

Certificate Number: o10172657i285440



Calibration Certificate



Accred. no. 2035
Calibration
ISO/IEC 17025

Customer
PHYSICS ASSOCIATES LLC
PETERS CREEK ROAD 5346
24019 ROANOKE
UNITED STATES

Laboratory
Unfors RaySafe AB
Uggledalsvägen 29
SE-42740 Billdal
Sweden
+46 31 719 97 10 (phone)
+46 31 910 950 (fax)
customerservice.se@raysafe.com

CUSTOMER INSTRUMENT

Product X2 R/F
Serial Number 285440
Manufacturer RaySafe

CALIBRATION INFORMATION

As Found Not performed
As Left 2020-10-20
Adjustment Done Yes
Tested by Eva Larsson

Approved by

Örjan Arnström
Finalization operator

Certificate Date 2020-10-27

This laboratory is accredited by the "Swedish Board for Accreditation and Conformity Assessment" (SWEDAC) and the results shown in this certificate have been determined within the scope of accreditation unless stated otherwise in this certificate.



Certificate Number: o10166197i286182



Calibration Certificate



Accred. no. 2035
Calibration
ISO/IEC 17025

Customer
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CUSTOMER INSTRUMENT

Product X2 MAM
Serial Number 286182
Manufacturer RaySafe

CALIBRATION INFORMATION

As Found Not performed
As Left 2020-07-07
Adjustment Done Yes
Tested by Marcus Alm

Approved by

Christoffer Lindström
Lab Technician

Certificate Date 2020-07-22

This laboratory is accredited by the "Swedish Board for Accreditation and Conformity Assessment" (SWEDAC) and the results shown in this certificate have been determined within the scope of accreditation unless stated otherwise in this certificate.



Certificate Number: 010144153i268053



Calibration Certificate



2035
ISO/IEC 17025

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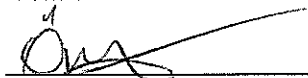
CUSTOMER INSTRUMENT

Product X2 MAM
Serial Number 268053
Manufacturer RaySafe

CALIBRATION INFORMATION

As Found Not performed
As Left 2019-08-15
Adjustment Done Yes
Tested by Pakorn Wisitnan

Approved by


Örjan Arnström
Finalization operator

Certificate Date 2019-09-05

This laboratory is accredited by the "Swedish Board for Accreditation and Conformity Assessment" (SWEDAC) and the results shown in this certificate have been determined within the scope of accreditation unless stated otherwise in this certificate.



MQSA⁽¹⁾ Certificate of Calibration

Issued To: Physics Associates
5346 Peters Creek Rd. Ste A-3
Roanoke, VA. 24019

Equipment Description	Model	S/N	Asset No.
Radiation Monitor	1015	2888	N/A
Ion Chamber	10X5-6M	7718	N/A

Condition of Equipment As-Left:

In Tolerance

Remarks: Prior to calibration, the equipment was examined and found to be in good condition and performed in accordance with the manufacturer's specifications with the exceptions listed below:

1. None


The equipment identified above has been calibrated and tested using standard Radcal calibration and acceptance procedures in accordance with Radcal Quality Manual PP1007, 4600130 - CertCal - Mammo Chamber.XLT Rev:K and technical requirements contained in the customer's order. These procedures are designed to ensure that the tested equipment meets or exceeds the stated specifications and the requirements of ANSI/NCLS Z540-1-1994.

⁽¹⁾See MQSA Advisory Note attached.


All measurements performed during the testing employ equipment traceable to NIST or another recognized National Laboratory such as Physikalisch-Technische Bundesanstalt (PTB). All calibration results included with this certificate were recorded at the time of measurement and shall not imply anything about the instrument's future stability. This must be determined from previous historical data.

Calibration Date: 16 November 2020
Date of Report 16 November 2020
Interval, as defined by MQSA: 24 months after date of calibration
Calibration Due: 16 November 2022

Calibration Tech.:


AV

By:


Authorized Reviewers
E. Macintosh / M. Bryant

MQSA⁽¹⁾ Certificate of Calibration

Measurement Test Conditions

A Lorad M-IV Mammographic X-ray generator equipped with Tungsten target and a beryllium window x-ray tube was used as the source of the required mammographic x-ray beam. The generator ripple is less than 1 kV. Filters were added to produce the required beam (see data). The output of the generator was measured with a Radcal Dynalyzer invasive voltage divider. The HV-1 output was measured with an analog-to-digital converter with an uncertainty of $\pm 0.1\%$. All reported kVp, mA and time measurement results have an uncertainty of better than $\pm 1\%$ at the 95% confidence level. Dose measurements were made using the substitution method and normalized with a reference mammographic dose diode. Reported dose and dose rate measurement results have an uncertainty of better than $\pm 5\%$ at the 95% confidence level.

Conditions of Measurement

Temperature: 21.2 °C
 Pressure: 100.11 kPa
 Humidity: 36%

NOTE: All dose measurements were normalized to 22°C, 101.3 kPa.

"CF" = correction factor and True Reading = CF x Reading

All exposures were made with the DUT oriented perpendicular to the beam.

The beam is collimated to not expose the chamber stem (if applicable).

Exposure Properties

ISO Beam	Added Filtration (mm Al)	First HVL (mm Al)	Homog. Coeff. hc	Set kV	Avg. Current mA	Avg. Time ms	Distance (Perp.)
M30	0.496	0.366	0.68	30	89	227	75 cm

Calibration Results

Exposure #	Standard	DUT	DUT CF
	Dose mR	Dose mR	
1	338.8	337.0	1.005
2	338.9	337.0	1.006
3	338.9	337.0	1.006
Avg.	338.9	337.0	1.006

MQSA⁽¹⁾ Certificate of Calibration

Issued To: Physics Associates
5346 Peters Creek Rd. Ste A-3
Roanoke, VA. 24019

Equipment Description	Model	S/N	Asset No.
Radiation Monitor	1015	6043	N/A
Ion Chamber	10X5-6M	7872	N/A

Condition of Equipment As-Left:
In Tolerance

Remarks: Prior to calibration, the equipment was examined and found to be in good condition and performed in accordance with the manufacturer's specifications with the exceptions listed below:

1. None

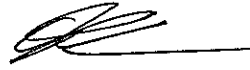
The equipment identified above has been calibrated and tested using standard Radcal calibration and acceptance procedures in accordance with Radcal Quality Manual PP1007, 4600130 - CertCal - Mammo Chamber.XLT Rev:J and technical requirements contained in the customer's order. These procedures are designed to ensure that the tested equipment meets or exceeds the stated specifications and the requirements of ANSI/NCLZ 5540-1-1994.

⁽¹⁾See MQSA Advisory Note attached.

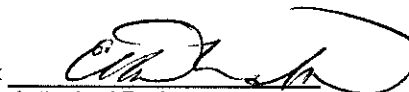
All measurements performed during the testing employ equipment traceable to NIST or another recognized National Laboratory such as Physikalisch-Technische Bundesanstalt (PTB). All calibration results included with this certificate were recorded at the time of measurement and shall not imply anything about the instrument's future stability. This must be determined from previous historical data.

Calibration Date: 8 October 2020
Date of Report 8 October 2020
Interval, as defined by MQSA: 24 months after date of calibration
Calibration Due: 8 October 2022

Calibration Tech.:


AV

By:


Authorized Reviewers
E. Macintosh / M. Bryant

MQSA⁽¹⁾ Certificate of Calibration

Measurement Test Conditions

A Lorad M-IV Mammographic X-ray generator equipped with Tungsten target and a beryllium window x-ray tube was used as the source of the required mammographic x-ray beam. The generator ripple is less than 1 kV. Filters were added to produce the required beam (see data). The output of the generator was measured with a Radcal Dynalyzer invasive voltage divider. The HV-1 output was measured with an analog-to-digital converter with an uncertainty of $\pm 0.1\%$. All reported kVp, mA and time measurement results have an uncertainty of better than $\pm 1\%$ at the 95% confidence level. Dose measurements were made using the substitution method and normalized with a reference mammographic dose diode. Reported dose and dose rate measurement results have an uncertainty of better than $\pm 5\%$ at the 95% confidence level.

Conditions of Measurement

Temperature: 22.3 °C
 Pressure: 99.80 kPa
 Humidity: 44%

NOTE: All dose measurements were normalized to 22°C, 101.3 kPa.
 "CF" = correction factor and True Reading = CF x Reading
 All exposures were made with the DUT oriented perpendicular to the beam.
 The beam is collimated to not expose the chamber stem (if applicable).

Exposure Properties

ISO Beam	Added Filtration (mm Al)	First HVL (mm Al)	Homog. Coeff. hc	Set kV	Avg. Current mA	Avg. Time ms	Distance (Perp.)
M30	0.496	0.366	0.68	30	89	227	75 cm

Calibration Results

Exposure #	Standard	DUT	DUT CF
	Dose mR	Dose mR	
1	338.6	344.0	0.984
2	338.9	344.0	0.985
3	338.9	344.0	0.985
Avg.	338.8	344.0	0.985



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Report No: 128579CAL

Certificate of Calibration

Issued To: Physics Associates
 5346 Peters Creek Rd. Ste A-3
 Roanoke, VA. 24019

Equipment Description	Model	S/N	Asset No.	Status As Left
Radiation Monitor	1015	5936	N/A	-----
Ion Chamber	10X5-6M	8826	N/A	In Tolerance

NOTE: Prior to calibration, the equipment was examined and found to be in good condition and performed in accordance with the manufacturer's specifications with the exceptions listed below:
 1. None

Status As Found/Left refers to system performance with each distinct sensor or chamber defining the system.

The equipment identified above has been calibrated and tested using standard Radcal calibration and acceptance procedures in accordance with Radcal Quality Manual PP1007, 4600130 - CertCal - Mammo Chamber.XLT Rev:J and technical requirements contained in the customer's order. These procedures are designed to ensure that the tested equipment meets or exceeds the stated specifications and the requirements of ANSI/NCLS Z540-1-1994.

All measurements performed during the testing employ equipment traceable to NIST or another recognized National Laboratory such as Physikalisch-Technische Bundesanstalt (PTB). All calibration results included with this certificate were recorded at the time of measurement and shall not imply anything about the instrument's future stability. This must be determined from previous historical data.

Calibration Date: 13 October 2020

Date of Report 13 October 2020

Interval, as defined by customer: 12 months after date of calibration

Calibration Due: 13 October 2021

Calibration Tech.:

AV

By:

Authorized Reviewers
 E. Macintosh
 Sensor Engineering