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# APPLICATION NOTE

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## Energy Correction Factors for the R100 Solid State Detector

This application note describes the energy correction data for radiographic dose and dose rate measurements. These data are stored in the ADI module and used in oRTIgo to automatically compensate the readings of dose and dose rate according to kVp and total filtration.

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### Introduction

When using PMX-III with oRTIgo all measured dose and rate values are automatically compensated for the energy dependence of the detector. For manual measurements a correction graph is provided in the PMX-III User's Manual (see Chapter 7).

This application note specifies the correction factors stored in the ADI modules 8/A (50-150 kV, 23,0 mm Al) for beam quality A and 8/B (50-150 kV, 2,2 - 8,0 mm Al) for beam quality B. The kV range is 50 to 150 kV and total filtration from 2,2 to 23 mm Al. The reference point is at 70 kV with 3,0 mm Al filtration.

### Measurements

Assume that you are measuring in stand alone mode (i.e. without oRTIgo) on a radiographic unit. The total filtration is 5,0 mm Al, kVp is 70 kV and measured dose is 1,20 mGy. From table 1 below you get:

Correction factor  $C_q = 0,97$

Measured dose is  $1,20 \cdot 0,97 = 1,16$  mGy

Table 1. Correction factors  $C_q$  for the R100 detector.

kVp	2,2 mm	2,5 mm	3,0 mm	3,5 mm	4,0 mm	5,0 mm	6,0 mm	7,0 mm	8,0 mm	10,0 mm	15,0 mm	20,0 mm	23,0 mm
50	1,04	1,03	1,01	1,00	0,98	0,97	0,95	0,94	0,94	0,93	0,93	0,94	0,93
60	1,03	1,02	1,00	0,99	0,98	0,97	0,96	0,95	0,95	0,95	0,95	0,97	0,98
70	1,02	1,01	1,00	0,99	0,98	0,97	0,97	0,96	0,96	0,96	0,98	0,99	1,00
80	1,02	1,01	1,00	1,00	0,99	0,98	0,98	0,98	0,98	0,98	0,99	1,00	1,00
90	1,02	1,01	1,00	1,00	1,00	0,99	0,99	0,99	0,99	0,99	1,00	1,01	1,01
100	1,02	1,01	1,00	1,00	0,99	0,99	0,99	0,99	0,99	1,00	1,00	1,00	1,00
110	1,01	1,01	0,99	0,99	0,99	0,99	0,98	0,99	1,00	1,00	1,00	1,00	0,99
120	1,01	1,00	0,99	0,97	0,98	0,98	0,98	0,99	1,00	1,00	1,00	0,99	0,99
130	1,01	1,00	0,99	0,99	0,99	0,98	0,99	0,99	0,99	0,99	0,99	0,99	0,99
140	1,01	1,00	0,99	0,99	0,99	0,98	0,99	0,99	0,99	0,98	0,99	0,99	1,00
150	1,01	1,00	0,99	0,99	0,99	0,99	0,99	0,99	0,99	0,98	0,98	0,98	1,00

As seen in table 1 above or in figure 1 below, the correction is within  $\pm 2$  % above 80 kVp for all filtrations.

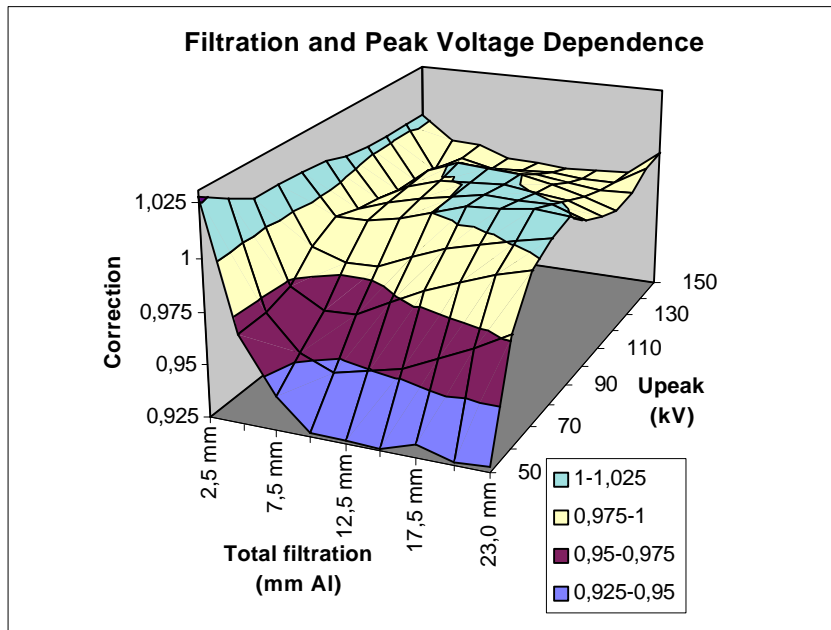


Fig. 1. 3D plot of the correction factor for peak voltage 50 to 150 kV and total filtration 2,5 to 23,0 mm Aluminium.

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