

Summary of Enclosed Documents

R-Tech Dental of Minnesota
Michael Wiltrout

Product:	Unfors Xi External Detector
Model:	RF
Serial Number:	146884

R/F Arrival Check: Date: 2009-06-15 Result: Within Tolerance

R/F Calibration Certificate: Date: 2009-06-15

Calibration Equipment List

Your instrument has passed several strict tests and has been approved for delivery. Enclosed you will find detailed documents for your instrument.

Service Activity:

Upgraded base to ver 5.05, upgraded external detector to ver 5.03, Calibrated and Verified

Recommended calibration interval for this instrument is 12 months that begins on the date of receipt by the customer.

Due to the different transportation methods and local customs (i.e. delivery channel), you may have received an instrument with a calibration certificate that is several weeks old. Our past experience indicates the calibration of this product is not affected by storage prior to its initial receipt by the customer. Important consideration should be given as to when the instrument is put into service and the manufacture recommended calibration interval.



Arrival Check

Unfors Xi R/F

R-Tech Dental of Minnesota

Michael Wiltrout

Date of Arrival Check:	06-15-09	Model:	RF
Product:	Unfors Xi External Detector	Serial Number:	146884

Measurement details

kVp

Total Filtration = 2.5 mm Al

R/F Low				
Generator settings		Measurements		
Set kVp	Set mA	Ref. kVp	Xi kV	spec. 2% Deviation (%)
49	100	49,6	49,9	0,7%
70	50	70,5	71,4	1,2%
99	25	99,7	99,8	0,1%
145	25	145,7	145,9	0,1%

Total Filtration = 2.5 mm Al

R/F High				
Generator settings		Measurements		
Set kVp	Set mA	Ref. kVp	Xi kVp	spec. 2% Deviation (%)
49	250	49,6	49,6	0,1%
70	100	70,5	70,9	0,6%
99	32	99,7	99,3	-0,4%
145	25	145,7	146,1	0,2%

Dose

Total Filtration = 2.5 mm Al

R/F Low				
Generator settings		Measurements		
Set kVp	Set mAs	Ref. Dose μ Gy	Xi dose μ Gy	spec. 5% Deviation (%)
49	32	220,4	221,8	0,7%
70	16	237,4	238,9	0,7%
99	8	223,9	223,1	-0,3%
145	8	434,5	425,0	-2,2%

Total Filtration = 2.5 mm Al

R/F High				
Generator settings		Measurements		
Set kVp	Set mAs	Ref. Dose μ Gy	Xi dose μ Gy	spec. 5% Deviation (%)
49	80	7346	7366	0,3%
70	32	6317	6313	-0,1%
99	10	3847	3800	-1,2%
145	8	5630	5478	-2,7%

Time

Total Filtration = 2.5 mm Al

R/F High				
Generator settings		Measurements		
Set kVp	Set ms	Ref. Time ms	Xi Time ms	spec. 0.5% Deviation (%)
70	320	320,0	320,6	0,2%

*) Out of Tolerance



Certificate of Calibration

Unfors Xi R/F

R-Tech Dental of Minnesota

Michael Willrout

Date of Calibration:	06-15-09	Product:	Unfors Xi External Detector
Serial Number:	146884	Model:	RF

Measurement details

kVp Total Filtration = 2.5 mm Al

R/F Low				
Generator settings		Measurements		
Set kVp	Set mA	Ref. kVp	Xi kV	spec. 2% Deviation (%)
49	100	49,3	49,2	-0,3%
70	50	70,5	70,5	0,0%
99	25	99,8	98,9	-0,9%
145	25	146,0	146,4	0,2%
Active Compensation		Total Filtration = 2.5 + 10 mm Al		
80	50	80,6	81,8	1,5%

Total Filtration = 2.5 mm Al

R/F High				
Generator settings		Measurements		
Set kVp	Set mA	Ref. kVp	Xi kVp	spec. 2% Deviation (%)
49	250	49,3	49,6	0,4%
70	100	70,5	70,5	0,0%
99	32	99,8	99,5	-0,3%
145	25	146,0	147,1	0,8%
Active Compensation		Total Filtration = 2.5 + 10 mm Al		
80	64	80,6	81,2	0,8%

Dose Total Filtration = 2.5 mm Al

R/F Low				
Generator settings		Measurements		
Set kVp	Set mAs	Ref. Dose μ Gy	Xi dose μ Gy	spec. 5% Deviation (%)
49	32	274,4	275,1	0,3%
70	16	297,5	296,2	-0,4%
99	8	278,2	276,6	-0,6%
145	8	334,7	334,3	-0,1%
Active Compensation		Total Filtration = 2.5 + 10 mm Al		
80	16	67,4	67,3	-0,1%
		Total Filtration = 2.5 mm Al + 26 mm Al		
70	50	21,57	21,64	0,3%

Total Filtration = 2.5 mm Al

R/F High				
Generator settings		Measurements		
Set kVp	Set mAs	Ref. Dose μ Gy	Xi dose μ Gy	spec. 5% Deviation (%)
49	80	8387	8397	0,1%
70	32	7257	7259	0,0%
99	10	4408	4389	-0,4%
145	8	6335	6335	0,0%
Active Compensation		Total Filtration = 2.5 + 10 mm Al		
80	20	1045	1043	-0,2%

HVL Total Filtration = 2.5 mm Al

R/F Low				
Generator settings		Measurements		
Set kVp	Set mAs	Ref. HVL	Xi HVL	spec. 10% Deviation (%)
70	16	2,48	2,56	3,2%

Total Filtration = 2.5 mm Al

R/F High				
Generator settings		Measurements		
Set kVp	Set mAs	Ref. HVL	Xi HVL	spec. 10% Deviation (%)
70	32	2,48	2,54	2,4%

Time Total Filtration = 2.5 mm Al

R/F High				
Generator settings		Measurements		
Set kVp	Set ms	Ref. Time ms	Xi Time ms	spec. 0.5% Deviation (%)
70	320	321,0	320,7	-0,1%

Summary of Enclosed Documents

R-Tech Dental on Minnesota
Michael Willtrout

Product:	Unfors Xi Base Unit w/ mAs
Model:	mAs
Serial Number:	147404

mAs Calibration Certificate: *Date:* 06-15-09
Calibration Equipment List

*Your instrument has passed several strict tests and has been approved for delivery.
Enclosed you will find detailed documents for your instrument.*

Service Activity:

Calibrated and verified

Recommended calibration interval for this instrument is 12 months that begins on the date of receipt by the customer.

Due to the different transportation methods and local customs (i.e. delivery channel), you may have received an instrument with a calibration certificate that is several weeks old. Our past experience indicates the calibration of this product is not affected by storage prior to its initial receipt by the customer. Important consideration should be given as to when the instrument is put into service and the manufacture recommended calibration interval.



Certificate of Calibration

R-Tech Dental on Minnesota
Michael Wiltrout

Serial number:	147404	Product:	Unfors Xi Base Unit w/ mAs
Date of calibration:	6-15-09	Model:	mAs

Measurement details

mA				
Nominal Settings		Measured Data		
Current (mA)	Exposure Time (s)	Ref. Current (mA)	Xi Current (mA)	spec. 1.0% Deviation (%)
1,2	6	1,2	1,2	0,7%
20	6	20,0	20,0	0,0%

mAs		
		Measured Data
Reference mAs (mAs)	Xi mAs (mAs)	spec. 1.0% Deviation (%)
200	200,9	0,5%



Calibration Equipment

R-Tech Dental on Minnesota
Michael Wiltrout

Date of calibration:	6-15-09	Model:	mAs
Product:	Unfors Xi Base Unit w/ mAs	Serial no:	147404

The listed equipment below were used as main references for the calibration

Reference Equipment		Calibration Date
REFERENCE SYSTEM mAs	Unfors mAs Box S/N: 114	04-21-09
REFERENCE SYSTEM mA	Fluke 189 S/N: 92180049	01-08-09

The expanded uncertainties of measurement for the Unfors Xi Base Unit w/ mAs are:


0,1 % for mAs 0.15% for mA

The expanded uncertainty is stated as the combined uncertainty of measurement multiplied by the coverage factor k=2, which assuming a normal distribution has a coverage probability of 95 % (Guide to Uncertainty of Measurements, ISO, 1995).

All reference systems are calibrated once a year. The mA system is tested by Fluke and traceable to NIST. The mAs system is tested by Bodycote Metech accredit by SWEDAC.

Calibration condition:

Ambient temperature: 72°F ± 3°F
Relative humidity: 50% ± 10%

Tested by: Jie He
Certified by: 
Susan Cussen

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