ALAT UJI
Products, Solution, Services

Unfors EDD-30

Radiation Protection in Fluoroscopy

Immediate Warning Decrease Your Dose

Interventional radiology procedures are considered to be essential to medical diagnosis and treatment. It is recognized, however, that exposure to radiation is also potentially harmful to the staff that is required to perform these procedures.

Although steps may be taken to minimize exposure to secondary radiation through the use of protective garments and other forms of shielding, it is impossible to provide total protection to all parts of the body. Radiation dose can be monitored through the use of film badges and TLDs, but these devices can only provide retrospective information. In contrast, to learn how to avoid being unnecessarily exposed to radiation, there is a need for immediate warnings. With a simple tool like Unfors EDD, anyone being exposed to unnecessary radiation can learn to avoid it.

EDD - Educational Direct Dosimeter

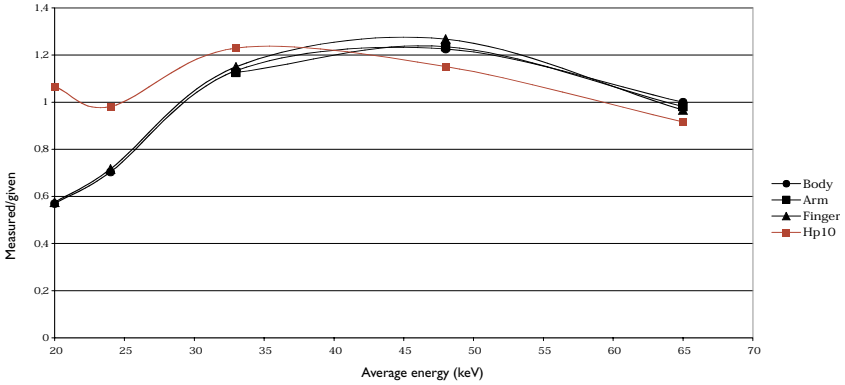
The Unfors EDD consists of a small sensor on a cable connected to a display unit. The sensor can measure the dose and dose rate to a specific part of the body, i.e. to eyes, hands, feet, etc. Total exposure time is also measured. When the sensor and display unit have been positioned and the instrument turned on, dose is accumulated and alarms are triggered when selected dose or dose rate limits are exceeded.

- **Immediate warning**
  (within one second)
- **Easy to wear**
- **Small sensor**
- **Spherical response**

Office: Jl. Radin Inten II No. 62 Duren Sawit, Jakarta 13440 - Indonesia
Workshop: Jl. Pahlawan Revolusi No. 22B, Jakarta 13430 - Indonesia
Phone: 021-8690 6777 (Hunting)
Mobile: +62 816 1740 8925
Fax: 021-8690 6777

Sensor Characteristics

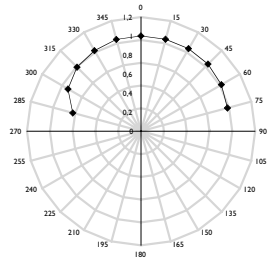
The Unfors EDD-30 sensor has a unique spherical response with an excellent linearity and accuracy so that true doses, at very low levels, can be measured anywhere on the body.



Unfors EDD-30 response [measured value/Hp(0.07)] on different ISO/ANSI phantoms and [measured value/Hp(10)] on ISO/ANSI body phantom.

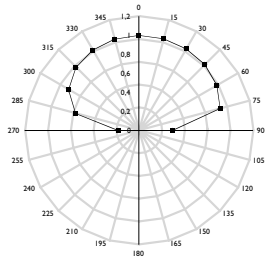
Response on body

Unfors EDD-30 response [measured value/Hp(0.07)] for 65 keV photons as a function of the incidence angle. The sensor is mounted on an ISO body phantom which is vertically rotated in the radiation field. The cable end of the detector is at 270°.



Response on finger

Unfors EDD-30 response [measured value/Hp(0.07)] for 65 keV photons as a function of the incidence angle. The sensor is mounted on an ISO finger phantom which is vertically rotated in the radiation field. The palm end is at 270° and the nail at 90°.



Specifications

General

Dose rate range:	0.03 mSv/h - 2 Sv/h 10 nGy/s - 0.6 mGy/s 2 mR/h - 130 R/h
1 mSv/h = 66 mR/h = 278 nGy/s	
Dose range:	10 nSv - 9999 Sv 10 nGy - 9999 Gy 1.0 µR - 9999 R
1 Sv = 98.3 R	
Start Trigger level:	0.054 mSv/h 15 nGy/s
End Trigger level:	0.036 mSv/h 10 nGy/s
Exposure time:	10 ms - 9999 s
System bandwidth:	10 Hz, 3 dB
Disinfections:	Sensor, cable and instrument housing can be wiped off with 70 % medical alcohol
Power source:	Two LR06 (AA) alkaline type
Battery life time:	130 hours
Auto Power off:	After two hours without radiation or key activities
Read out	4 digit custom LCD, display units
Size (H x W x L)	82 x 98 x 21 mm, 3.2 x 3.6 x 0.8 in
Weight	200 gr

Sensor

Inaccuracy:	± 6 % at calibration point
Calibration:	N-80 (80 kVp, 2 mm Cu and 4 mm Al)
Size (H x W x L)	6 x 11 x 22 mm, 0.2 x 0.4 x 0.9 in
Cable length:	1.5 m

Alarms

Body	Level 1	0.1 mSv/h
	Level 2	0.5 mSv/h
	Level 3	2.5 mSv/h
	Level 4	1.0 mSv
Eye	Level 1	0.3 mSv/h
	Level 2	1.5 mSv/h
	Level 3	7.5 mSv/h
	Level 4	1.0 mSv
Hand	Level 1	1.0 mSv/h
	Level 2	5.0 mSv/h
	Level 3	25.0 mSv/h
	Level 4	1.0 mSv
User defineable alarms		Yes
Buzzer		ON or OFF

All specifications may change without notice.

Office: Jl. Radin Inten II No. 62 Duren Sawit, Jakarta 13440 - Indonesia
Workshop: Jl. Pahlawan Revolusi No. 22B, Jakarta 13430 - Indonesia
Phone: 021-8690 6777 (Hunting)
Mobile: +62 816 1740 8925
Fax: 021-8690 6777

ALAT UJI
Products, Solution, Services

- ✔ *Fully Automatic X-ray meter*
- ✔ *kVp, dose, rate, HVL and time*
- ✔ *Extremely easy to use*

Unfors ThinX RAD

No keys! No menus! Just position and expose!

ALAT UJI
Products, Solution, Services

Unfors ThinX RAD

– An easy tool for fast results

The all-new Unfors ThinX RAD has been optimized to meet the need for a basic multi-parameter instrument for simultaneous measurement of dose, dose rate, kVp, HVL, exposure time and pulses. All parameters are conveniently displayed in the large LCD.

The main advantage of the Unfors ThinX RAD is that it provides a fully automatic user interface. Simply, there are no keys on the Unfors ThinX RAD. No set-up. No settings. No range selection. It's all automatic. Just position and expose. Utilizing Auto ON/OFF, the Unfors ThinX RAD turns itself on when radiation is detected! With an unequalled battery life of more than 1 year, there is literally no maintenance needed.

In spite of its small size, it is packed with world-leading, state-of-the-art technology to make your measurements effortless. There is no need to worry about manual corrections for added filtration. The meter uses Unfors' exclusive Active Compensation to apply corrections for variations in beam filtration to both kVp and dose measurements.

The Unfors ThinX RAD, being small and easy to use, is a perfect choice for radiation measurements in radiographic applications.

Immediate and effortless measurements

Unfors is renowned for improving productivity and providing pocket-sized easy-to-use meters based on solid state detectors. Now, the Unfors ThinX RAD provides even more accuracy by utilizing the Active Compensation feature.

Active Compensation is a proprietary feature derived from the market leading Unfors Xi technology. Multiple sensors and advanced calculations automatically determine the beam quality, thereby eliminating the need for further corrections of measured kVp and dose values.

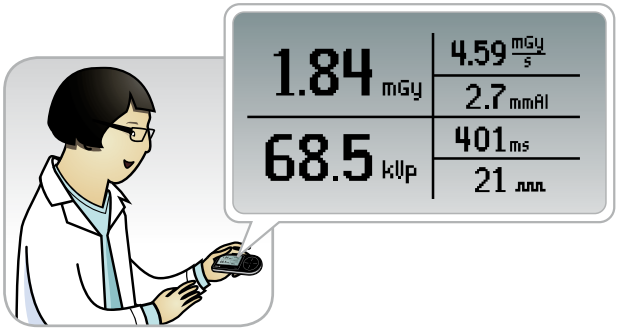
This results in a higher degree of simplicity for the user since no further corrections are needed to achieve maximum accuracy. Solid state sensor technology from Unfors equals immediate and effortless measurements.

How it works

The Unfors ThinX RAD is very easy to use. Simply position the meter under the X-ray beam and make one exposure. The display clearly shows all measured values.

Position

Expose



Read out

Office: Jl. Radin Inten II No. 62 Duren Sawit, Jakarta 13440 - Indonesia
Workshop: Jl. Pahlawan Revolusi No. 22B, Jakarta 13430 - Indonesia
Phone: 021-8690 6777 (Hunting)
Mobile: +62 816 1740 8925
Fax: 021-8690 6777

Specifications Unfors ThinX RAD

General

EMC tested according to EN 61000-6-1:2001 and EN 61000-6-3:2001

Exposure needed	One
Power off	Automatic after 2.5 min of inactivity
Reset	Automatic
Power source	1 battery CR 2450
Battery life	2 years of typical use
Read out	128 x 64 pixel LCD
Size (H x W x L)	13 x 45 x 108 mm, 0.5 x 1.8 x 4.3 in
Weight	< 70 g, 2.5 oz

kVp

Range	45 – 150 kVp
Resolution	0.5 kVp
Uncertainty	3%

Dose

Range	20 µGy – 999 mGy at >70 kV (2.3 mR–114 R) Minimum dose at 50 kV is 100 µGy (11.4 mR)
Resolution	1 µGy (0.1 mR)
Uncertainty	5%

Dose rate

Range	0.1 mGy/s – 100 mGy/s at >70 kV (0.7 R/min – 685 R/min) Minimum dose rate at 50 kV is 0.5 mGy/s (3.4 R/min)
Resolution	0.01 mGy/s (0.1 R/min)
Uncertainty	5%

HVL

Range	1.0–10.0 mm Al
Resolution	0.1 mm Al
Uncertainty	10% or 0.2 mm Al

Exposure time

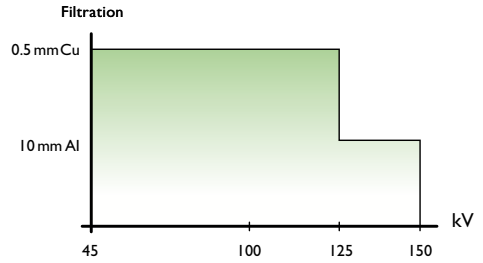
Range	10 ms – 10 s
Uncertainty	0.5%
Resolution	1 ms
Bandwidth	0.5 kHz

Pulses

Range	3–999 pulses, max 375 ms dead time between pulses.
Uncertainty	1 pulse

If the X-ray generator waveform is pulsed the Unfors ThinX RAD will also automatically display pulses.

Active Compensation Range



The Unfors ThinX RAD comes in three models:

ThinX RAD	Dose, rate, kVp, HVL, time, pulses
ThinX RAD kVp	kVp, time, pulses
ThinX RAD Dose	Dose, rate, HVL, time, pulses

Office: Jl. Radin Inten II No. 62 Duren Sawit, Jakarta 13440 - Indonesia
Workshop: Jl. Pahlawan Revolusi No. 22B, Jakarta 13430 - Indonesia
Phone: 021-8690 6777 (Hunting)
Mobile: +62 816 1740 8925
Fax: 021-8690 6777

ALAT UJI
Products, Solution, Services

Unfors Instruments

Unfors, established in 1994 in Billdal, Sweden, is a market leading manufacturer of measuring instruments for QA and service of diagnostic X-ray equipment. While the headquarter is in Sweden we serve our international customers from our subsidiaries in USA, Germany, Singapore, India and China. Thanks to our customers' acceptance of the unique Unfors Concept, we are now the leading and fastest growing company in our industry. Based on our long history of designing small and easy-to-use meters we used the best of our advanced proprietary technologies, from instruments like the Unfors Xi and the Unfors Mult-O-Meter, to design the new Unfors ThinX.

Office: Jl. Radin Inten II No. 62 Duren Sawit, Jakarta 13440 - Indonesia
Workshop: Jl. Pahlawan Revolusi No. 22B, Jakarta 13430 - Indonesia
Phone: 021-8690 6777 (Hunting)
Mobile: +62 816 1740 8925
Fax: 021-8690 6777

Unfors PSD
Patient Skin Dosimeter

Avoid radiation injuries on patients

The new Unfors PSD, Patient Skin Dosimeter, represents the latest in today's technology for radiation protection. The Unfors PSD is used in CT and fluoroscopy procedures to prevent excessive dose usage and consequential patient lesions.

The Unfors PSD

The Unfors PSD consists of several small sensors on cables connected to a display unit. The small sensors can be placed anywhere on the body and leave a minimal footprint on the X-ray image.

The display unit can be placed on the side of the patient table or next to ceiling suspended monitors. When the sensor and display unit have been positioned and the instrument turned on, dose is accumulated and alarms (audible and visual) are triggered when selected dose limits are exceeded. The Unfors PSD can be delivered with one, two , three or four sensors depending on the application.

Sensor Characteristics

The Unfors PSD sensors have been specially designed to meet the needs of real-time dose measurements on patients. Sensor characteristics give accurate information to the user on when injury risk is imminent.

The sensors, cable and instrument can be sanitized with an antiseptic such as propyl alcohol.

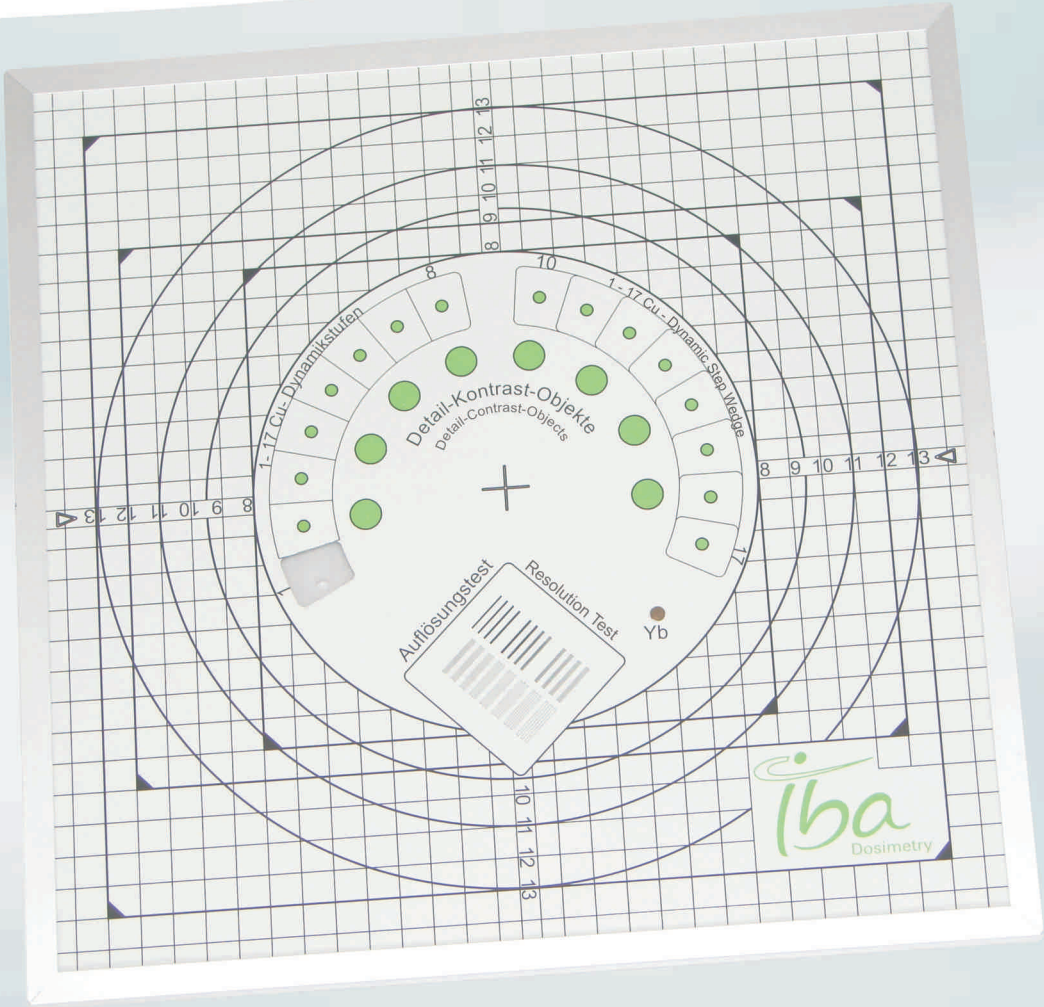
Alarms

There are four different factory alarm levels set to 25%, 50%, 75% or 100% of 2 Gy which is the documented deterministic biological injury level. Accumulated dose can be read in the display. The Unfors PSD gives you the unique opportunity to decrease patient dose by increasing your awareness.

Office: Jl. Radin Inten II No. 62 Duren Sawit, Jakarta 13440 - Indonesia
Workshop: Jl. Pahlawan Revolusi No. 22B, Jakarta 13430 - Indonesia
Phone: 021-8690 6777 (Hunting)
Mobile: +62 816 1740 8925
Fax: 021-8690 6777

ALAT UJI
Products, Solution, Services

Quality Assurance in Radiodiagnostics
“All-in-One” Image Quality Test Device Primus |



for digital + conventional Radiography and Fluoroscopy

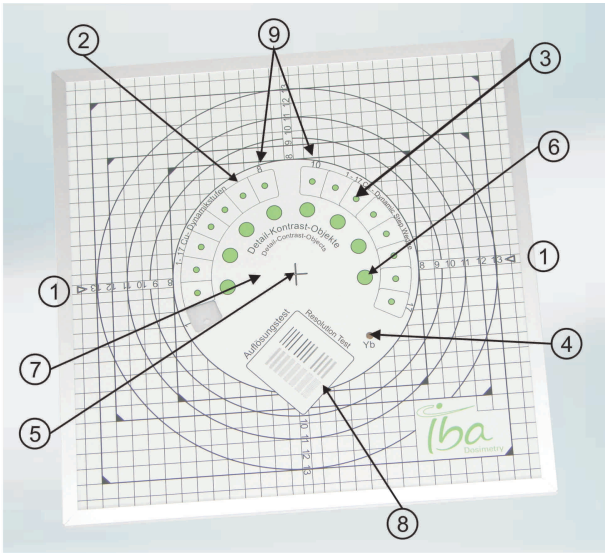
Office: Jl. Radin Inten II No. 62 Duren Sawit, Jakarta 13440 - Indonesia
Workshop: Jl. Pahlawan Revolusi No. 22B, Jakarta 13430 - Indonesia
Phone: 021-8690 6777 (Hunting)
Mobile: +62 816 1740 8925
Fax: 021-8690 6777

Image quality test device Primus |

ALAT UJI
Products, Solution, Services

Our newest “All-in-One” test device for ....
... QA - tests at digital + conventional radiographic and fluoroscopic X-ray units

Structured body in accordance with DIN 6868-4, 2007.



1. Direction of the tube axis
2. Dynamic step wedge (Step 1 : 0.00 mm Cu; Step 17 : 3.48 mm Cu)
3. 16 detail contrast objects with a diameter of 4 mm, depth 2.5 mm in PMMA
   (for the evaluation of the contrast resolution in each step of the copper step wedge)
4. kV-test area made of Ytterbium, 0.78 mm thick
5. Line cross as center mark
6. 8 detail contrast objects with a diameter of 10 mm, depth 0.4 - 4 mm;
   for the determination of the contrast resolution at the current work settings.
7. Unstructured inner area
8. High resolution test 0.6 - 5.0 lp/mm (Dimension of the deposited plate of copper: 1.1 mm)
9. Radiographically visible numbers for indication of the dynamic steps.

Parameters and their determination:

- Dose and dose rate
- Dose indicator
- Linepair resolution performance
- Contrast resolution
- Limitation of the radiation field
- Artefacts

VD0203510 Test device Primus S
200 x 200 mm, incl. 30 mm PMMA-plate
VD0203520 Test device Primus L
300 x 300 mm
25 mm Al-pre-attenuator (VD050320) or PMMA-attenuation body (VD0203521) necessary

Office: Jl. Radin Inten II No. 62 Duren Sawit, Jakarta 13440 - Indonesia
Workshop: Jl. Pahlawan Revolusi No. 22B, Jakarta 13430 - Indonesia
Phone: 021-8690 6777 (Hunting)
Mobile: +62 816 1740 8925
Fax: 021-8690 6777

ALAT UJI
Products, Solution, Services

Unfors DXR+

Direct X-ray Ruler

X-ray/Light field alignment

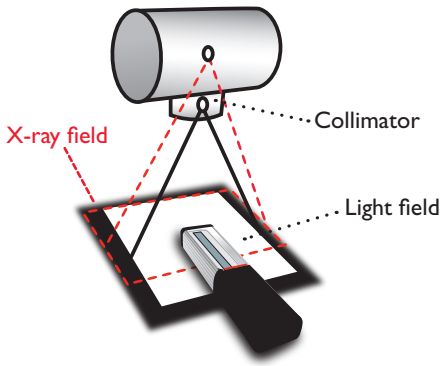
The new Unfors DXR+, Direct X-ray Ruler, represents the latest in today's technology for alignment of the light and radiation field.

Traditionally screen-film cassettes have been used for X-ray/light field alignment measurements. The digitization of X-ray imaging makes this method obsolete as cassettes and film processors are often unavailable. The Unfors DXR+ provides you with an easy to use alternative to making these measurements.

The Unfors DXR+ is extremely easy to use as it is powered on by simply exposing the meter. Features include auto reset and auto power off. There is no need to adjust the light field to a square phantom before making an exposure. No time is wasted waiting for films to be developed.

The pocket-sized Unfors DXR+ operates down to 30 kVp and gives an objective, reproducible and immediate read-out.

- **Fully automatic**
- **Radiographic & Mammo**
- **Ideal for digital imaging**
- **6 - 8 years battery life**



Expose the Unfors DXR+ and read the deviation in the display within seconds.

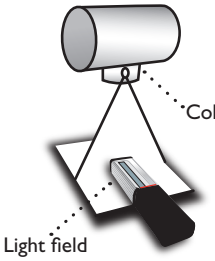
Office: Jl. Radin Inten II No. 62 Duren Sawit, Jakarta 13440 - Indonesia
Workshop: Jl. Pahlawan Revolusi No. 22B, Jakarta 13430 - Indonesia
Phone: 021-8690 6777 (Hunting)
Mobile: +62 816 1740 8925
Fax: 021-8690 6777

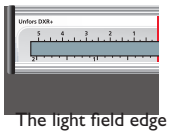
Quick checks

International regulations recommends that the radiation and light field should be aligned within 2 % of the SID or even ± 5 mm at the chest wall for mammo. The Unfors DXR+ sensor array has been specially designed to meet the needs of real-time checks of the light and radiation field alignment on radiographic and mammographic X-ray equipment.
The characteristics of the sensors provide an accurate and instantaneous result where adjustment is needed. A metric scale on the Unfors DXR+ PCB is visible on the X-ray image.

1. Position the Unfors DXR+

- Position the X-ray ▶ -symbol within the light field.
- Align the red center line with the light field edge.

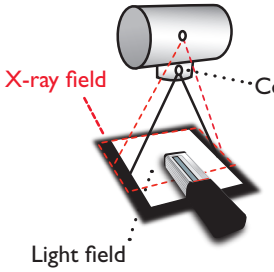




The light field edge is aligned with the red center line.

2. Expose and read out

- Expose and read any X-ray/light field deviation in the Unfors DXR+ display.



The X-ray field is 1.2 cm (0.5 in) inside of the light field.

Adjust the collimator.

Specifications Unfors DXR+

General

Range	± 5 cm or ± 2 in
Segment sensors/read out	41 solid state sensors and corresponding LCD display segments
Segment resolution	0.25 cm 0.1 in
Function test	All segments should turn on when the Unfors DXR+ is fully irradiated.
Power on	Automatic when exposed
Power off	Automatic after 1 min of inactivity
Reset	Automatic
Battery life time	6 - 8 years (CR1632) based on 2000 exposures per year
Operating temperature	10 - 40°C 50 - 104°F
Storage temperature	-20 - +60°C -4 - +140°F
Size (H x W x L)	15 x 30 x 145 mm, 0.59 x 1.18 x 5.71 in
Weight	75 gr, 2.6 oz

Recommended Generator Settings

kVp	30	50	70	100
mA	>100	>200	>100	>50
SID cm	<65	<100	<100	<100
Exposure time	>10 ms			
No added tube filtration				

Office: Jl. Radin Inten II No. 62 Duren Sawit, Jakarta 13440 - Indonesia
Workshop: Jl. Pahlawan Revolusi No. 22B, Jakarta 13430 - Indonesia
Phone: 021-8690 6777 (Hunting)
Mobile: +62 816 1740 8925
Fax: 021-8690 6777