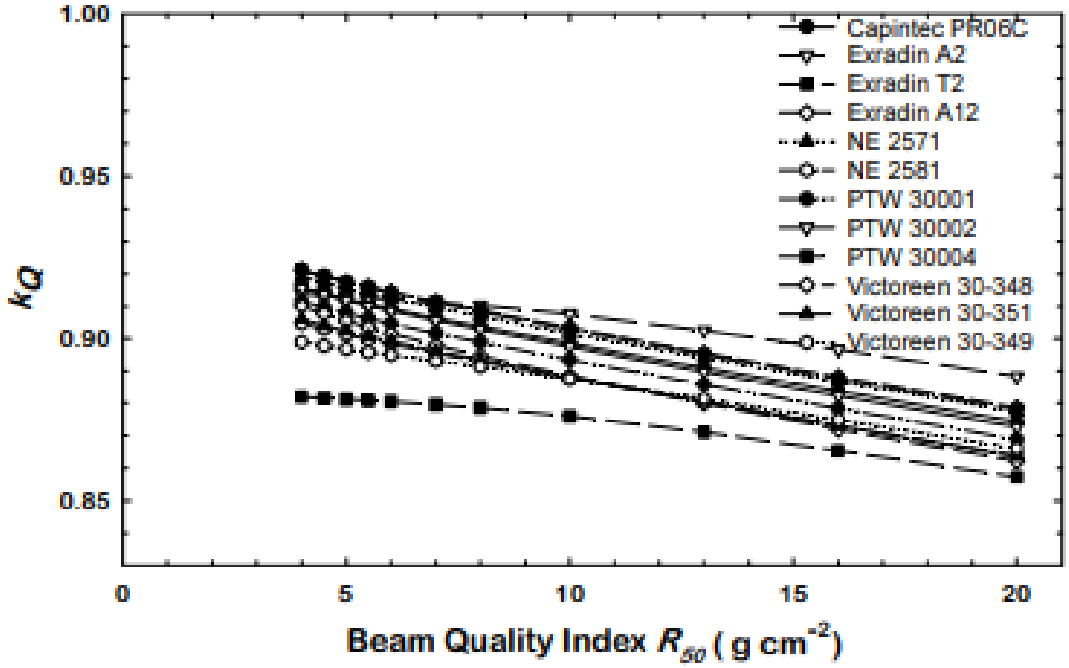


Figure 7.2. Calculated k_Q values for electron beams, for various cylindrical chamber types calibrated in ^{60}Co gamma radiation.