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APPLICATION NOTE

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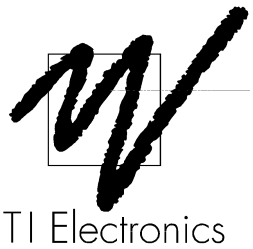

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Maximum mA Settings at Different kVp When Using the R25 or R100 Dose Detector with PMX-III

This application note describes how the highest possible tube current varies with kV and source to detector distance (SDD), when using PMX-III and the R25 or R100 semiconductor dose detector. The limitation depends on the sensitivity of the detector, and the current limitation in the PMX-III electrometer.

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Introduction

The PMX-III electrometer has an upper limit when measuring dose rate. For the dose value, the limitation is the upper display limit for the PMX-III. For example the upper limit for the rate is 2300 nA, which corresponds to around 180 mGy/s (1200 R/min) for R25, and around 45 mGy/s (300 R/min) for R100. The limitation for the display of the dose value is 9999 mGy (9999 R) for both R25 and R100. While the dose in most applications is not that high, the dose rate sets the limitation when measuring with the PMX-III.

When selecting between an R100 and an R25, one also has to have in mind that the R100 is about four times more sensitive than R25. That means that one can measure lower dose rates, which can be of advantage, for instance when measuring image intensifyer entrance dose rate. In most cases the sensititvity of R25 will be enough. Table 1 shows the dose rate ranges for PMX-III version 5.2 with the preamplifier AMP-1, and R25 or R100.

Table 1. *Dose rate ranges for PMX-III version 5.2. The lower limits are valid for AMP-1 (P1) and free run mode.*

R25	R100
40 nGy/s - 180 mGy/s	10 nGy/s - 45 mGy/s
4.5 µR/s - 1200 R/min	1.1 µR/s - 300 R/min

Maximum mA and kV for different source to detector distance

The dose rates mentioned above is corresponding to a mA and kV value, under conditions that no other changes are made in the measuring geometry. The table and figure below show typical values for a 3-phase, 12-pulse generator, operating under normal conditions. The values are valid for a total filtration of 3 mm Al.

Table 2 and Figure 1.*Upper limit for set tube current at different kV and SDD, when measuring with PMX-III and the dose detector R25 or R100. The values are valid for a 3 phase, 12 pulse generator, tungsten target, and a total filtration of 3 mm Al.*

Tube Potential	Typical mA limit for overflow in the PMX-III electrometer			
	R100 (SDD=50 cm)	R100 (SDD=100 cm)	R25 (SDD=50 cm)	R25 (SDD=100 cm)
50 kV	540 mA	2100 mA	2300 mA	9000 mA
60 kV	310 mA	1200 mA	1300 mA	5100 mA
70 kV	220 mA	880 mA	920 mA	3700 mA
80 kV	170 mA	680 mA	720 mA	2900 mA
90 kV	140 mA	560 mA	590 mA	2400 mA
100 kV	120 mA	460 mA	480 mA	1900 mA
110 kV	100 mA	400 mA	420 mA	1700 mA
120 kV	90 mA	340 mA	360 mA	1400 mA
130 kV	80 mA	310 mA	320 mA	1300 mA
140 kV	70 mA	280 mA	290 mA	1200 mA