

## Certificate of Calibration

### Beaverton Service Center

**Certificate Number:** 104715

**Data Type:** As-Left  
**Result Summary:** In Tolerance  
**Manufacturer:** Fluke  
**Model:** 70 III  
**Serial Number:** 69920523  
**Description:** Multimeter

**Calibration Date:** 27-Jan-2015  
**Calibration Due:** 27-Jul-2015  
**Certificate Date:** 27-Jan-2015  
**Temperature:** 23.0 °C  
**Humidity:** 35.5 %

**Procedure:** Fluke 70-3: (1 year) CAL VER /5520A

**Revision:** 1.2

**Customer:** STATE OF WASHINGTON

**City:** SEATTLE

**Country:** US

**State:** WA

**Purchase Order:** IW 20-JAN-2015

**RMA:** 30703768

This calibration is traceable to the International System of Units (SI), through National Metrology Institutes (NIST, PTB, NRC, NPL, etc.), radiometric techniques, or natural physical constants. This certificate applies only to the item identified and shall not be reproduced other than in full, without the specific written approval by Fluke Corporation. Calibration certificates without signature are not valid. The calibration has been completed in accordance with Fluke Electronics Corporation Quality System Document 111.0 Revision 118 8/2014 and/or Fluke 17025 Quality Manual QSD 111.41 Revision 005 9/2014.

The Data Type found in this certificate must be interpreted as:

- As - Found Calibration data collected before the unit is adjusted and / or repaired.
- As - Left Calibration data collected after the unit has been adjusted and / or repaired.
- Found-Left Calibration data collected without any adjustment and / or repair performed.

This calibration conforms to the requirements of ANSI/NCCL Z540-1-1994 (R2002).

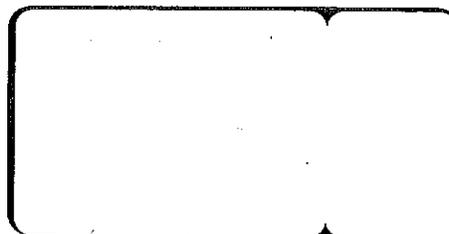
In the attached measurement results, deviation may be expressed with units, Measured Value (MV) - Nominal Value (NV) or as a proportion of the nominal value ((MV-NV)/NV), expressed without units with a scalar multiplier such as % (0.01), or as a ratio of the units (mA/A,  $\mu$ V/V, etc.) Descriptions such as  $\mu$ A/A,  $\mu$ V/V, and others, where used to annotate results or column headings are the preferred replacements for what was historically labeled as "ppm" or parts-per-million and described the results in that column, unless otherwise noted by units symbols.

Where applicable, the expanded uncertainty of measurement at the time of test is given in the following pages. They are calculated in accordance with the method described in the ISO Guide to the Expression of Uncertainty in Measurement (GUM). The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k, such that the confidence level approximates 95%.

Where applicable, the Test Uncertainty Ratio (TUR) is provided in the following pages. Unless otherwise stated, the TUR for a given measurement result is 4:1 or greater.

Results are reviewed to establish where any measurement results exceeded the manufacturer's specifications.

Measurement results greater than limits of error are indicated by 'I'.



*Don Buhler*  
 DON BUHLER  
 Issued By

**Certificate Number:** 104715**Date of Calibration:** 27-Jan-2015**Standards Used**

| <b>Asset</b> | <b>Description</b>     | <b>Cal-Date</b> | <b>Cal-Due</b> |
|--------------|------------------------|-----------------|----------------|
| 9899         | Fluke 5520A Calibrator | 04-Oct-2014     | 04-Apr-2015    |

Certificate Number: 104715

Date of Calibration: 27-Jan-2015

**Calibration Data**

| Parameter                               | Nominal Value | Measurement Result | Limits of Error |             | Test Uncertainty Ratio (TUR) |
|---|---------------|--------------------|-----------------|-------------|------------------------------|
|   |               |                    | Lower Limit     | Upper Limit |                              |
| <b>DISPLAY TEST</b>                     |               |                    |                 |             |                              |
| Display Segments Illuminated Correctly: |               | Pass               |                 |             |                              |
| <b>RESISTANCE TEST</b>                  |               |                    |                 |             |                              |
| <b>320Ohms Range</b>                    |               |                    |                 |             |                              |
| 0.0 Ohm                                 | 0.00          | 0.0                | 0.0             | 0.2         |                              |
| 100.0 Ohm                               | 100.00        | 100.0              | 99.3            | 100.7       |                              |
| <b>3200Ohms Range</b>                   |               |                    |                 |             |                              |
| 1000 Ohm                                | 1000.0        | 1000               | 994             | 1006        |                              |
| <b>32kOhms Range</b>                    |               |                    |                 |             |                              |
| 10.00 kOhm                              | 10.000        | 10.00              | 9.94            | 10.06       |                              |
| <b>320kOhms Range</b>                   |               |                    |                 |             |                              |
| 100.0 kOhm                              | 100.00        | 100.0              | 99.4            | 100.6       |                              |
| <b>3.2MOhms Range</b>                   |               |                    |                 |             |                              |
| 1.000 MOhm                              | 1.0000        | 1.000              | 0.994           | 1.006       |                              |
| <b>32MOhms Range</b>                    |               |                    |                 |             |                              |
| 10.00 MOhm                              | 10.000        | 10.01              | 9.79            | 10.21       |                              |
| <b>DIODE TEST</b>                       |               |                    |                 |             |                              |
| Beeper Audible                          |               | Pass               |                 |             |                              |
| Beeper OFF                              |               | Pass               |                 |             |                              |
| <b>DC VOLTAGE TEST</b>                  |               |                    |                 |             |                              |
| <b>320mV Range</b>                      |               |                    |                 |             |                              |
| 300.0 mV                                | 300.00        | 300.0              | 299.0           | 301.0       |                              |
| <b>DC VOLTAGE TEST</b>                  |               |                    |                 |             |                              |
| <b>3.2V Range</b>                       |               |                    |                 |             |                              |
| 2.700 V                                 | 2.7000        | 2.700              | 2.691           | 2.709       |                              |
| <b>32V Range</b>                        |               |                    |                 |             |                              |
| 27.00 V                                 | 27.000        | 27.00              | 26.91           | 27.09       |                              |
| <b>320V Range</b>                       |               |                    |                 |             |                              |
| 270.0 V                                 | 270.00        | 270.1              | 269.1           | 270.9       |                              |
| <b>600V Range</b>                       |               |                    |                 |             |                              |
| 600 V                                   | 600.0         | 600                | 597             | 603         |                              |
| <b>AC VOLTAGE TEST</b>                  |               |                    |                 |             |                              |
| <b>3.2V Range</b>                       |               |                    |                 |             |                              |
| 2.700 V @ 100 Hz                        | 2.7000        | 2.705              | 2.644           | 2.756       |                              |
| 2.700 V @ 500 Hz                        | 2.7000        | 2.692              | 2.644           | 2.756       |                              |

Certificate Number: 104715

Date of Calibration: 27-Jan-2015

**Calibration Data**

| Parameter         | Nominal Value | Measurement Result | Limits of Error |             | Test Uncertainty Ratio (TUR) |
|-------------------|---------------|--------------------|-----------------|-------------|------------------------------|
|                   |               |                    | Lower Limit     | Upper Limit |                              |
| <b>600V Range</b> |               |                    |                 |             |                              |
| 600 V @ 100 Hz    | 600.0         | 601                | 586             | 614         |                              |
| 600 V @ 1 kHz     | 600.0         | 601                | 586             | 614         |                              |

# Z540.1

## Certificate of Calibration

### Beaverton Service Center

|                                     |                                      |
|-------------------------------------|--------------------------------------|
| <b>Certificate Number:</b> 177143   | <b>Replacement for:</b> 104715       |
| <b>Data Type:</b> As-Left           | <b>Calibration Date:</b> 27-Jan-2015 |
| <b>Result Summary:</b> In Tolerance | <b>Calibration Due:</b> 27-Jan-2016  |
| <b>Manufacturer:</b> Fluke          | <b>Certificate Date:</b> 28-Sep-2015 |
| <b>Model:</b> 70 III                | <b>Temperature:</b> 23.0 °C          |
| <b>Serial Number:</b> 69920523      | <b>Humidity:</b> 35.5 %              |
| <b>Description:</b> Multimeter      |                                      |

|   |                      |
|---|----------------------|
| <b>Procedure:</b> Fluke 70-3: (1 year) CAL VER /5520A | <b>Revision:</b> 1.2 |
| <b>Customer:</b> STATE OF WASHINGTON                  |                      |
| <b>City:</b> SEATTLE                                  | <b>Country:</b> US   |
| <b>State:</b> WA                                      |                      |
| <b>Purchase Order:</b> IW 20-JAN-2015                 | <b>RMA:</b> 30703768 |

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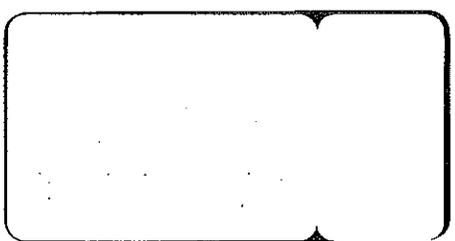
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DON BUHLER  
Issued By

Certificate Number: 177143

Date of Calibration: 27-Jan-2015

**Standards Used**

| <b>Asset</b> | <b>Description</b>     | <b>Cal-Date</b> | <b>Cal-Due</b> |
|--------------|------------------------|-----------------|----------------|
| 9899         | Fluke 5520A Calibrator | 04-Oct-2014     | 04-Apr-2015    |

**Calibration Data**

| Parameter                               | Nominal Value | Measurement Result | Limits of Error |             | Test Uncertainty Ratio (TUR) |
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| Display Segments Illuminated Correctly: |               | Pass               |                 |             |                              |
| <b>RESISTANCE TEST</b>                  |               |                    |                 |             |                              |
| <b>320Ohms Range</b>                    |               |                    |                 |             |                              |
| 0.0 Ohm                                 | 0.00          | 0.0                | 0.0             | 0.2         |                              |
| 100.0 Ohm                               | 100.00        | 100.0              | 99.3            | 100.7       |                              |
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| 10.00 MOhm                              | 10.000        | 10.01              | 9.79            | 10.21       |                              |
| <b>DIODE TEST</b>                       |               |                    |                 |             |                              |
| Beeper Audible                          |               | Pass               |                 |             |                              |
| Beeper OFF                              |               | Pass               |                 |             |                              |
| <b>DC VOLTAGE TEST</b>                  |               |                    |                 |             |                              |
| <b>320mV Range</b>                      |               |                    |                 |             |                              |
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| 600 V                                   | 600.0         | 600                | 597             | 603         |                              |
| <b>AC VOLTAGE TEST</b>                  |               |                    |                 |             |                              |
| <b>3.2V Range</b>                       |               |                    |                 |             |                              |
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| Parameter         | Nominal Value | Measurement Result | Limits of Error |             | Test Uncertainty Ratio (TUR) |
|-------------------|---------------|--------------------|-----------------|-------------|------------------------------|
|                   |               |                    | Lower Limit     | Upper Limit |                              |
| <b>600V Range</b> |               |                    |                 |             |                              |
| 600 V @ 100 Hz    | 600.0         | 601                | 586             | 614         |                              |
| 600 V @ 1 kHz     | 600.0         | 601                | 586             | 614         |                              |