
APPLICATION NOTE

RTI Electronics AB, Sweden

March, 1993



RTI Electronics

Box 2034,
431 02 MÖLNDAL
SWEDEN

Phone: Int+ 46 31 275 275
Fax: Int+ 46 31 270 573

HVL-Total filtration conversion in oRTIgo PMX.

oRTIgo - PMX has the ability to convert the obtained HVL-values to total filtration provided the waveform of the generator is known. The background of this algorithm is given in this note.

RTI Electronics does not take any responsibility for the result when this application note is used.

By

R & D and Sales Department, RTI Electronics AB
Jan Lindström

What is the purpose of estimating HVL?

- * To convert the value to total filtration
- * To check the kVp

APPLICATION NOTE

No. 03-006/01

* To get a crude idea of how the spectrum looks like.

HVL is closely related to the effective energy of the spectrum. An X-ray spectrum is polyenergetic and that proves to distort our estimations of HVL severely.

If we assume that all the energies in a spectrum are weighted into only one, monoenergetic beam, this beam will have the "effective energy" of the polyenergetic beam. This leads to the interesting conclusion:

A spectrum having a low maximum energy and a high total filtration can have the same HVL-value as a spectrum having a higher maximum energy but a lower total filtration. To bypass this problem one can use the so called second HVL. A second HVL still having a high value will tell you that there is a high maximum energy present while a low max-energy spectrum will give a lower value.

HVL depends on

1. total filtration. (If other than Al, how does it influence?)
2. ripple
3. kVp
4. consistency of generator
5. anode angle
6. anode roughness
7. geometry (back scattering?)
8. field size (scatter)
9. extra focal scatter
10. purity of filters (Alloy 1100, 99.0 % for mammography: 99.99 %)
11. angulation of filters
12. thickness of filters
13. energy dependence of detector
14. interpolation procedures

• End •