

The equipment was tested for conformance with Radcal specifications using applicable Conformance test procedures. These procedures include inspection, operation with an x-ray machine and electrical test. The results are summarized below:

Model Number	Serial Number	Description	Meets Mfr Spec	Spec limit (±)	Cal Date
9096	96-0409	Control Unit - Accu-Pro	Yes	Pass/Fail	13-Nov-15
9660	01-2264	Ion Chamber Converter	Yes	Pass/Fail	13-Nov-15
10X6-6	03-0668	Ion Chamber	Yes	4%	13-Nov-15
40X12-W	52-0539	Diagnostic kV Sensor	Yes	Pass/Fail	13-Nov-15
10X6-6M	04-0468	Ion Chamber	Yes	4%	13-Nov-15
40X9-MO	49-1022	Mammography kV Sensor	Yes	Pass/Fail	13-Nov-15

Service requested:

When the kV cable is connected to either of the kV meters the unit says "No Converter".
Sometimes works, but numbers are very inaccurate.
Perform conformance test, inspection and issue certificate.

Service performed:

Verified customers problem statement.
Replaced main cable to fix problem.
The 10x6-6 ion chamber cap was loose and cracked.
Replaced cap.
Replaced alkaline batteries with rechargables.
MQSA still valid.
Issued Certificate of Conformance.

Parts Replaced

Part No	Quantity	Description	Unit cost	Ext cost
4001002-006	1	MP-CAP	\$22.25	\$22.25
BAT/NIMH-C	2	BATTERY, NIMH C-CELL 2500MAH	\$27.50	\$55.00



Certificate of Conformance

Issued to: Upstate Medical Physics
1290 Blossom Dr.
Victor NY 14564

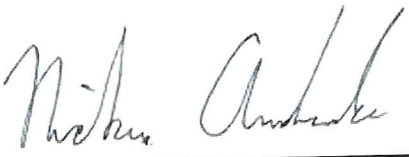
<u>Equipment Description</u>	<u>Model</u>	<u>S/N</u>
Control Unit - Accu-Pro	9096	96-0409
Ion Chamber Converter	9660	01-2264
Ion Chamber	10X6-6	03-0668
Ion Chamber	10X6-6M	04-0468

The equipment identified above has been calibrated and tested using Radcal calibration and acceptance procedure PP1102, Radcal Quality Manual PP1007, Radcal Policy and Procedure PP1038, PI1045, PI1055 and other related documents. The equipment has been found to conform in all respects. These test procedures are designed to ensure that the tested equipment meets or exceeds all aspects of Radcal's published product specifications and requirements. Radcal is an ACLASS accredited calibration lab that meets the requirements of ISO 17025 and ANSI/NCLZ 540-1, cert number AC-1553.

All measurements performed during the testing employ equipment traceable to NIST or another recognized National Laboratory such as Physikalisch-Technische Bundesanstalt (PTB).

For additional information please refer to Radcal's Product note: "The Importance of Conformance Testing". Radcal recommends revalidation in 12 months.

Certificate Issue Date: 13-Nov-15

By: 
Authorized Representative

Radcal Corporation

426 W. Duarte Rd.
Monrovia, CA 91016
Tel: (626) 357-7921
Fax: (626) 357-8863

Service No: S116522

Certificate of Conformance

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Victor NY 14564

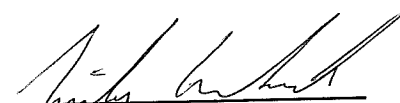
Equipment Description	Model	S/N
Accu-kV Mammographic Sensor	40X9-MO	49-1022

The equipment identified above has been calibrated and tested using Radcal service acceptance procedure A4087133, Radcal Quality Manual PP1007, Radcal Calibration Program Policy and Procedure PP1038 and other related documents. These procedures are designed to ensure that the tested equipment meets or exceeds Radcal's specifications and the requirements of ANSI/NCLS Z540-1-1994. For additional information please refer to Radcal's Product Note: "The Importance of Conformance Testing"

All measurements performed during the testing employ equipment traceable to NIST or another recognized National Laboratory such as Physikalisch-Technische Bundesanstalt (PTB).

Radcal recommends a recalibration interval of 12 months.

Certificate Issue Date: November 13, 2015

By: 
Authorized Reviewer

Radcal Corporation
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Service No: S116522
Date: November 13, 2015

Certificate of Conformance

Measurement Test Conditions

A Lorad M-II Mammographic X-ray generator equipped with Mo target and a beryllium window x-ray tube was used as the source of the required x-ray beam. The generator ripple is less than 0.1 kV. A 30 μ m Mo filter was added to the beam. The Accu-kV sensor's long axis was aligned perpendicular to the tube anode-cathode axis for all measurements. The output of the generator was measured with a Radcal HV-1 High-Voltage Divider. The voltage divider output was recorded at a 7 kHz sampling rate by a 16-bit analog to digital converter and the results were averaged over 100 mS. All reported measurement results have an accuracy of better than ± 1 % at the 95% confidence level.

Test Methods

The measurements were made in accordance with Radcal Test Procedure A4087133.

Limitations of Use:

See Manufacturer's specifications

Conditions of Measurement

Temperature: 24 °C
Humidity: 34%

Note: Corrections for environmental conditions
are not required for this equipment

Measurement Results

AccuKv 40X9-MO Mammographic Sensor Calibration

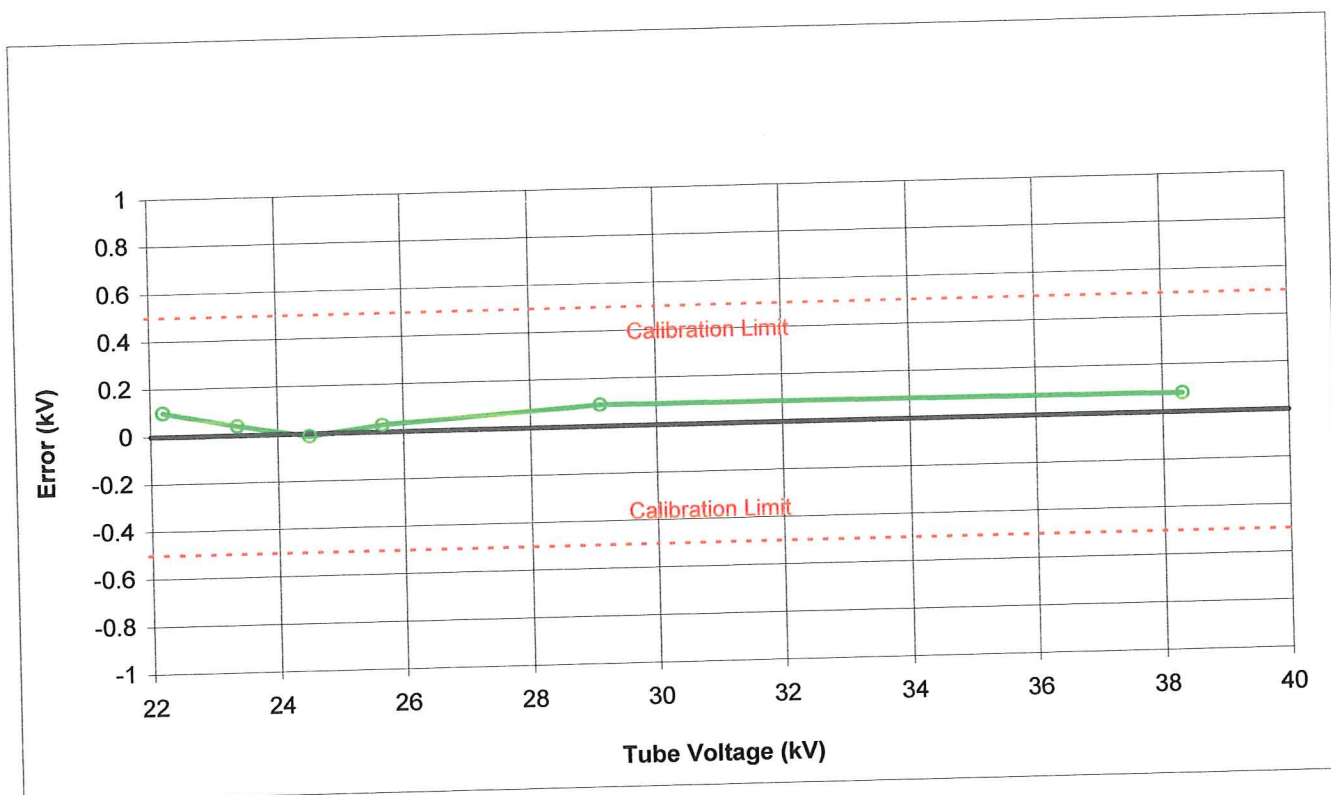
25-40 mA , 500 ms, 30 μ m Mo total filtration, 30.5 cm target to detector

Invasive kV	Accu kV kVAvg	Error		Pass/ Fail
22.20 kV	22.30 kV	0.10 kV	0.45%	Pass
23.36 kV	23.40 kV	0.04 kV	0.17%	Pass
24.51 kV	24.50 kV	-0.01 kV	-0.04%	Pass
25.67 kV	25.70 kV	0.03 kV	0.12%	Pass
29.11 kV	29.20 kV	0.09 kV	0.31%	Pass
38.32 kV	38.40 kV	0.08 kV	0.21%	Pass

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Service No: S116522
Date: November 13, 2015

AccukV 40X9-MO Mammographic Sensor 49-1022
Calibration Error (kV) vs. Tube Voltage (kV)
30 μ m Mo Total Filtration



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Certificate of Conformance

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Victor NY 14564


Equipment Description	Model	S/N
Accu-kV Diagnostic Sensor	40X12-W	52-0539

The equipment identified above has been calibrated and tested using Radcal calibration and acceptance procedure A4087132, Radcal Quality Manual PP1007, Radcal Calibration Program Policy and Procedure PP1038 and other related documents. These procedures are designed to ensure that the tested equipment meets or exceeds Radcal's 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).

Radcal recommends a recalibration interval of 12 months.

Certificate Issue Date: November 13, 2015

By: 
Authorized Reviewer

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Certificate of Conformance

Measurement Test Conditions

An Electromed EDEC-80 X-ray generator equipped with a Varian Model A192 tungsten target x-ray tube was used as the source of the required x-ray beam. The generator ripple is less than 0.5 kV. The X-ray Generator's filtration is set to produce a half value layer of 2.89 mmAl at 70kV. The output of the generator was measured by a Radcal Dynalyzer IIIU. The Dynalyzer outputs was recorded at a 7 kHz sampling rate by a 16-bit analog-to-digital converter and the results were averaged over 200mS. All reported measurement results have an accuracy of better than $\pm 1\%$ at the 95% confidence level.

Test Methods

The measurements were made in accordance with Radcal Test Procedure A4087132

Limitations of Use:

See Manufacturer's specifications

Conditions of Measurement

Temperature: 23 °C

Humidity: 35%

Note: Corrections for environmental conditions
are not required for this equipment

Measurement Results

AccukV 40X12-W Diagnostic Sensor calibration

EMED 1 Values 25 ma , 750 ms, 2.89 mmAl half value layer at 70kVp, 53 cm target to detector

Dynalyzer kV	Accu kV kVAvg	Error	Error %	Pass/Fail
41.1	41.0 kV	-0.11 kV	-0.3%	Pass
59.7	59.7 kV	-0.04 kV	-0.1%	Pass
70.0	69.7 kV	-0.26 kV	-0.4%	Pass
86.4	86.6 kV	0.20 kV	0.2%	Pass
97.8	98.0 kV	0.23 kV	0.2%	Pass
153.3	153.2 kV	-0.10 kV	-0.1%	Pass

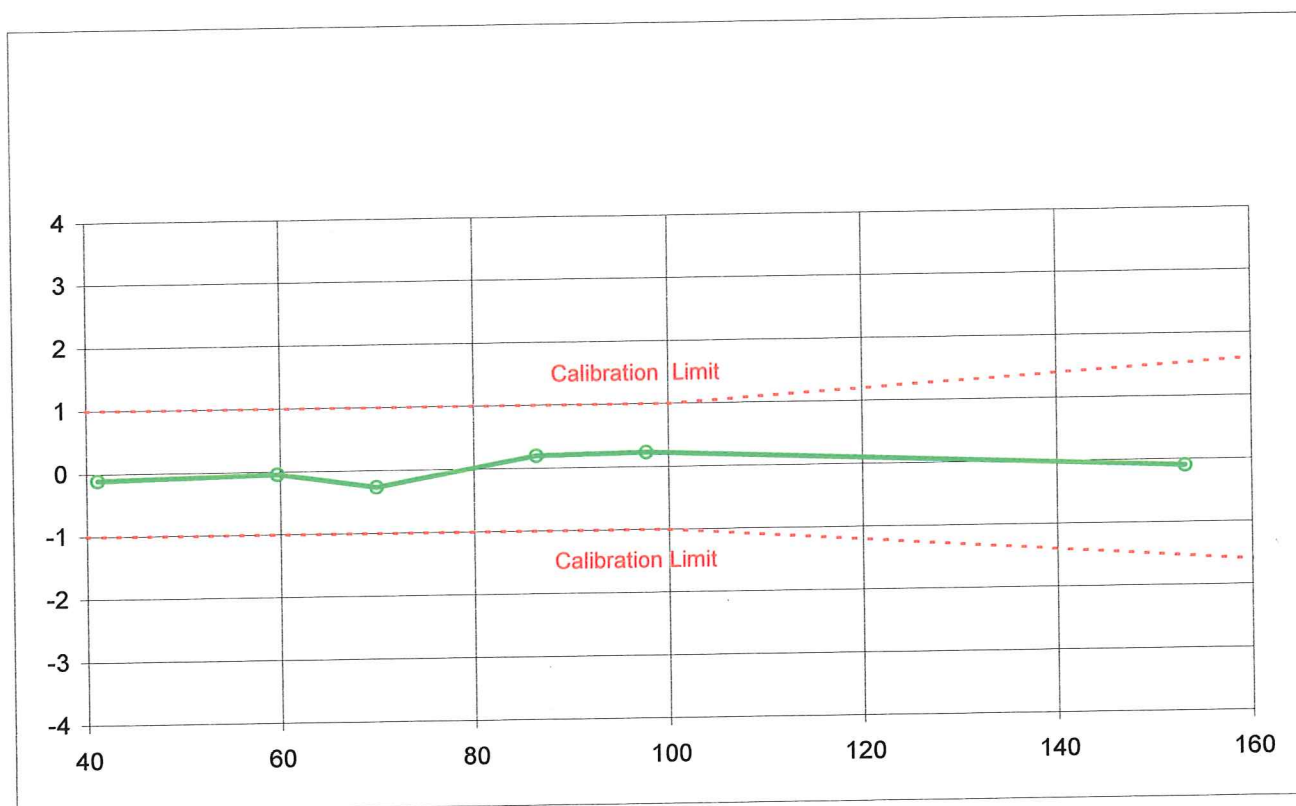
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AccukV 40X12-W Diagnostic Sensor 52-0539
Calibration Error (kV) vs. Tube Voltage (kV)
2.89 mm Al HVL at 70kV





Product Note

Topic: The Importance of Conformance Testing

High-quality dose-measurement instruments have evolved from rather simple devices to sophisticated measurement systems. They are no longer simple ion-chamber and solid-state instruments that are easy to characterize and calibrate in terms of charge and current. They have dynamic ranges exceeding 10,000,000 to one and may measure dose, dose rate, time, kVp and other parameters in a variety of ways. Many have direct computer access and provide automatic corrections for ambient conditions and other measurement parameters.

Owners of Radcal equipment have an additional benefit designed into their instruments — detector interchangeability. Radcal guarantees that its calibration specifications will be met when detectors are exchanged between compatible control units. Thus, detectors and control units are not calibrated as matched sets. Each component is tested and adjusted independently to meet its own specific requirements. The benefits of interchangeability can be enormous for users who own or have access to more than one Radcal instrument. Specialized detectors for CT, mammography, or scatter measurements can be shared freely thereby reducing calibration and system costs. When a detector or control unit requires service, only the faulty component needs to be returned for service if it is clear which component is faulty.

What is appropriate for a calibration of such equipment? Correction factors stating the deviation from a few standard values? Can you be sure that these correction factors are valid under your measurement conditions? Can you be confident that these correction factors are valid for the doses, dose-rates, and beam qualities you will use? Will your instrument properly perform the additional functions that may be present in your instrument such as timing and temperature and pressure correction?

Radcal believes that its customers should have full confidence that their instrument will meet all of its published specifications following service and calibration. This condition can only be satisfied when extensive tests, and adjustments if necessary, are performed in the same manner as when a new instrument is tested before delivery. These test procedures are designed to insure automatic detector recognition and interchangeability, full operation over the instrument's dynamic range, and proper operation of all special functions such as timing and temperature and pressure corrections. This then is the full meaning of Radcal's Certificate of Conformance. It is far more than the simple statement of a correction factor. It guarantees that your instrument will perform as stated in Radcal's published specifications.