INDEPENDENT X-RAY
QUALITY ASSURANCE

Quick Guide

DAP chamber
used with
RTI Chamber Adapter

This Quick Guide describes the requirements and specifications for use of the DAP chambers 147x147 mm^2) and 86x86 mm^2 (VacuDAP model 160 00 XX series) with the RTI Chamber Adapter.

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Specifications

DAP Chambers VacuDAP model 160 00 XX used with RTI Chamber Adapter

Range:	6 mGycm²/s - 1800 mGycm²/s
	0.6 mGycm² - 1 kGycm²
Exp. Uncertainty:	±6 % at reference conditions RQR5
	±10 % RQR2 to RQR10
Valid for:	Exp time >100 ms
	RTI Chamber Adapter v.1.1.

Note 1: The RTI Chamber Adapter must be of version 1.1 or higher.
Note 2: If the rate exceeds the specified range, the RTI Chamber Adapter will lock, and the Piranha will give a high signal message. This cannot be reset from Ocean. The Chamber Adapter will have to be powered off and on again to be un-locked.

How to use

The DAP chamber delivered from RTI is normally calibrated for incident Air Kerma Area Product. This means that the measured result will present the Air Kerma Area Product for any position after the exit window of the x-ray collimator where the radiation conditions can be considered to be the same. This makes it convenient to use the chamber for calibration or check of built-in DAP.
A DAP chamber can also be calibrated to measure transmitted radiation. In this case the measured result will present the Air Kerma Area Product for any position after the DAP chamber, where the radiation conditions can be considered to be the same. I.e. the attenuation of radiation that the DAP chamber itself adds is included, and thereby the reading will be lower than for incident Air Kerma Area Product.

Geometric arrangement

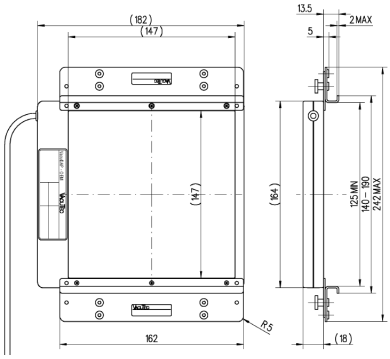
The positioning of the chamber is i many cases difficult. To achieve an as good geometry as possible there are a few things to think about that contributes to uncertainties.

1. The radiation field must, in any direction, fit inside the limits of the transparent window of the DAP chamber.
2. Avoid Back scatter, by keeping a distance to scattering material from patient table, image receptor, or other scattering material.
3. Avoid extra focal radiation and reduce scatter from the collimator, by keeping a distance from the focal spot and x-ray collimator.

To achieve a good geometry can be very hard. A positioning close to the x-ray collimator is normally a good trade off. Though one has to be aware of that some scatter and extra focal radiation will contribute to a slightly higher reading than if measure in a reference point at good geometric conditions free in air.

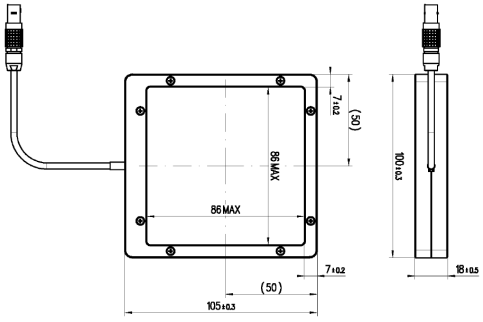
Specifications

DAP chamber 147x147 mm
VacuDAP 160 00 18 and 160 00 19



Notice: The rails showed in image are optional

DAP chamber 86x86 mm
VacuDAP 160 00 13



Technical Data
DAP chamber 147x147 mm, VacuDAP 160 00 18 and 160 00 19

All technical data are valid for the specified ambient conditions according to IEC 60580.

Response	
without additional absorber	800 pC / µGy·m²
with additional absorber (0.5 mm Al)	920 pC / µGy·m²
Leakage current	≤ 0.1 pA
Response versus radiation quality	- 6% / + 0% (50 kV ...150 kV, acc. IEC 60580)
Quality equivalent filtration (70 kV)	0.2 mm Al
Transparency	> 70%
Active Area (max.)	(1 .. 200) cm^2
Chamber voltage	300 V
Distance of the electrodes	6 mm
Stabilization time	5 min
Rated range of use	
Tube voltage	(40 ... 150) kV
Atmospheric pressure	(80.0 ... 106.0) kPa
Temperature	(+10 ... +40) °C
Air humidity	(10 ... 80) % rel. humidity (max. 20 g/m³)
Weight	
Ionization chamber	250 g

ATTENTION! The ionization chamber must frame the radiation field at all times!
The maximum dose area product rate must not be exceeded.

DAP chamber 86x86 mm, VacuDAP 160 00 13

All technical data are valid for the specified ambient conditions according to IEC 60580.

Response	
without additional absorber	900 pC / µGy·m²
with additional absorber (0.5 mm Al)	1050 pC / µGy·m²
Leakage current	≤ 0.1 pA
Response versus radiation quality	- 6% / + 0% (50 kV ...150 kV, acc. IEC 60580)
Quality equivalent filtration (70 kV)	0.2 mm Al
Transparency	> 70%
Active Area (max.)	(1 .. 64) cm^2
Chamber voltage	300 V
Distance of the electrodes	6 mm
Stabilization time	5 min
Rated range of use	
Tube voltage	(40 ... 150) kV
Atmospheric pressure	(80.0 ... 106.0) kPa
Temperature	(+10 ... +40) °C
Air humidity	(10 ... 80) % rel. humidity (max. 20 g/m³)
Weight Ionization chamber	100 g

ATTENTION! The ionization chamber must frame the radiation field at all times!

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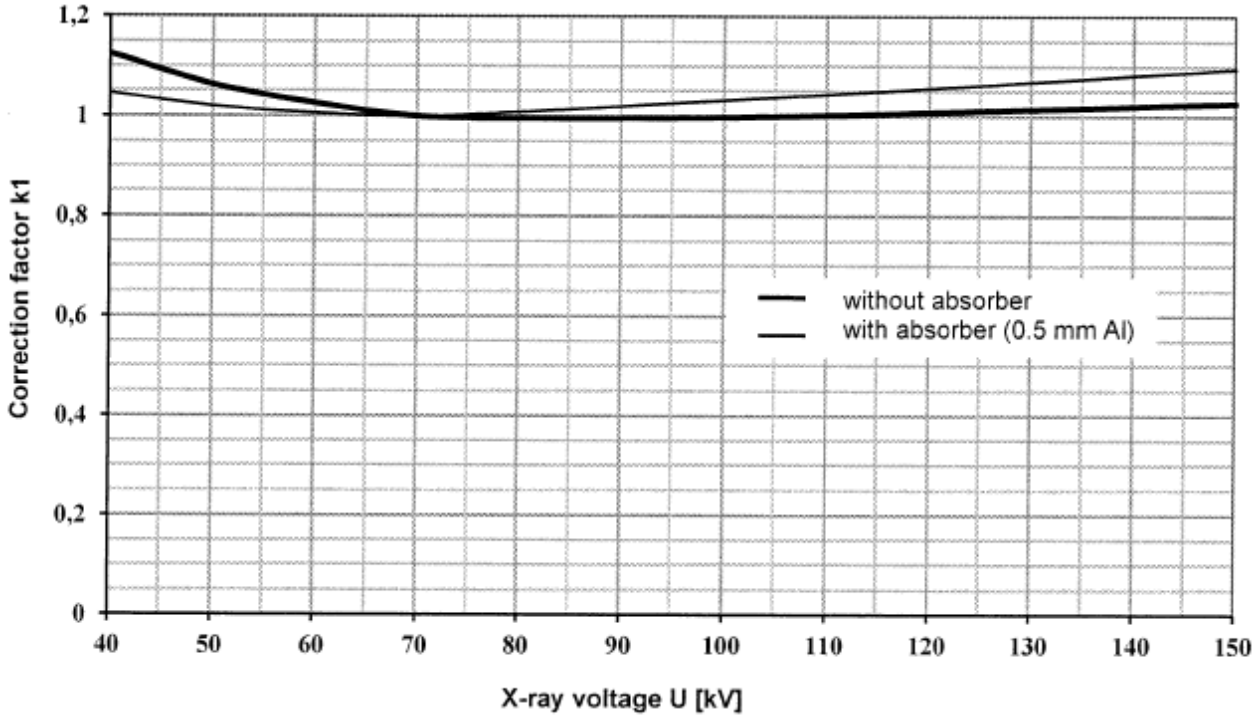
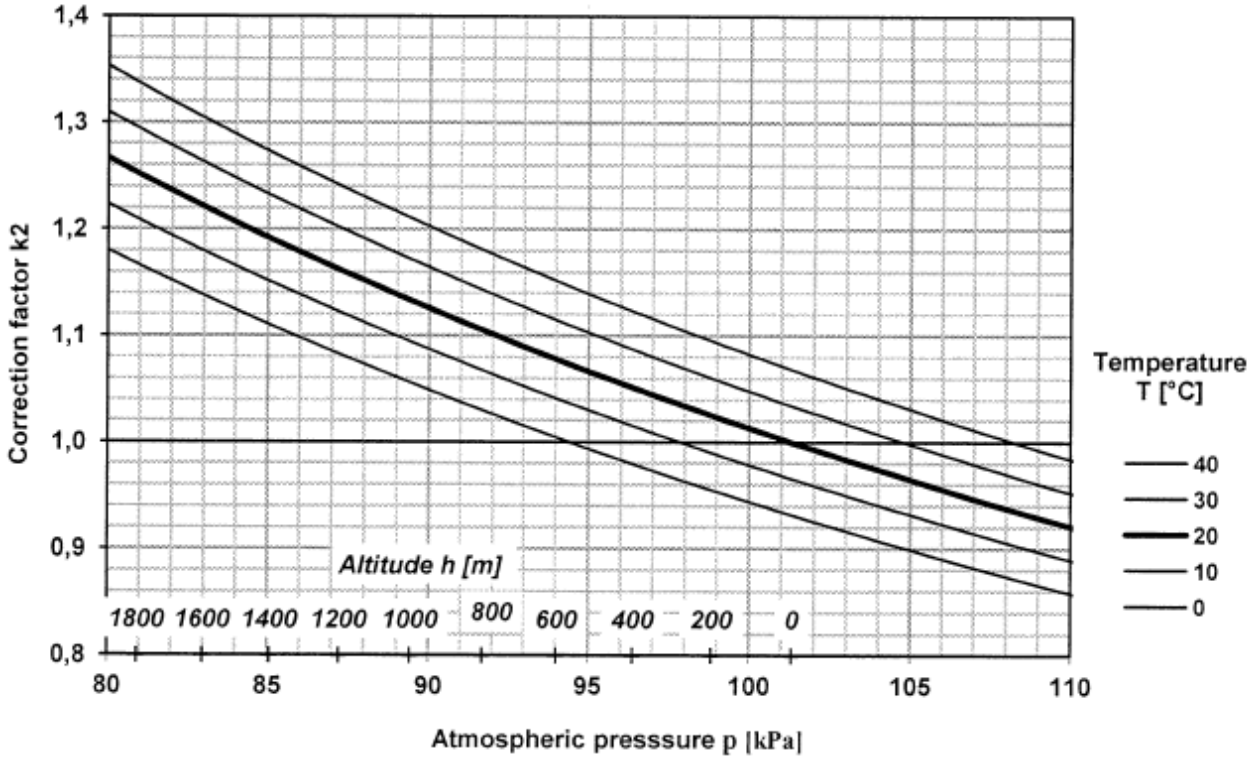
Response Correction VacuDAP 160 00 XX

The response of the ionization chamber is affected by the radiation quality and the air density. The response of the ionization chamber at different values of the X-ray voltage relative to the response at 70 kV is shown in Graph 1. The dependence on the air pressure or respectively the altitude is shown in Graph 2.



Graph 1: Response correction versus radiation quality.



Graph 2: Response correction versus atmospheric pressure.