


# Schedule of Accreditation

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## United Kingdom Accreditation Service

21 - 47 High Street, Feltham, Middlesex, TW13 4UN, UK

 <p><b>UKAS</b> CALIBRATION 0183</p> <p>Accredited to <b>ISO/IEC 17025:2005</b></p>	<p><b>Fluke Precision Measurement Ltd</b></p> <p>Issue No: 037    Issue date: 20 January 2012</p>	
	<p>52 Hurricane Way Norwich Airport Norwich Norfolk NR6 6JB</p>	<p>Contact: Mr P Bunyan Tel: +44 (0)1603-256600 Fax: +44 (0)1603-256777 E-Mail: industrial@uk.fluke.nl Website: www.fluke.com</p>
<p><b>Calibration performed at the above address only</b></p>		

### DETAIL OF ACCREDITATION

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty ( $k = 2$ )	Remarks
DC RESISTANCE			
Specific values	0.1 $\Omega$ 1 $\Omega$ 10 $\Omega$ 100 $\Omega$ 1 k $\Omega$ 10 k $\Omega$ 100 k $\Omega$ 1 M $\Omega$ 10 M $\Omega$ 100 M $\Omega$ 1 G $\Omega$	3.6 ppm 2.4 ppm 1.2 ppm 0.29 ppm 0.36 ppm 0.29 ppm 1.7 ppm 2.0 ppm 2.2 ppm 10 ppm 19 ppm	Measurement of resistors with negligible power dissipation. Resistors of modest dimensions may be measured in oil.
	0.1 $\Omega$ 1 $\Omega$ 10 $\Omega$ 100 $\Omega$ 1 k $\Omega$ 10 k $\Omega$ 100 k $\Omega$ 1 M $\Omega$ 10 M $\Omega$ 100 M $\Omega$ 1 G $\Omega$	2.7 ppm 0.18 ppm 0.18 ppm 0.18 ppm 0.27 ppm 0.18 ppm 1.7 ppm 1.7 ppm 1.8 ppm 6.7 ppm 14 ppm	For the calibration of resistance measuring instruments.



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Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty ( $k = 2$ )	Remarks
DC RESISTANCE (continued)			
Other values	100 m $\Omega$ to 1 $\Omega$ 1 $\Omega$ to 1.9 $\Omega$ 1.9 $\Omega$ to 10 $\Omega$ 10 $\Omega$ to 19 $\Omega$ 19 $\Omega$ to 100 $\Omega$ 100 $\Omega$ to 190 $\Omega$ 190 $\Omega$ to 1 k $\Omega$ 1 k $\Omega$ to 1.9 k $\Omega$ 1.9 k $\Omega$ to 10 k $\Omega$ 10 k $\Omega$ to 19 k $\Omega$ 19 k $\Omega$ to 100 k $\Omega$ 100 k $\Omega$ to 1 M $\Omega$ 1 M $\Omega$ to 10 M $\Omega$ 10 M $\Omega$ to 100 M $\Omega$	24 ppm to 5.0 ppm 0.77 ppm 7.5 ppm to 3.0 ppm 1.4 ppm 1.3 ppm to 0.70 ppm 0.79 ppm 0.60 ppm to 0.40 ppm 0.79 ppm 0.80 ppm to 0.70 ppm 0.70 ppm 3.7 ppm 6.4 ppm 8.0 ppm 16 ppm	
DC VOLTAGE			
Specific Values	100 mV 1 V 1.018 V 10 V 100 V 1000 V	1.8 ppm 0.46 ppm 0.46 ppm 0.27 ppm 0.55 ppm 0.60 ppm	
Other Values	1 V to 10 V in 1 V increments 10 V to 100 V in 10 V increments 100 V to 1 kV in 100 V increments	0.75 ppm 0.75 ppm 0.75 ppm	
	0 mV to 100 mV 100 mV to 100 V 100 V to 1000 V	0.70 ppm + 0.20 $\mu$ V 0.60 ppm + 0.20 $\mu$ V 0.70 ppm	
	1 kV to 10 kV 10 kV to 40 kV	220 ppm 0.20 %	For the calibration of high voltage sources, meters and dividers.
DC CURRENT	10 $\mu$ A to 10 mA 10 mA to 200 mA 200 mA to 2 A 2 A to 20 A	2.5 ppm 3.0 ppm 7.5 ppm 12 ppm	
AC VOLTAGE	10 mV to 2 V 0.05 Hz to 200 Hz	(0.21 % to 0.0038 %) + 15 $\mu$ V	Uncertainty depends upon both voltage and frequency.
	1 mV to 1 V 20 Hz to 20 kHz 20 kHz to 50 kHz 50 kHz to 100 kHz	0.012 % 0.020 % 0.040 %	For the calibration of voltage measuring instruments.



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Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty ( $k = 2$ )	Remarks
AC VOLTAGE (continued)	50 Hz and 60 Hz:  1 kV to 10 kV 10 kV to 30 kV	0.25 % 0.36 %	For the calibration of high voltage meters and sources.
AC CURRENT	1 kV to 10 kV 10 kV to 30 kV	0.27 % 0.37 %	For the calibration of high voltage dividers.
Specific Values			For the calibration of AC current sources using an AC/DC current transfer method.
Calibration and Measurement Capability (CMC) in ppm of value expressed as an Expanded Uncertainty ( $k = 2$ )			
Current	40 Hz	1 kHz	10 kHz
5 mA	27	21	34
10 mA	21	21	29
20 mA	21	21	21
30 mA	21	21	34
50 mA	21	21	21
100 mA	21	21	23
200 mA	23	23	23
300 mA	30	31	31
500 mA	27	31	27
1 A	32	31	35
2 A	32	31	35
3 A	33	33	33
5 A	33	51	38
10 A	35	62	46
20 A	47	74	49
Other Values	10 $\mu$ A to 2 A 10 Hz to 100 Hz 100 Hz to 5 kHz	50 ppm 40 ppm	For the calibration of AC current sources.
CAPACITANCE	2 A to 20 A 40 Hz to 60 Hz  At effective frequencies from 0.02 Hz to 10 Hz:  0.5 nF to 4 nF 4 nF to 40 nF 40 nF to 400 nF 400 nF to 4 $\mu$ F 4 $\mu$ F to 40 $\mu$ F 40 $\mu$ F to 400 $\mu$ F 400 $\mu$ F to 4 mF 4 mF to 40 mF	65 ppm  500 ppm + 3.0 pF 300 ppm + 3.0 pF 150 ppm 100 ppm 150 ppm 250 ppm 250 ppm 250 ppm	For the calibration of the active capacitance function of multi-function calibrators on an automated system.



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CAPACITANCE (continued)	<i>At 100 Hz:</i> 0.33 $\mu$ F 1.09 $\mu$ F 1.2 $\mu$ F 3 $\mu$ F 3.3 $\mu$ F 10.9 $\mu$ F	0.070 % 0.12 % 0.14 % 0.17 % 0.13 % 0.13 %	Measurement of ground-isolated capacitors and capacitance calibrators.
	<i>At 1 kHz:</i> 350 pF 480 pF 600 pF 1 nF 1.2 nF 3 nF 3.3 nF 10.9 nF 12 nF 30 nF 33 nF 109 nF 120 nF 300 nF	1.7 % 1.3 % 0.80 % 0.43 % 0.39 % 0.15 % 0.15 % 0.080 % 0.17 % 0.090 % 0.080 % 0.070 % 0.070 % 0.060 %	Measurement of ground-isolated capacitors and capacitance calibrators
FREQUENCY			
Generation	10 MHz	6.2 parts in $10^{12}$	For the calibration of frequency measuring instruments.
Measurement	10 Hz to 100 Hz 100 Hz to 1 kHz 1 kHz to 100 kHz 100 kHz to 1 MHz 1 MHz to 10 MHz 10 MHz to 30 MHz 30 MHz to 1 GHz 1 GHz to 4 GHz 4 GHz to 26.5 GHz	1.1 parts in $10^6$ 2.0 parts in $10^7$ 1.4 parts in $10^8$ 7.2 parts in $10^{10}$ 5.1 parts in $10^{11}$ 1.7 parts in $10^{11}$ 8.9 parts in $10^{12}$ 1.9 parts in $10^{11}$ 1.1 parts in $10^{10}$	



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Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty ( $k = 2$ )	Remarks
<b>MEASUREMENT CAPABILITIES FOR THE CALIBRATION OF AC VOLTAGE MEASUREMENT STANDARDS</b>			
<b>Datron-Wavetek Model 4920 AVMS Calibration</b>			
The CMCs shown relate to voltages and frequencies that lie within $\pm 10\%$ of the specified values. For intermediate frequencies between spot points up to 100 kHz, the CMC is the greater of the two. For frequencies greater than 100 kHz, where interpolation is required, an additional uncertainty of 50% of the greater of the uncertainties of the adjacent known points must be added.			
AUTOMATED COAXIAL AC/DC TRANSFER SYSTEM			
AC VOLTAGE			
Specific values	100 mV 10 Hz and 20 Hz 40 Hz, 45 Hz, 1 kHz and 20 kHz 50 kHz and 100 kHz 500 kHz 1 MHz	45 ppm 30 ppm 40 ppm 230 ppm 610 ppm	
	0.3 V 10 Hz and 20 Hz 40 Hz, 45 Hz and 1 kHz 20 kHz 50 kHz 100 kHz 500 kHz 1 MHz	20 ppm 11 ppm 11 ppm 12 ppm 15 ppm 60 ppm 130 ppm	
	1 V 10 Hz and 20 Hz 40 Hz, 45 Hz, 100 Hz and 1 kHz 10 kHz 20 kHz, 30 kHz and 50 kHz 60 kHz 100 kHz 200 kHz 300 kHz 500 kHz 700 kHz 1 MHz 1.1 MHz	15 ppm 11 ppm 10 ppm 11 ppm 12 ppm 13 ppm 25 ppm 30 ppm 45 ppm 90 ppm 100 ppm 360 ppm	
	2 V 10 Hz and 20 Hz 100 Hz 1 kHz and 10 kHz 30 kHz 100 kHz 200 kHz 300 kHz 500 kHz 700 kHz 1 MHz 1.2 MHz	20 ppm 11 ppm 12 ppm 10 ppm 13 ppm 25 ppm 25 ppm 35 ppm 75 ppm 90 ppm 360 ppm	



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AUTOMATED COAXIAL AC/DC TRANSFER SYSTEM			
AC VOLTAGE (continued)			
Specific values	3 V		
	10 Hz	20 ppm	
	40 Hz and 45 Hz	12 ppm	
	1 kHz	11 ppm	
	20 kHz	13 ppm	
	30 kHz	11 ppm	
	50 kHz	10 ppm	
	100 kHz	13 ppm	
	200 kHz	25 ppm	
	500 kHz	35 ppm	
	700 kHz	75 ppm	
	1 MHz	90 ppm	
	1.2 MHz	360 ppm	
	4 V		
	10 Hz and 20 Hz	20 ppm	
	100 Hz and 1 kHz	12 ppm	
	10 kHz and 30 kHz	11 ppm	
	100 kHz	13 ppm	
	200 kHz	20 ppm	
	300 kHz	25 ppm	
	500 kHz	35 ppm	
	700 kHz	70 ppm	
	1 MHz	80 ppm	
	1.2 MHz	360 ppm	
	5 V		
	20 Hz	15 ppm	
	100 Hz	11 ppm	
	1 kHz, 10 kHz and 30 kHz	10 ppm	
	100 kHz	11 ppm	
	200 kHz	20 ppm	
	300 kHz	25 ppm	
	500 kHz	30 ppm	
	700 kHz	70 ppm	
	1 MHz	80 ppm	



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Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty ( $k = 2$ )	Remarks
AUTOMATED COAXIAL AC/DC TRANSFER SYSTEM AC VOLTAGE (continued) Specific values	10 V 10 Hz and 20 Hz 40 Hz and 45 Hz 100 Hz and 1 kHz 10 kHz 20 kHz, 30 kHz, 50 kHz and 60 kHz 100 kHz 200 kHz 300 kHz 500 kHz 700 kHz 1 MHz 1.2 MHz  20 V 10 Hz and 20 Hz 40 Hz and 45 Hz 100 Hz 1 kHz 10 kHz 20 kHz 30 kHz, 50 kHz and 60 kHz 100 kHz 200 kHz 300 kHz 500 kHz 700 kHz 1 MHz 1.2 MHz  30 V 10 Hz 40 Hz, 45 Hz and 1 kHz 20 kHz and 30 kHz 50 kHz 100 kHz 200 kHz	20 ppm 12 ppm 11 ppm 12 ppm  11 ppm 12 ppm 20 ppm 25 ppm 30 ppm 70 ppm 80 ppm 360 ppm  20 ppm 11 ppm 12 ppm 11 ppm 12 ppm 13 ppm 11 ppm 13 ppm 20 ppm 25 ppm 30 ppm 70 ppm 80 ppm 360 ppm  20 ppm 12 ppm 11 ppm 12 ppm 13 ppm 25 ppm	



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AUTOMATED COAXIAL AC/DC TRANSFER SYSTEM AC VOLTAGE (continued) Specific values	100 V 10 Hz 100 Hz, 1 kHz and 10 kHz 30 kHz 50 kHz 100 kHz  200 V 1 kHz and 10 kHz 30 kHz and 100 kHz  300 V 40 Hz to 45 Hz 1 kHz 5 kHz 20 kHz 50 kHz 100 kHz  500 V 1 kHz 5 kHz 30 kHz and 50 kHz 100 kHz  700 V 1 kHz 30 kHz 50 kHz 100 kHz  1000 V 40Hz to 45 Hz 100 Hz 1 kHz 5 kHz 10 kHz 20 kHz 30 kHz and 33 kHz 50 kHz 100 kHz  1 V and 3 V into 50 ohms 1 MHz and 10 MHz 20 MHz 30 MHz 40 MHz 50 MHz	20 ppm 12 ppm 13 ppm 12 ppm 15 ppm  14 ppm 21 ppm 35 ppm  14 ppm 13 ppm 14 ppm 16 ppm 25 ppm 35 ppm  15 ppm 13 ppm 35 ppm 110 ppm  14 ppm 30 ppm 40 ppm 65 ppm  19 ppm 17 ppm 14 ppm 15 ppm 16 ppm 30 ppm 35 ppm 45 ppm 85 ppm  0.15 % 0.25 % 0.30 % 0.45 % 0.50 %	



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Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty ( $k = 2$ )	Remarks
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**Fluke 5790A AC Measurement Standard Calibration - AC/DC Voltage Difference**

The table below shows the Calibration and Measurement Capability (CMC) for the calibration of Fluke 5790A AC Measurement Standards. The CMCs are in ppm of the nominal voltage and relate to the measured AC/DC voltage difference of these instruments.

Frequency	2.2 mV range		7 mV range	22 mV range		70 mV range	
	2 mV	6 mV	6 mV	10 mV	20 mV	20 mV	60 mV
10 Hz	560	230	230	98	84	75	45
20 Hz	550	230	230	85	73	62	31
30 Hz	550	230	230	85	73	62	28
40 Hz	550	180	180	85	73	62	28
55 Hz	550	180	180	85	66	53	28
60 Hz	550	180	180	77	66	53	31
120 Hz	550	170	170	77	67	54	31
300 Hz	550	170	170	79	66	53	31
400 Hz	550	170	170	74	64	50	28
500 Hz	550	170	170	82	64	50	28
1 kHz	550	170	170	82	65	51	28
10 kHz	550	170	170	82	66	54	30
20 kHz	550	170	170	82	64	50	28
30 kHz	550	170	170	82	64	50	34
50 kHz	550	170	170	82	66	53	31
70 kHz	550	170	170	82	66	53	31
100 kHz	550	170	170	87	71	60	31
200 kHz	550	250	250	93	76	66	40
300 kHz	550	250	250	93	78	68	41
500 kHz	560	250	250	110	96	89	59
700 kHz	570	270	270	130	120	110	81
800 kHz	570	270	270	130	120	120	88
1 MHz	580	280	280	150	150	150	110

Frequency	220 mV range			700 mV range					2.2 V range			
	60 mV	100 mV	200 mV	200 mV	300 mV	400 mV	500 mV	600 mV	700 mV	600 mV	1 V	2 V
10 Hz	45	23	22	19	19	19	17	18	18	16	12	8.2
20 Hz	31	19	19	16	16	16	15	15	15	15	12	7.2
30 Hz	28	18	15	18	17	17	15	15	15	15	11	6.3
40 Hz	28	14	14	14	13	13	13	13	13	13	6.3	6.3
55 Hz	28	15	14	14	13	13	13	13	13	12	6.3	6.3
60 Hz	31	14	13	13	13	13	13	13	13	12	6.3	6.3
120 Hz	31	15	13	13	13	13	13	13	13	12	6.1	6.1
300 Hz	31	14	13	13	13	13	13	13	13	12	6.1	6.1
400 Hz	28	11	9.2	8.4	8.7	8.7	7.5	7.5	7.5	7.3	6.0	6.0
500 Hz	28	12	9.2	8.4	8.3	8.7	7.5	7.5	7.5	7.3	6.0	6.0
1 kHz	28	12	9.2	9.3	9.2	9.2	7.5	7.5	7.5	7.3	6.0	6.0
10 kHz	30	12	9.2	8.4	10	9.2	7.5	7.5	7.5	11	7.5	7.5
20 kHz	28	12	9.5	8.8	9.1	9.5	7.9	7.9	7.9	12	7.5	7.5
30 kHz	34	12	9.5	8.8	9.6	9.5	7.9	7.9	7.9	12	7.5	7.5
50 kHz	31	12	9.5	8.8	9.1	9.5	7.9	7.9	7.9	12	7.5	7.5
70 kHz	31	13	11	9.3	9.6	10	8.4	8.4	8.4	12	7.7	7.7
100 kHz	31	12	13	12	12	12	9.8	9.8	9.8	13	8.1	8.1
200 kHz	40	25	27	22	20	20	20	21	21	24	14	11
300 kHz	41	26	27	26	20	20	25	24	24	27	16	14
500 kHz	59	47	42	41	36	33	39	39	39	35	25	25
700 kHz	81	61	61	54	50	50	53	53	53	44	25	25
800 kHz	88	70	71	57	53	53	56	56	56	45	27	26
1 MHz	110	85	91	71	68	68	70	70	70	48	29	27



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Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty ( $k = 2$ )	Remarks
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**Fluke 5790A AC Measurement Standard Calibration (continued) - AC/DC Voltage Difference**

The table below shows the Calibration and Measurement Capability (CMC) for the calibration of Fluke 5790A AC Measurement Standards. The CMCs are in ppm of the nominal voltage and relate to the measured AC/DC voltage difference of these instruments.

Frequency	7 V range						22 V range			
	2 V	3 V	4 V	5 V	6 V	7 V	6 V	8 V	10 V	20 V
10 Hz	12	9.3	11	13	11	9.5	13	13	13	14
20 Hz	12	8.8	9.5	8.2	8.2	8.2	12	12	12	13
30 Hz	11	8.7	9.4	8.3	8.3	8.3	6.3	6.3	7.2	8.5
40 Hz	8.9	6.8	7.8	5.8	5.8	6.3	6.3	6.3	7.2	8.5
55 Hz	8.9	6.8	7.8	5.8	5.8	6.3	6.3	6.2	7.2	8.5
60 Hz	8.9	6.8	7.6	5.7	5.7	6.2	6.3	6.2	6.5	8.5
120 Hz	8.0	6.8	6.2	5.7	5.7	6.2	6.3	6.2	6.5	7.9
300 Hz	8.0	6.8	5.7	5.7	5.7	6.2	6.3	6.2	6.5	7.9
400 Hz	8.0	6.8	5.7	5.7	5.7	6.2	6.3	6.2	6.5	7.9
500 Hz	8.0	6.8	5.7	5.7	5.7	6.2	7.7	7.6	8.0	9.1
1 kHz	8.0	6.8	5.7	5.7	5.7	5.7	6.4	6.3	6.5	7.9
10 kHz	8.0	6.8	5.7	5.7	5.7	5.7	6.3	6.2	6.5	7.9
20 kHz	8.0	6.8	5.7	5.7	5.7	5.7	6.3	6.2	6.5	7.9
30 kHz	8.0	6.8	5.7	5.7	5.7	5.7	6.3	6.3	6.5	7.9
50 kHz	8.0	6.8	5.7	6.8	6.8	5.7	6.3	6.3	6.5	7.9
70 kHz	8.2	7.8	5.9	9.7	9.7	5.9	6.5	6.5	6.6	7.9
100 kHz	9.4	8.3	7.3	11	11	6.9	7.4	7.4	7.4	8.9
200 kHz	10	9.4	12	13	13	8.7	12	13	13	15
300 kHz	16	13	13	15	15	9.5	13	13	13	16
500 kHz	83	83	83	82	68	69	69	67	55	24
700 kHz	81	80	80	80	67	69	68	68	54	28
800 kHz	81	81	81	80	81	82	68	68	67	32
1 MHz	82	80	80	80	80	80	67	67	67	38

Frequency	70 V range						220 V range		
	20 V	30 V	40 V	50 V	60 V	70 V	60 V	100 V	200 V
10 Hz	11	12	10	10	10	10	11	15	16
20 Hz	11	12	8.5	8.5	8.5	8.5	9.2	13	14
30 Hz	8.9	8.3	8.5	8.5	8.5	8.5	9.2	13	13
40 Hz	8.0	8.3	8.5	8.5	8.5	8.5	9.2	13	13
55 Hz	10	11	8.5	8.5	8.5	8.5	9.2	13	13
60 Hz	8.5	8.8	8.5	8.5	8.5	8.5	9.2	13	13
120 Hz	8.5	8.5	8.5	8.5	8.5	8.5	9.2	13	13
300 Hz	8.5	8.5	8.5	8.5	8.5	8.5	9.2	13	13
400 Hz	8.5	8.5	8.5	8.5	8.5	8.5	9.6	13	13
500 Hz	8.5	8.5	8.5	8.5	8.5	8.5	9.6	13	13
1 kHz	8.5	8.5	8.5	8.5	8.5	8.5	9.2	13	13
10 kHz	8.5	8.5	8.5	8.5	8.5	8.5	9.2	13	13
20 kHz	8.5	8.5	8.5	8.5	8.5	8.5	11	13	13
30 kHz	8.5	8.5	8.5	8.5	8.5	8.5	11	13	13
50 kHz	8.5	8.5	8.5	8.5	8.5	8.5	11	13	13
70 kHz	8.5	8.5	14	14	14	14	12	17	19
100 kHz	9.5	9.8	16	16	16	16	24	28	28
200 kHz	17	17							
300 kHz	19	21							
500 kHz	22	24							
700 kHz	27	32							
800 kHz	30								
1 MHz	35								



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**Fluke 5790A AC Measurement Standard Calibration (continued) - AC/DC Voltage Difference**

The table below shows the Calibration and Measurement Capability (CMC) for the calibration of Fluke 5790A AC Measurement Standards. The CMCs are in ppm of the nominal voltage and relate to the measured AC/DC voltage difference of these instruments.

Frequency	700 V range				1000 V range		
	200 V	300 V	500 V	600 V	600 V	800 V	1000 V
10 Hz	24	22	21	20	20	21	25
20 Hz	14	13	13	13	13	13	14
30 Hz	14	12	12	13	13	13	13
40 Hz	14	12	12	13	13	13	13
55 Hz	14	12	12	13	13	13	13
60 Hz	14	12	12	13	13	13	13
120 Hz	14	13	13	13	13	13	13
300 Hz	14	13	13	13	13	13	13
400 Hz	14	13	13	13	13	13	13
500 Hz	14	13	13	13	13	13	13
1 kHz	14	13	13	13	13	13	13
10 kHz	14	13	13	13	13	13	13
20 kHz	15	14	13	14	14	13	13
30 kHz	14	14	13	14	14	13	14
50 kHz	15	16	15	15	15	14	15
70 kHz	19	20	19	26	26	26	26
100 kHz	28	28	29	34	34	35	35

**Fluke 5790A AC Measurement Standard Calibration - AC Voltage**

The table below shows the Calibration and Measurement Capability (CMC) for the calibration of Fluke 5790A AC Measurement Standards. The CMCs are in ppm of the nominal voltage and relate to the AC voltage function of these instruments.

Frequency	2.2 mV range	7 mV range	22 mV range		70 mV range	
	2 mV	6 mV	10 mV	20 mV	20 mV	60 mV
10 Hz	610	240	120	89	81	46
20 Hz	610	240	110	79	69	32
30 Hz	610	240	110	79	69	30
40 Hz	610	200	110	79	69	30
55 Hz	610	190	110	72	61	30
60 Hz	610	190	100	72	61	33
120 Hz	610	190	100	73	62	33
300 Hz	610	190	100	72	61	33
400 Hz	610	180	100	70	58	30
500 Hz	610	180	110	70	58	30
1 kHz	610	180	110	71	59	30
10 kHz	610	180	110	72	61	31
20 kHz	610	180	100	70	58	30
30 kHz	610	180	100	70	58	35
50 kHz	610	180	100	72	61	33
70 kHz	610	180	100	72	61	33
100 kHz	610	190	110	77	67	33
200 kHz	610	260	110	81	72	41
300 kHz	610	260	110	83	75	42
500 kHz	610	260	130	100	100	60
700 kHz	640	280	140	130	120	82
800 kHz	640	280	150	130	120	88
1 MHz	650	290	160	160	150	110



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**Fluke Precision Measurement Ltd**  
Issue No: 037 Issue date: 20 January 2012

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Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty ( $k = 2$ )	Remarks
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**Fluke 5790A AC Measurement Standard Calibration (continued) - AC Voltage**

The table below shows the Calibration and Measurement Capability (CMC) for the calibration of Fluke 5790A AC Measurement Standards. The CMCs are in ppm of the nominal voltage and relate to the AC voltage function of these instruments.

Frequency	220 mV range			700 mV range						2.2 V range		
	60 mV	100 mV	200 mV	200 mV	300 mV	400 mV	500 mV	600 mV	700 mV	600 mV	1 V	2 V
10 Hz	46	24	23	20	19	19	17	18	18	16	12	8.2
20 Hz	32	20	19	17	16	16	15	15	15	15	12	7.2
30 Hz	30	19	16	18	17	17	15	15	15	15	11	6.4
40 Hz	30	16	14	15	14	13	13	13	13	13	6.5	6.4
55 Hz	30	16	14	15	14	13	13	13	13	13	6.5	6.4
60 Hz	33	16	14	14	14	13	13	13	13	13	6.5	6.4
120 Hz	33	17	14	14	14	13	13	13	13	13	6.2	6.1
300 Hz	33	16	14	14	14	13	13	13	13	13	6.2	6.1
400 Hz	30	13	10	10	10	9.0	7.8	7.7	7.6	7.7	6.2	6.1
500 Hz	30	13	10	10	9.0	9.0	7.8	7.7	7.6	7.7	6.2	6.1
1 kHz	30	13	10	11	10	10	7.8	7.7	7.6	7.7	6.2	6.1
10 kHz	31	13	10	10	11	10	7.8	7.7	7.6	12	7.7	7.6
20 kHz	30	14	11	10	10	10	8.2	8.1	8.1	12	7.7	7.6
30 kHz	35	14	11	10	11	10	8.2	8.1	8.1	12	7.7	7.6
50 kHz	33	14	11	10	10	10	8.2	8.1	8.1	12	7.7	7.6
70 kHz	33	14	11	11	11	11	8.7	8.6	8.6	12	7.9	7.8
100 kHz	33	14	13	13	13	13	10	10	10	13	8.2	8.1
200 kHz	41	26	27	22	20	20	20	21	21	24	14	11
300 kHz	42	27	27	26	20	20	25	24	24	27	16	14
500 kHz	60	47	42	42	36	33	39	39	39	35	25	25
700 kHz	82	61	61	54	50	50	53	53	53	44	25	25
800 kHz	88	70	71	57	54	54	56	56	56	45	27	26
1 MHz	110	86	91	71	68	68	70	70	70	48	29	28

Frequency	7 V range						22 V range				
	2 V	3 V	4 V	5 V	6 V	7 V	6 V	8 V	10 V	20 V	
10 Hz	12	10	11	13	11	10	14	13	13	14	
20 Hz	12	10	10	8.4	8.3	8.3	13	12	12	13	
30 Hz	11	9	10	8.3	8.2	8.2	6.6	6.4	7.3	8.5	
40 Hz	10	7.1	8.0	6.0	6.0	6.4	6.6	6.4	7.3	8.5	
55 Hz	10	7.1	8.0	6.0	6.0	6.4	6.6	6.4	7.3	8.5	
60 Hz	10	7.1	7.8	5.9	5.8	6.2	6.6	6.4	6.7	8.5	
120 Hz	8.7	7.1	6.4	5.9	5.8	6.2	6.6	6.4	6.7	7.9	
300 Hz	8.7	7.1	5.9	5.9	5.8	6.2	6.6	6.4	6.7	7.9	
400 Hz	8.7	7.1	5.9	5.9	5.8	6.2	6.6	6.4	6.7	7.9	
500 Hz	8.7	7.1	5.9	5.9	5.8	6.2	8.0	7.8	8.1	10	
1 kHz	8.7	7.1	5.9	5.9	5.8	5.8	6.8	6.5	6.7	8.0	
10 kHz	8.7	7.1	5.9	5.9	5.8	5.8	6.6	6.4	6.7	8.0	
20 kHz	8.7	7.1	5.9	5.9	5.8	5.8	6.6	6.4	6.7	8.0	
30 kHz	8.7	7.1	5.9	5.9	5.8	5.8	6.6	6.4	6.7	8.0	
50 kHz	8.7	7.1	5.9	7.0	6.9	5.8	6.6	6.4	6.7	8.0	
70 kHz	8.9	8.1	6.1	10	10	6.0	6.8	6.6	6.8	8.0	
100 kHz	10	8.6	7.5	11	11	6.9	7.7	7.6	7.5	9.0	
200 kHz	11	10	12	13	13	8.7	13	13	13	15	
300 kHz	17	14	13	15	15	10	13	13	13	16	
500 kHz	84	83	83	82	68	69	69	67	55	24	
700 kHz	81	80	80	80	67	69	68	68	54	28	
800 kHz	81	81	81	80	81	82	68	69	67	32	
1 MHz	82	80	80	80	80	80	67	67	67	38	



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Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty ( $k = 2$ )	Remarks
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**Fluke 5790A AC Measurement Standard Calibration (continued) - AC Voltage**

The table below shows the Calibration and Measurement Capability (CMC) for the calibration of Fluke 5790A AC Measurement Standards. The CMCs are in ppm of the nominal voltage and relate to the AC voltage function of these instruments.

Frequency	70 V range						220 V range		
	20 V	30 V	40 V	50 V	60 V	70 V	60 V	100 V	200 V
10 Hz	12	12	11	11	11	11	11	15	16
20 Hz	12	12	8.8	8.7	8.6	8.6	10	13	14
30 Hz	11	9.0	8.8	8.7	8.6	8.6	10	13	13
40 Hz	10	9.0	8.8	8.7	8.6	8.6	10	13	13
55 Hz	12	11	8.8	8.7	8.6	8.6	10	13	13
60 Hz	10	10	8.8	8.7	8.6	8.6	10	13	13
120 Hz	10	9.0	8.8	8.7	8.6	8.6	10	13	13
300 Hz	10	9.0	8.8	8.7	8.6	8.6	10	13	13
400 Hz	10	9.0	8.8	8.7	8.6	8.6	10	13	13
500 Hz	10	9.0	8.8	8.7	8.6	8.6	10	13	13
1 kHz	10	9.0	8.8	8.7	8.6	8.6	10	13	13
10 kHz	10	9.0	8.8	8.7	8.6	8.6	10	13	13
20 kHz	10	9.0	8.8	8.7	8.6	8.6	11	13	13
30 kHz	10	10	8.8	8.7	8.6	8.6	11	13	13
50 kHz	10	10	8.8	8.7	8.6	8.6	11	13	13
70 kHz	10	10	14	14	14	14	12	17	19
100 kHz	11	11	17	17	16	16	24	28	28
200 kHz	17	17							
300 kHz	20	21							
500 kHz	23	24							
700 kHz	27	32							
800 kHz	31								
1 MHz	35								

Frequency	700 V range				1000 V range			
	200 V	300 V	500 V	600 V	600 V	800 V	1000 V	
10 Hz	24	22	22	20	20	21	25	
20 Hz	14	13	13	13	13	13	14	
30 Hz	14	13	12	13	13	13	13	
40 Hz	14	13	12	13	13	13	13	
55 Hz	14	13	12	13	13	13	13	
60 Hz	14	13	12	13	13	13	13	
120 Hz	14	13	13	13	13	13	13	
300 Hz	14	13	13	13	13	13	13	
400 Hz	14	13	13	13	13	13	13	
500 Hz	14	14	13	13	13	13	13	
1 kHz	14	14	13	13	13	13	13	
10 kHz	14	14	13	13	13	13	13	
20 kHz	15	14	13	14	14	13	13	
30 kHz	14	14	13	14	14	13	14	
50 kHz	15	16	15	15	15	14	15	
70 kHz	19	20	19	26	26	26	26	
100 kHz	28	28	29	34	34	35	35	



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Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty ( $k = 2$ )	Remarks
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**MEASUREMENT CAPABILITIES FOR THE CALIBRATION OF FLUKE 792A AC/DC TRANSFER STANDARDS**

The table below shows the Calibration and Measurement Capability (CMC) for the calibration of Fluke 792A AC/DC transfer standards.  
The CMCs are in ppm of the nominal voltage and relate to the measured AC/DC voltage difference of these instruments.

Frequency	22 mV range				220 mV range			700 mV range						2.2 V range			7 V range						
	2 mV	6 mV	10 mV	20 mV	60 mV	100 mV	200 mV	200 mV	300 mV	400 mV	500 mV	600 mV	700 mV	600 mV	1 V	2 V	2 V	3 V	4 V	5 V	6 V	7 V	
10 Hz	280	130	90	73	44	22	21	17	17	17	15	16	16	13	7.4	7.0	9.2	6.4	8.7	11	7.9	6.9	
20 Hz	270	120	75	60	29	17	17	14	13	13	13	12	12	12	5.7	5.7	9.2	5.5	6.8	4.0	4.0	4.0	
30 Hz	270	120	75	60	27	16	12	16	15	14	12	12	12	12	4.5	4.5	8.1	5.2	6.5	3.6	3.6	3.7	
40 Hz	260	120	75	60	27	13	12	14	12	12	12	12	12	12	4.5	4.5	8.1	5.2	6.5	3.6	3.6	4.5	
55 Hz	260	100	75	50	27	14	12	13	12	12	12	12	12	12	4.5	4.5	8.1	5.2	6.5	3.6	3.6	4.5	
60 Hz	260	100	65	50	31	13	12	13	12	12	12	12	12	12	4.5	4.5	8.1	5.2	6.4	3.2	3.2	4.2	
120 Hz	260	79	65	51	31	14	12	13	12	12	12	12	12	12	4.1	4.1	7.1	5.2	4.2	3.2	3.2	4.2	
300 Hz	260	79	67	50	31	13	12	13	12	12	12	12	12	12	4.1	4.1	7.1	5.2	3.3	3.2	3.2	4.2	
400 Hz	260	76	61	46	27	8.5	6.3	7.4	7.8	7.6	6.1	6.1	6.1	5.9	4.0	4.0	7.1	5.2	3.3	3.2	3.2	4.2	
500 Hz	260	76	72	46	28	9.2	6.3	7.4	7.3	7.6	6.1	6.1	6.1	5.9	4.0	4.0	7.1	5.2	3.3	3.2	3.2	4.2	
1 kHz	260	76	72	48	27	9.2	6.3	8.4	8.3	8.2	6.1	6.1	6.1	5.9	4.0	4.0	7.1	5.2	3.3	3.2	3.2	3.3	
10 kHz	260	76	72	50	29	9.2	6.3	7.4	9.2	8.2	6.1	6.1	6.1	11	6.2	6.2	7.1	5.2	3.3	3.2	3.2	3.3	
20 kHz	260	72	71	46	27	10	6.8	7.9	8.2	8.6	6.7	6.7	6.7	11	6.2	6.2	7.1	5.2	3.3	3.2	3.2	3.3	
30 kHz	260	72	71	46	33	10	6.8	7.9	8.8	8.6	6.7	6.7	6.7	11	6.2	6.2	7.1	5.2	3.3	3.2	3.2	3.3	
50 kHz	270	72	71	50	31	10	6.8	7.9	8.2	8.6	6.7	6.7	6.7	11	6.2	6.2	7.1	5.2	3.3	5.2	5.2	3.3	
70 kHz	270	74	71	50	31	11	7.9	8.4	8.7	9.2	7.3	7.3	7.3	11	6.4	6.4	7.3	6.6	3.7	8.8	8.8	3.7	
100 kHz	270	96	77	57	31	11	10	11	12	12	8.8	8.8	8.8	12	6.8	6.8	8.6	7.3	5.9	9.5	9.5	5.3	
200 kHz	270	110	84	63	40	24	26	21	20	20	20	21	21	21	8.0	8.0	9.0	8.2	11	11	11	7.3	
300 kHz	270	110	84	66	40	26	26	25	20	20	25	24	24	24	8.6	8.6	15	12	12	14	14	7.9	
500 kHz	280	130	98	87	59	46	41	41	35	32	38	38	38	31	18	19	18	18	17	15	19	12	
700 kHz	340	170	120	110	81	60	60	53	49	49	52	52	52	41	19	19	23	20	21	21	22	15	
800 kHz	340	170	130	120	87	69	71	57	53	53	56	56	56	41	19	19	23	21	23	21	23	15	
1 MHz	360	190	150	150	110	85	91	71	68	68	70	70	70	44	21	21	24	27	27	27	27	27	

Frequency	22 V range				70 V range						220 V range			1 kV range						
	6 V	8 V	10 V	20 V	20 V	30 V	40 V	50 V	60 V	70 V	60 V	100 V	200 V	200 V	300 V	500 V	600 V	800 V	1000 V	
10 Hz	9.6	9.0	8.9	9.9	10	11	9.1	9.1	9.1	9.1	9.3	15	16	21	19	19	17	18	23	
20 Hz	7.8	6.8	7.1	8.1	10	11	7.4	7.3	7.3	7.3	8.4	12	13	14	12	12	12	13	13	
30 Hz	4.5	4.5	5.8	7.3	8.0	7.2	7.4	7.3	7.3	7.3	8.4	12	12	14	12	12	12	12	12	
40 Hz	4.5	4.5	5.8	7.3	6.8	7.2	7.4	7.3	7.3	7.3	8.4	12	12	14	12	12	12	12	12	
55 Hz	4.5	4.2	5.8	7.3	9.2	9.4	7.4	7.3	7.3	7.3	8.4	12	13	14	12	12	12	12	12	
60 Hz	4.5	4.2	4.8	7.3	7.5	7.8	7.4	7.3	7.3	7.3	8.4	12	12	14	12	12	12	12	12	
120 Hz	4.5	4.2	4.8	6.6	7.5	7.4	7.4	7.3	7.3	7.3	8.4	12	12	14	12	12	12	12	12	
300 Hz	4.5	4.2	4.8	6.6	7.5	7.4	7.4	7.3	7.3	7.3	8.4	12	12	14	12	12	12	12	12	
400 Hz	4.5	4.2	4.8	6.6	7.5	7.4	7.4	7.3	7.3	7.3	8.8	12	12	14	12	12	12	12	12	
500 Hz	6.5	6.4	6.8	8.1	7.5	7.4	7.4	7.3	7.3	7.3	8.8	12	12	14	13	12	12	12	12	
1 kHz	4.8	4.5	4.8	6.7	7.5	7.4	7.4	7.3	7.3	7.3	8.4	12	12	14	13	12	13	12	12	
10 kHz	4.5	4.2	4.8	6.7	7.5	7.4	7.4	7.3	7.3	7.3	8.4	12	12	14	13	12	13	12	12	
20 kHz	4.5	4.2	4.8	6.7	7.5	7.4	7.4	7.3	7.3	7.3	8.4	12	12	14	14	13	13	12	12	
30 kHz	4.5	4.5	4.8	6.7	7.5	7.4	7.4	7.3	7.3	7.3	8.6	12	12	14	14	13	13	12	13	
50 kHz	4.5	4.5	4.8	6.7	7.5	7.4	7.4	7.4	7.3	7.3	8.6	12	13	14	15	13	13	13	14	
70 kHz	4.8	4.8	5.2	6.7	7.5	7.4	14	14	14	14	9.2	17	18	18	18	18	25	25	25	
100 kHz	6.1	6.1	6.2	7.9	8.6	8.9	16	16	16	16	15	27	28	27	28	29	34	34	34	
200 kHz	11	12	12	14	12	13														
300 kHz	12	12	12	15	16	17														
500 kHz	12	16	17	23	19	21														
700 kHz	20	21	22	27	24	30														
800 kHz	20	21	22	27	24															
1 MHz	23	23	23	33	30															



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**Fluke Precision Measurement Ltd**  
Issue No: 037 Issue date: 20 January 2012

Calibration performed at main address only

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty ( $k = 2$ )	Remarks
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**AC VOLTAGE MEASUREMENTS USING FLUKE 792A AC/DC TRANSFER STANDARD**  
The CMCs shown relate to voltages and frequencies that lie within  $\pm 10\%$  of the specified values.  
For intermediate frequencies the CMC is that of the greater of the two adjacent frequencies.

Voltage	Calibration and Measurement Capability in ppm of voltage expressed as an Expanded Uncertainty ( $k = 2$ )																	
	Hz				kHz								MHz					
	10	20	40	55	0.3	0.5	1	10	20	30	50	70	100	0.2	0.3	0.5	0.7	1.0
2 mV	480	470	470	470	470	470	470	470	470	470	470	470	470	470	470	480	520	780
6 mV	280	270	270	260	260	260	260	260	250	250	250	260	270	270	280	300	640	
10 mV	130	100	100	100	100	100	100	100	100	100	100	100	110	110	120	140	170	
20 mV	110	70	70	70	70	70	70	70	70	70	70	75	80	90	100	130	170	
60 mV	62	36	35	35	38	35	35	36	35	40	38	38	46	50	70	90	120	
100 mV	33	24	22	22	22	28	20	20	20	20	20	21	30	39	54	70	100	
200 mV	35	28	20	20	20	20	17	17	17	17	17	17	19	31	35	47	120	
400 mV	23	17	16	16	16	13	13	13	14	14	14	14	16	23	25	35	70	
600 mV	25	16	16	16	16	12	12	12	12	12	12	12	13	24	28	41	73	
1 V	24	15	11	11	11	11	11	12	12	12	12	12	13	16	21	28	46	
2 V	23	14	10	10	10	10	10	11	11	11	11	11	12	16	16	25	35	
4 V	25	16	13	13	14	12	12	12	12	12	12	13	16	17	27	30	39	
6 V	23	13	8.9	8.9	8.7	8.7	8.7	8.7	8.7	8.7	9.7	12	13	14	20	25	39	
10 V	24	16	12	12	11	12	11	11	11	11	11	12	12	16	18	22	28	
20 V	25	16	13	13	12	13	12	12	12	12	12	12	13	18	29	34	42	
40 V	26	18	15	15	15	15	15	15	15	16	16	20	22					
60 V	25	18	15	15	15	15	15	15	15	16	16	20	21					
100 V	30	22	20	20	20	20	20	20	20	20	22	27	38					
200 V	29	21	18	19	18	18	18	18	18	18	21	26	38					
600 V	31	23	21	21	21	21	21	21	21	21	23	32	43					
1 kV	39	30	28	28	28	28	28	28	28	28	30	37	47					

**AC VOLTAGE MEASUREMENTS USING FLUKE 5790A AC MEASUREMENT STANDARD.**

The CMCs shown relate to voltages and frequencies that lie within  $\pm 10\%$  of the specified values. For intermediate frequencies the quoted uncertainty will be the larger of the adjacent CMCs. The CMCs are for the calibration of AC Voltage Sources with 4 terminal output sensing capability, and for AC Voltage measuring instruments simultaneously connected to the AC Voltage Source.

Voltage	Calibration and Measurement Capability in ppm of voltage expressed as an Expanded Uncertainty ( $k = 2$ )											
	10 Hz	20 Hz	40 Hz	500 Hz	1 kHz	10 kHz	20 kHz	50 kHz	100 kHz	200 kHz	500 kHz	1 MHz
2 mV	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
6 mV	430	430	410	400	400	400	400	400	400	440	450	480
10 mV	170	170	170	170	170	170	160	160	170	170	190	230
20 mV	150	150	150	140	140	140	140	140	140	150	170	230
60 mV	60	49	48	48	48	49	48	130	130	130	140	600
100 mV	40	26	23	21	21	21	22	22	22	33	80	260
200 mV	40	25	22	19	19	19	20	20	22	34	80	160
600 mV	30	22	21	18	18	20	20	20	22	31	50	140
1 V	20	20	18	17	17	18	18	18	19	24	50	140
2 V	30	18	18	17	17	18	18	18	19	23	50	140
6 V	30	27	27	27	27	27	27	27	29	34	90	260
10 V	30	29	27	27	27	27	27	27	28	34	70	160
20 V	30	29	27	28	27	27	27	27	28	35	50	150
60 V	30	27	27	27	27	27	27	27	31			
100 V	40	29	29	29	29	29	29	29	39			
200 V	40	29	29	29	29	29	29	29	39			
600 V	40	29	29	29	29	29	29	30	60			
1000 V	70	29	29	29	29	29	29	30	60			



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Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty ( $k = 2$ )	Remarks
AC/DC TRANSFER CURRENT DIFFERENCE (including absolute current measurement)			Calibrations may be performed at intermediate frequencies with the larger of the adjacent uncertainties

Frequency kHz	AC/DC Current Transfer Difference (ppm) for A40B shunts without detector													
	1 mA	10 mA	20 mA	50 mA	100 mA	200 mA	500 mA	1 A	2 A	5 A	10 A	20 A	50 A	100 A
0.01	16	9.0	10	10	11	12	10	10	10	18	22	32	42	52
1	16	9.0	10	10	11	12	10	10	10	18	23	32	42	52
10	16	11	11	12	11	12	10	10	10	19	23	42	52	72
30	16	11	12	12	13	14	11	15	19	29	52	63	73	83
70	17	16	18	12	13	14	15	15	28	44	63	85	95	130
100	23	19	20	16	13	14	15	19	42	64	84	110	140	160

Frequency kHz	AC/DC Current Transfer Difference (ppm) for shunts with their own detector (Fluke 792A, 5790A or thermal converter)													
	1 mA	10 mA	20 mA	50 mA	100 mA	200 mA	500 mA	1 A	2 A	5 A	10 A	20 A	50 A	100 A
0.01	22	18	18	18	19	19	18	18	18	24	27	36	44	54
1	18	13	13	13	14	14	13	13	13	20	24	33	43	53
10	20	16	16	16	16	17	15	16	15	22	26	44	53	73
30	21	17	18	18	19	19	18	20	23	32	54	64	74	84
70	21	21	22	18	19	19	20	20	31	46	64	86	96	130
100	27	23	24	21	19	19	20	23	44	65	85	110	140	160

Frequency	Resistance at full rated current (ppm)													
	1 mA	10 mA	20 mA	50 mA	100 mA	200 mA	500 mA	1 A	2 A	5 A	10 A	20 A	50 A	100 A
DC	6.0	6.0	5.7	7.1	7.2	7.5	7.8	9.7	7.8	9.5	11	8.7	15	17

Frequency kHz	Absolute current measurement (ppm)													
	1 mA	10 mA	20 mA	50 mA	100 mA	200 mA	500 mA	1 A	2 A	5 A	10 A	20 A	50 A	100 A
DC	14	14	14	14	14	15	15	16	15	16	17	15	20	21
0.01	170	170	170	170	120	120	120	120	120	120	120	120	130	130
0.02	57	56	56	56	40	40	39	40	39	43	45	50	58	66
0.04	31	28	28	29	25	26	25	26	25	30	33	40	50	59
1	31	28	28	29	25	26	25	26	25	30	34	40	50	59
10	31	29	29	29	25	26	25	26	25	31	34	48	59	78
30	31	29	29	29	26	27	26	28	30	38	58	68	78	88
70	32	34	33	30	26	27	28	28	36	50	68	89	99	140
100	43	44	42	40	26	27	28	31	48	69	88	120	150	170



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Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty ( $k = 2$ )	Remarks
PHASE ANGLE			
Voltage/voltage 3 V : 1 V	0°, 60° and 90° 60 Hz 400 Hz 1 kHz 5 kHz 10 kHz	0.11° 0.11° 0.13° 0.33° 0.59°	
Voltage/current 33 V : 300 mA	0° 65 Hz	0.090°	
33 V : 2 A	0° 65 Hz	0.12°	
33 V : 5 A	0° 65 Hz 400 Hz	0.23° 0.36°	
<b>DC AND LF AUTOMATED CALIBRATION SYSTEM</b>			
DC RESISTANCE			
Measurement	0 $\Omega$ to 12 $\Omega$ 12 $\Omega$ to 120 $\Omega$ 120 $\Omega$ to 120 k $\Omega$ 120 k $\Omega$ to 1.2 M $\Omega$ 1.2 M $\Omega$ to 12 M $\Omega$ 12 M $\Omega$ to 100 M $\Omega$	17 ppm + 0.10 m $\Omega$ 12 ppm + 0.60 m $\Omega$ 9.0 ppm + 0.60 m $\Omega$ 14 ppm 58 ppm 580 ppm	For the calibration of resistance sources.
Generation	1 $\Omega$ 1.9 $\Omega$ 10 $\Omega$ 19 $\Omega$ 100 $\Omega$ 190 $\Omega$ 1 k $\Omega$ 1.9 k $\Omega$ 10 k $\Omega$ 19 k $\Omega$ 100 k $\Omega$ 190 k $\Omega$ 1 M $\Omega$ 1.9 M $\Omega$ 10 M $\Omega$ 19 M $\Omega$ 100 M $\Omega$	80 ppm 80 ppm 23 ppm 22 ppm 14 ppm 14 ppm 10 ppm 10 ppm 9.5 ppm 9.5 ppm 11 ppm 11 ppm 15 ppm 16 ppm 31 ppm 31 ppm 100 ppm	Specific values for the calibration of resistance measuring instruments.



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Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty ( $k = 2$ )	Remarks
DC VOLTAGE			
Measurement	0 mV to 120 mV 120 mV to 1.2 V 1.2 V to 12 V 12 V to 120 V 120 V to 1050 V	4.0 ppm + 1.2 $\mu$ V 3.6 ppm + 1.2 $\mu$ V 3.0 ppm 5.2 ppm 8.7 ppm	For the calibration of voltage sources.
Generation	0 mV to 20 mV 220 mV to 2.2 V 2.2 V to 22 V 22 V to 220 V 220 V to 1100 V	6.0 ppm + 0.60 $\mu$ V 5.0 ppm + 1.0 $\mu$ V 4.0 ppm 5.2 ppm 8.7 ppm	For the calibration of voltage measuring instruments.
DC CURRENT			
Measurement	1.2 $\mu$ A to 12 mA 12 mA to 120 mA 120 mA to 1 A	17 ppm + 5.0 nA 35 ppm 120 ppm	For the calibration of current sources.
Generation	0 mA to 2.2 mA 2.2 mA to 220 mA 220 mA to 2.2 A 2.2 A to 11 A	44 ppm + 8.0 nA 50 ppm + 0.80 nA 65 ppm + 25 nA 340 ppm + 0.48 mA	For the calibration of current measuring instruments.
AC CURRENT			
Measurement	2.5 mA to 120 mA 10 Hz to 20 Hz 20 Hz to 45 Hz 45 Hz to 100 Hz 100 Hz to 5 kHz 5 kHz to 10 kHz	0.46 % 0.17 % 0.070 % 0.030 % 0.070 %	For the calibration of current sources.
Generation	120 mA to 1 A 10 Hz to 20 Hz 20 Hz to 45 Hz 45 Hz to 100 Hz 100 Hz to 5 kHz 5 kHz to 10 kHz	0.46 % 0.18 % 0.090 % 0.12 % 0.35 %	
Measurement	2.5 mA to 220 mA 10 Hz to 20 Hz 20 Hz to 40 Hz 40 Hz to 1 kHz 1 kHz to 5 kHz 5 kHz to 10 kHz	0.060 % 0.031 % 0.012 % 0.050 % 0.14 %	For the calibration of current measuring instruments.
Generation	220 mA to 2.2 A 40 Hz to 1 kHz 1 kHz to 5 kHz 5 kHz to 10 kHz	0.055 % 0.065 % 0.75%	
Measurement	2.2 A to 11 A 40 Hz to 1 kHz 1 kHz to 5 kHz 5 kHz to 10 kHz	0.040 % 0.85 % 0.33 %	



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Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty ( $k = 2$ )	Remarks
<b>MEASUREMENT CAPABILITIES FOR THE CALIBRATION OF OSCILLOSCOPE CALIBRATORS</b>			
Voltage Amplitude	DC Voltage, 0 V to 120 V	0.010 % or 100 $\mu$ V, whichever is greater	These voltages can be measured into either 50 $\Omega$ or 1 M $\Omega$ up to 3 V, but into 1 M $\Omega$ only at 3 V and above.
	AC Squarewave 10 mV to 120 V pk-pk at 1 kHz	0.12 % to 0.050 %	
	AC Sinewave <i>Peak to peak values at frequencies from 50 kHz to 1 MHz</i>		Into 50 $\Omega$ Into 50 $\Omega$ Into 50 $\Omega$ Into 50 $\Omega$ Into 50 $\Omega$ Into 50 $\Omega$
	2.5 V to 5 V	0.030 % to 0.40%	
	0.9 V to 1.8 V	0.030 % to 1.0 %	
	0.3 V	0.040 % to 0.40 %	
	0.1 V	0.40 % to 1.0 %	
	30 mV	0.060 % to 1.0 %	
	20 mV	0.070 % to 1.5 %	
	<i>Peak to peak values at frequencies from 1 MHz to 1 GHz</i>		
	30 mV	2.5 %	
	100 mV	1.5 %	
	300 mV	1.5 %	
900 mV to 1.8 V	1.5 %		
2.5 V to 5 V	1.5 %		
RF Voltage - Sinewave <i>Peak to peak values at frequencies from 1 MHz to 250 MHz</i>		Into 50 $\Omega$	
0.1 V, 2.5 V to 5 V	1.6 %		
0.3 V, 0.9 V to 1.8 V	1.5 %		
30 mV	2.3 %		
20 mV	2.6 %		
AC Squarewave			The uncertainties in parentheses apply if a 50 $\Omega$ termination is used, the capability being limited to a maximum of 5 V.
<i>10 Hz to 1 kHz</i>			
5 mV to 25 mV	0.11 % (0.12 %)		
25 mV to 130 mV	0.050 % (0.060 %)		
130 mV to 200 V	0.020 % (0.030 %)		
<i>1 kHz to 10 kHz</i>			
5 mV to 25 mV	0.12 % (0.12 %)		
25 mV to 130 mV	0.060 % (0.070 %)		
130 mV to 200 V	0.040 % (0.050 %)		
<i>10 kHz to 30 kHz</i>			
5 mV to 25 mV	0.15 % (0.15 %)		
25 mV to 130 mV	0.11 % (0.11 %)		
130 mV to 200 V	0.10 % (0.10 %)		



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Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty ( $k = 2$ )	Remarks
Voltage Amplitude (continued)	30 kHz to 100 kHz 5 mV to 25 mV 25 mV to 200 V	0.36 % (0.36 %) 0.32 % (0.32 %)	The uncertainties in parentheses apply if a 50 $\Omega$ termination is used, the capability being limited to a maximum of 5 V.
Risetime	1 ns or greater, 25 mV <sub>pk-pk</sub> to 1 V <sub>pk-pk</sub> 100 Hz to 10 MHz	22 ps	Into 50 $\Omega$
	150 ps or greater, 5 mV to 3 V 10 kHz to 2 MHz	11 ps	Into 50 $\Omega$
	500 ps or greater, 5 mV to 3 V 10 kHz to 2 MHz 5 mV to 50 mV 50 mV to 3 V	22 ps 18 ps	Into 50 $\Omega$ Into 50 $\Omega$
Frequency and Markers	50 mV to 1 V: 0.02 Hz to 10 Hz 10 Hz to 1 MHz 1 MHz to 2 GHz	0.060 ppm 0.030 ppm 0.010 ppm	

**MEASUREMENT CAPABILITIES FOR THE CALIBRATION OF FLUKE 6100 SERIES ELECTRICAL POWER STANDARDS**

The capability shown is for the calibration of Fluke 6100 series of Electrical Power Standards. The Calibration and Measurement Capability refers to the fundamental component of the selected waveform.

Voltage Amplitude	Calibration and Measurement Capability in ppm expressed as an Expanded Uncertainty ( $k = 2$ ), from 10 % to 100 % of the stated voltage range. CMCs for intermediate frequencies may be provided upon request and will lie between the uncertainties at the adjacent points.									
	Voltage range:	0.8 V	1.5 V	10 V	23 V	45 V	90 V	180 V	360 V	1008 V
Frequency										
DC	33	32	32	32	31	31	31	32	32	32
16 Hz	25	24	21	21	19	21	22	24	24	24
40 Hz	25	24	21	21	19	21	22	24	24	24
50 Hz	25	24	21	21	19	21	22	24	24	24
60 Hz	25	24	21	21	19	21	22	24	24	24
120 Hz	25	24	21	21	19	21	22	24	24	24
180 Hz	25	24	21	21	19	21	22	24	24	24
450 Hz	25	24	21	21	19	21	22	24	24	24
850 Hz	25	25	24	24	23	24	25	26	26	26
1 200 Hz	34	34	33	34	32	34	34	35	35	35
1 800 Hz	34	34	33	34	32	34	34	35	35	35
2 400 Hz	34	34	33	34	32	34	34	35	35	35
3 000 Hz	34	34	33	34	32	34	34	35	35	35
3 600 Hz	34	34	33	34	32	34	34	35	35	35
4 200 Hz	34	34	33	34	32	34	34	35	35	35
4 800 Hz	34	34	33	34	32	34	34	35	35	35
5 400 Hz	34	34	33	34	32	34	34	35	35	35
6 000 Hz	34	34	33	34	32	34	34	35	35	35



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Measured Quantity Instrument or Gauge	Range		Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty ( $k = 2$ )		Remarks				
<b>Voltage Phase</b>	<i>Calibration and Measurement Capability</i> in millidegrees expressed as an Expanded Uncertainty ( $k = 2$ ), from 10 % to 100 % of the stated voltage range. The CMCs apply to the phase difference between the voltage channel and the master timing signal. Uncertainties for intermediate frequencies may be provided upon request and will lie between the uncertainties at the adjacent points.								
Voltage range:	0.8 V	1.5 V	10 V	16 V	33 V	78 V	168 V	336 V	1008 V
<i>Frequency</i>									
16 Hz	0.80	1.0	1.4	1.4	1.4	1.4	1.4	1.4	1.5
40 Hz	1.8	1.9	2.2	2.1	2.2	2.2	2.1	2.2	2.2
50 Hz	2.3	2.3	2.6	2.5	2.5	2.5	2.5	2.6	2.6
60 Hz	2.7	2.8	3.0	2.9	2.9	2.9	2.9	3.0	3.0
120 Hz	5.4	5.4	5.7	5.7	5.7	5.7	5.7	5.7	5.7
180 Hz	8.0	8.2	8.3	8.3	8.3	8.3	8.3	8.3	8.3
450 Hz	20	20	21	21	21	21	21	21	21
850 Hz	38	38	39	38	38	38	38	39	39
1 200 Hz	54	54	55	54	54	54	54	55	55
1 800 Hz	80	80	82	81	81	81	81	82	81
2 400 Hz	110	110	110	110	110	110	110	110	110
3 000 Hz	140	140	140	140	140	140	140	140	140
3 600 Hz	160	160	170	170	170	170	170	170	170
4 200 Hz	190	190	190	190	190	190	190	190	190
4 800 Hz	220	220	220	220	220	220	220	220	220
5 400 Hz	240	240	250	250	250	250	250	250	250
6 000 Hz	270	270	280	270	270	270	270	270	270
<b>Current Amplitude</b>	<i>Calibration and Measurement Capability</i> in ppm expressed as an Expanded Uncertainty ( $k = 2$ ), from 10 % to 100 % of the stated current range. CMCs for intermediate frequencies may be provided upon request and will lie between the uncertainties at the adjacent points.								
Current range:	0.1 A	0.5 A	1 A	2 A	5 A	10 A	20 A	50 A	100 A
<i>Frequency</i>									
DC	26	27	27	26	28	28	28	27	33
16 Hz	26	26	26	26	31	33	34	33	37
40 Hz	26	26	26	26	31	33	34	33	37
50 Hz	26	26	26	26	31	33	34	33	37
60 Hz	26	26	26	26	31	33	34	33	37
120 Hz	26	26	26	26	31	35	41	49	61
180 Hz	26	26	26	26	31	35	41	49	61
450 Hz	26	26	26	26	31	35	41	49	61
850 Hz	27	27	27	27	32	35	41	50	61
1 200 Hz	27	27	27	27	33	35	41	50	61
1 800 Hz	27	27	27	27	33	35	50	58	79
2 400 Hz	27	27	27	27	33	35	50	58	79
3 000 Hz	27	27	27	27	33	35	50	58	79
3 600 Hz	27	27	27	27	33	35	50	58	79
4 200 Hz	27	27	27	27	33	35	50	58	79
4 800 Hz	27	27	27	27	33	35	50	58	79
5 400 Hz	27	27	27	27	33	35	50	58	79
6 000 Hz	27	27	27	27	33	35	50	58	79



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<b>Current Phase</b>	<i>Calibration and Measurement Capability</i> in millidegrees expressed as an Expanded Uncertainty ( $k = 2$ ), from 10 % to 100 % of the stated current range. The CMCs apply to the phase difference between the current channel and the master timing signal. CMCs for intermediate frequencies may be provided upon request and will lie between the uncertainties at the adjacent points.								
Current range:	0.1 A	0.5 A	1 A	2 A	5 A	10 A	20 A	50 A	100 A
<i>Frequency</i>									
16 Hz	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
40 Hz	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
50 Hz	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4
60 Hz	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8
120 Hz	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.5
180 Hz	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1
450 Hz	21	21	21	21	21	21	21	21	21
850 Hz	38	38	38	38	38	38	38	38	39
1 200 Hz	54	54	54	54	54	54	54	54	54
1 800 Hz	81	81	81	81	81	81	81	81	81
2 400 Hz	110	110	110	110	110	110	110	110	110
3 000 Hz	140	140	140	140	140	140	140	140	140
3 600 Hz	170	160	160	160	170	170	170	170	170
4 200 Hz	190	190	190	190	190	190	190	190	190
4 800 Hz	220	220	220	220	220	220	220	220	220
5 400 Hz	250	240	240	240	240	250	250	250	250
6 000 Hz	270	270	270	270	270	270	270	270	270
<b>Channel to channel phase difference</b>	<i>Calibration and Measurement Capability</i> in millidegrees expressed as an Expanded Uncertainty ( $k = 2$ ), from 10 % to 100 % of the stated range. CMCs for intermediate frequencies may be provided upon request and will lie between the uncertainties at the adjacent points.								
Frequency	Voltage Channel Relative to any other Voltage Channel		Voltage Channel Relative to any Current Channel		Voltage Channel to Voltage Channel using the same Measurement System Range				
16 Hz	1.3		1.1		1.3				
40 Hz	1.4		1.2		1.3				
50 Hz	1.4		1.2		1.3				
60 Hz	1.4		1.2		1.3				
120 Hz	1.9		1.7		1.3				
180 Hz	2.8		2.3		1.7				
450 Hz	5.7		4.9		1.7				
850 Hz	11		8.9		1.7				
1 200 Hz	16		14		5.1				
1 800 Hz	23		20		5.1				
2 400 Hz	30		26		5.1				
3 000 Hz	37		32		5.1				
3 600 Hz	45		38		5.1				
4 200 Hz	52		44		6.5				
4 800 Hz	60		50		9.4				
5 400 Hz	67		57		9.4				
6 000 Hz	74		63		9.4				



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Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty ( $k = 2$ )	Remarks
DC and AC POWER (simulated)	DC and 16 Hz to 6 kHz: 0 W to 100.8 kW	The RSS combination of the voltage, current and phase (expressed in terms of power factor) uncertainties as stated on Pages 14 to 16. At power factors approaching zero, the uncertainties will be stated in absolute terms.	Limiting voltage 1008 V Limiting current 100 A Power factor zero to unity, capacitive and inductive, single phase only.

**MEASUREMENT CAPABILITIES FOR THE CALIBRATION OF FLUKE 9600 SERIES RF REFERENCE SOURCES**

Levelled sine wave output accuracy  
50  $\Omega$  system

*Calibration and Measurement Capability* in dB expressed as an Expanded Uncertainty ( $k = 2$ ).  
For frequencies between those in the table the greater of the adjacent CMCs applies.

Level (dBm):	+ 24 to + 20	+ 20 to 0	0 to - 10	- 10 to - 20	- 20 to - 30	- 30 to - 40	- 40 to - 48	- 48 to - 58	- 58 to - 68	- 68 to - 78	- 78 to - 88	- 88 to - 98	- 98 to - 108	- 108 to - 118	- 118 to - 128
Frequency MHz															
0.001	0.0020	0.0020	0.0020	0.0020	0.0030	0.0040	0.0040								
0.020	0.0020	0.0020	0.0020	0.0020	0.0030	0.0040	0.0040	0.024							
0.075	0.0020	0.0020	0.0020	0.0020	0.0030	0.0040	0.0040	0.024							
0.1	0.0020	0.0020	0.0020	0.0020	0.0030	0.0050	0.0060	0.030	0.042	0.045	0.10	0.14	0.20	0.19	0.46
0.3	0.017	0.011	0.024	0.024	0.022	0.022	0.024	0.030	0.042	0.038	0.10	0.10	0.13	0.19	0.46
1	0.017	0.011	0.023	0.023	0.021	0.021	0.023	0.030	0.042	0.038	0.10	0.076	0.13	0.19	0.46
10	0.018	0.012	0.023	0.023	0.021	0.021	0.023	0.030	0.035	0.038	0.092	0.061	0.11	0.17	0.21
20	0.023	0.019	0.030	0.030	0.028	0.028	0.029	0.034	0.040	0.042	0.064	0.063	0.10	0.16	0.21
100	0.030	0.027	0.029	0.029	0.027	0.028	0.029	0.034	0.039	0.041	0.064	0.063	0.099	0.16	0.21
125	0.030	0.027	0.034	0.034	0.032	0.033	0.034	0.038	0.043	0.045	0.067	0.065	0.10	0.16	0.25
300		0.027	0.034	0.034	0.033	0.033	0.034	0.038	0.043	0.045	0.067	0.065	0.20	0.39	0.47
750		0.040	0.046	0.046	0.045	0.045	0.046	0.049	0.064	0.065	0.077	0.086	0.20	0.40	0.47
1000		0.040	0.046	0.046	0.045	0.045	0.046	0.050	0.078	0.080	0.10	0.10	0.21	0.41	0.47
1400		0.058	0.065	0.065	0.062	0.062	0.063	0.066	0.11	0.11	0.13	0.13	0.22	0.42	0.48
2000		0.058	0.065	0.065	0.062	0.062	0.063	0.066	0.13	0.13	0.15	0.14	0.24	0.43	0.48
2500		0.066	0.072	0.072	0.070	0.070	0.070	0.078	0.14	0.14	0.18	0.17	0.25	0.43	0.49
3000		0.067	0.072	0.072	0.070	0.070	0.070	0.078	0.17	0.17	0.18	0.19	0.25	0.45	0.49
3500		0.11	0.087	0.087	0.085	0.085	0.086	0.092	0.18	0.18	0.18	0.19	0.28	0.49	0.55
4000		0.11	0.11	0.11	0.11	0.11	0.11	0.12	0.19	0.20	0.20	0.21			



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**Fluke Precision Measurement Ltd**  
Issue No: 037 Issue date: 20 January 2012

Calibration performed at main address only

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty ( $k = 2$ )	Remarks
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**MEASUREMENT CAPABILITIES FOR THE CALIBRATION OF FLUKE 9600 SERIES RF REFERENCE SOURCES**  
(continued)

Output VSWR (50Ω)	1.0 to 1.4 300 kHz to 0.99 MHz 1 MHz to 1.7 GHz 1.7 GHz to 2 GHz 2 GHz to 3 GHz 3 GHz to 3.6 GHz 3.6 GHz to 4 GHz	0.095 0.036 0.038 0.097 0.18 0.23	For output levels between -17 dBm and +13 dBm. The results and uncertainties may also be expressed in terms of VRC or return loss.
	1.0 to 1.4 300 kHz to 0.99 MHz 1 MHz to 2 GHz 2 GHz to 3 GHz 3 GHz to 3.6 GHz 3.6 GHz to 4 GHz	0.096 0.033 0.095 0.17 0.22	For output levels ≤ -7 dBm. The results and uncertainties may also be expressed in terms of VRC or return loss

Levelled sine wave output accuracy  
75 Ω system

Calibration and Measurement Capability in dB expressed as an Expanded Uncertainty ( $k = 2$ ).  
For frequencies between those in the table the greater of the adjacent CMCs applies.

Level (dBm):	+ 18 to + 11	+ 11 to 0	0 to - 10	- 10 to - 20	- 20 to - 30	- 30 to - 40	- 40 to - 50	- 50 to - 55	- 55 to - 65	- 65 to - 75	- 75 to - 85	- 85 to - 95	- 95 to - 105	- 105 to - 115	- 115 to - 125
Frequency MHz															
0.001	0.0020	0.0020	0.0020	0.0030	0.0030	0.0040	0.0040	0.0050							
0.020	0.0020	0.0020	0.0020	0.0030	0.0030	0.0040	0.0040	0.0050	0.045						
0.075	0.0020	0.0020	0.0020	0.0030	0.0030	0.0040	0.0040	0.0050	0.045						
0.1	0.0020	0.0020	0.0030	0.0030	0.0040	0.0050	0.0050	0.0050	0.045	0.046	0.067	0.070	0.13	0.25	0.25
0.3	0.023	0.020	0.020	0.021	0.019	0.019	0.019	0.047	0.047	0.049	0.069	0.072	0.13	0.25	0.25
1	0.023	0.020	0.020	0.021	0.019	0.019	0.019	0.047	0.047	0.049	0.069	0.072	0.13	0.25	0.25
10	0.023	0.020	0.020	0.021	0.019	0.019	0.019	0.047	0.047	0.049	0.069	0.072	0.13	0.25	0.25
20	0.029	0.027	0.027	0.027	0.026	0.026	0.026	0.050	0.050	0.052	0.071	0.074	0.13	0.25	0.25
100	0.029	0.027	0.027	0.027	0.026	0.026	0.026	0.050	0.050	0.052	0.071	0.074	0.13	0.25	0.25
125	0.029	0.027	0.027	0.027	0.026	0.026	0.026	0.050	0.050	0.052	0.071	0.074	0.13	0.25	0.25
300	0.031	0.029	0.029	0.029	0.028	0.028	0.028	0.052	0.052	0.053	0.072	0.075	0.21	0.44	0.44
750	0.045	0.044	0.044	0.044	0.043	0.043	0.043	0.061	0.061	0.063	0.079	0.082	0.22	0.44	0.44
1000	0.045	0.044	0.044	0.044	0.043	0.043	0.043	0.061	0.061	0.063	0.079	0.082	0.22	0.44	0.44
1400	0.066	0.064	0.064	0.065	0.062	0.062	0.062	0.089	0.089	0.090	0.12	0.13	0.22	0.45	0.45
2000		0.068	0.068	0.068	0.067	0.067	0.067	0.090	0.090	0.091	0.12	0.13	0.22	0.45	0.45
2500		0.12	0.12	0.11	0.11	0.11	0.11	0.12	0.12	0.12	0.15	0.15	0.24	0.46	0.46
3000		0.12	0.12	0.11	0.11	0.11	0.11	0.12	0.12	0.12	0.15	0.15	0.24	0.46	0.46



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Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty ( $k = 2$ )	Remarks
<b>MEASUREMENT CAPABILITIES FOR THE CALIBRATION OF FLUKE 9600 SERIES RF REFERENCE SOURCES</b> <i>(continued)</i>			
Output VSWR (75Ω)	1.0 to 1.4 300 kHz to 0.99 MHz 1 MHz to 1.3 GHz 1.3 GHz to 1.7 GHz 1.7 GHz to 2 GHz 2 GHz to 3 GHz	0.098 0.039 0.059 0.060 0.10	For output levels between + 7 dBm and - 3 dBm. The results and uncertainties may also be expressed in terms of VRC or return loss.
	1.0 to 1.4 300 kHz to 0.99 MHz 1 MHz to 1.3 GHz 1.3 GHz to 2 GHz 2 GHz to 3 GHz	0.097 0.036 0.058 0.098	For output levels ≤ - 3 dBm. The results and uncertainties may also be expressed in terms of VRC or return loss.
--- END OF SCHEDULE ---			



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Appendix - Calibration and Measurement Capabilities

**Introduction**

The definitive statement of the accreditation status of a calibration laboratory is the Accreditation Certificate and the associated Schedule of Accreditation. This Schedule of Accreditation is a critical document, as it defines the measurement capabilities, ranges and boundaries of the calibration activities for which the organisation holds accreditation.

**Calibration and Measurement Capabilities (CMCs)**

The capabilities provided by accredited calibration laboratories are described by the Calibration and Measurement Capability (CMC), which expresses the lowest uncertainty of measurement that can be achieved during a calibration. If a particular device under calibration itself contributes significantly to the uncertainty (for example, if it has limited resolution or exhibits significant non-repeatability) then the uncertainty quoted on a calibration certificate will be increased to account for such factors. The CIPM-ILAC definition of the CMC is as follows:

*A CMC is a calibration and measurement capability available to customers under normal conditions:*

*(a) as published in the BIPM key comparison database (KCDB) of the CIPM MRA; or*

*(b) as described in the laboratory's scope of accreditation granted by a signatory to the ILAC Arrangement.*

The CMC is normally used to describe the uncertainty that appears in an accredited calibration laboratory's schedule of accreditation and is the uncertainty for which the laboratory has been accredited using the procedure that was the subject of assessment. The CMC is calculated according to the procedures given in M3003 and is normally stated as an expanded uncertainty at a coverage probability of 95 %, which usually requires the use of a coverage factor of  $k = 2$ . An accredited laboratory is not permitted to quote an uncertainty that is smaller than the published CMC in certificates issued under its accreditation.

The CMC may be described using various methods in the Schedule of Accreditation:

As a single value that is valid throughout the range.

As an explicit function of the measurand or of a parameter (see below).

As a range of values. The range is stated such that the customer can make a reasonable estimate of the likely uncertainty at any point within the range.

As a matrix or table where the CMCs depend on the values of the measurand and a further quantity.

In graphical form, providing there is sufficient resolution on each axis to obtain at least two significant figures for the CMC.

**Expression of CMCs - symbols and units**

In general, only units of the SI and those units recognised for use with the SI are used to express the values of quantities and of the associated CMCs. Nevertheless, other commonly used units may be used where considered appropriate for the intended audience. For example, the term "ppm" (part per million) is frequently used by manufacturers of test and measurement equipment to specify the performance of their products. Terms like this may be used in Schedules of Accreditation where they are in common use and understood by the users of such equipment, providing their use does not introduce any ambiguity in the capability that is being described.

When the CMC is expressed as an explicit function of the measurand or of a parameter, this often comprises a relative term (e.g., percentage) and an absolute term, i.e. one expressed in the same units as those of the measurand. This form of expression is used to describe the capability that can be achieved over a range of values. Some examples, and an indication of how they are to be interpreted, are shown below.

DC voltage, 100 mV to 1 V: 0.0025 % + 5.0  $\mu$ V:

Over the range 100 mV to 1 V, the CMC is 0.0025 %  $\cdot$  V + 5.0  $\mu$ V, where V is the measured voltage.

Hydraulic pressure, 0.5 MPa to 140 MPa: 0.0036 % + 0.12 ppm/MPa + 4.0 Pa

Over the range 0.5 MPa to 140 MPa, the CMC is 0.0036 %  $\cdot$  p + (0.12  $\cdot$  10<sup>-6</sup>  $\cdot$  p  $\cdot$  10<sup>-6</sup>) + 4.0 Pa, where p is the measured pressure in Pa.

It should be noted that the percentage symbol (%) simply represents the number 0.01. In cases where the CMC is stated only as a percentage, this is to be interpreted as meaning percentage of the measured value or indication.

Thus, for example, a CMC of 1.5 % means 1.5  $\cdot$  0.01  $\cdot$  i, where i is the instrument indication.