



Calibration Certificate

Certificate No: M724612

Certificate Issued To	Aurecon New Zealand Ltd		Address	Level 3, Te Tihi 110 Carlton Gore Road Newmarket Auckland 1023		
Purchase Order No	Brent Wilson					
Manufacturer	Geotechnics	Model	Geovane	S/No	1378	
				Unique ID		
Description	Handheld shear vane with matching blade(s)					
Calibration Date	27/09/2024		Temp During Test		19.8 to 20.3 °C	
Method	MCC 5.51c.01 – Handheld Soil Shear Vane Testers (2021), Guideline for Hand Held Shear Vane Test (NZGS, 2001) was used as a guide.					

Results

19 mm Ø Vane Blade

Shear Strength = A × Reading	A (kPa/div)	1.383	Area Ratio	24.0%
------------------------------	-------------	-------	------------	-------

Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)
0	0	30	41	60	83	90	124	120	166
2	3	32	44	62	86	92	127	122	169
4	6	34	47	64	88	94	130	124	171
6	8	36	50	66	91	96	133	126	174
8	11	38	53	68	94	98	136	128	177
10	14	40	55	70	97	100	138	130	180
12	17	42	58	72	100	102	141	132	183
14	19	44	61	74	102	104	144	134	185
16	22	46	64	76	105	106	147	136	188
18	25	48	66	78	108	108	149	138	191
20	28	50	69	80	111	110	152	140	194
22	30	52	72	82	113	112	155		
24	33	54	75	84	116	114	158		
26	36	56	77	86	119	116	160		
28	39	58	80	88	122	118	163		

The expanded uncertainty of measurement, expressed at the 95% confidence level, is ±4.9 kPa. The coverage factor (k) is 2.

Remarks

When received, this equipment was in good condition.

Measurement results are traceable to the International System of Units (SI), or other recognised references via an unbroken chain of comparisons to the New Zealand National Standards or to the National Standards of other Signatories to the CIPM MRA.

This certificate has been prepared for the benefit of Aurecon New Zealand Ltd, with respect to the particular brief given to us and it cannot be relied upon in other contexts or for any other purpose without our prior review and agreement. Results relate only to the specific equipment described above.

This calibration was performed at 1 Hill Street, Onehunga, Auckland, NZ.

Prepared by

 **Jesse Richardson**
Calibration Technician

Checked by

 **Annalyse Ryan**
Metrologist | Team Leader

Key Technical Person

 **Annalyse Ryan**
Metrologist | Team Leader



All measurements reported herein have been performed in accordance with the laboratory's scope of accreditation



Calibration Certificate

Certificate No: M727737

Certificate Issued To	Aurecon New Zealand Ltd		Address	Level 3 110 Carlton Gore Road Newmarket Auckland 1023		
Purchase Order No	Brent Wilson					
Manufacturer	Geotechnics	Model	Geovane	S/No	1378	
				Unique ID		
Description	Handheld shear vane with matching blade(s)					
Calibration Date	20/10/2025		Temp During Test		19.2 to 19.7 °C	
Method	MCC 5.51c.01 – Handheld Soil Shear Vane Testers (2021), Guideline for Hand Held Shear Vane Test (NZGS, 2001) was used as a guide.					

Results

19 mm Ø Vane Blade

Shear Strength = A × Reading	A (kPa/div)	1.490	Area Ratio	23.9%
------------------------------	-------------	-------	------------	-------

Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)
0	0	30	45	60	89	90	134	120	179
2	3	32	48	62	92	92	137	122	182
4	6	34	51	64	95	94	140	124	185
6	9	36	54	66	98	96	143	126	188
8	12	38	57	68	101	98	146	128	191
10	15	40	60	70	104	100	149	130	194
12	18	42	63	72	107	102	152	132	197
14	21	44	66	74	110	104	155	134	200
16	24	46	69	76	113	106	158	136	203
18	27	48	72	78	116	108	161	138	206
20	30	50	74	80	119	110	164	140	209
22	33	52	77	82	122	112	167		
24	36	54	80	84	125	114	170		
26	39	56	83	86	128	116	173		
28	42	58	86	88	131	118	176		

The expanded uncertainty of measurement, expressed at the 95% confidence level, is ±5.9 kPa. The coverage factor (k) is 2.

Remarks

When received, this equipment was in good condition.

Measurement results are traceable to the International System of Units (SI), or other recognised references via an unbroken chain of comparisons to the New Zealand National Standards or to the National Standards of other Signatories to the CIPM MRA.

This certificate has been prepared for the benefit of Aurecon New Zealand Ltd, with respect to the particular brief given to us and it cannot be relied upon in other contexts or for any other purpose without our prior review and agreement. Results relate only to the specific equipment described above.

This calibration was performed at 1 Hill Street, Onehunga, Auckland, NZ.

Prepared by

Checked by

Key Technical Person

 Ivan Caresosa
Calibration Technician

 Herman Wessels
Calibration Technician

 Herman Wessels
Calibration Technician



All measurements reported herein have been performed in accordance with the laboratory's scope of accreditation



Calibration Certificate

Certificate No: M725376

Certificate Issued To	Aurecon New Zealand Ltd		Address	Aurecon, Level 3 110 Carlton Gore Road Newmarket Auckland		
Purchase Order No	Brent Wilson					
Manufacturer	Geotechnics	Model	Geovane	S/No	2006	
				Unique ID		
Description	Handheld shear vane with matching blade(s)					
Calibration Date	18/12/2024		Temp During Test		19.5 to 20.2 °C	
Method	MCC 5.51c.01 – Handheld Soil Shear Vane Testers (2021), Guideline for Hand Held Shear Vane Test (NZGS, 2001) was used as a guide.					

Results

19 mm Ø Vane Blade

Shear Strength = A × Reading	A (kPa/div)	1.581	Area Ratio	23.8%
------------------------------	-------------	-------	------------	-------

Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)
0	0	30	47	60	95	90	142	120	190
2	3	32	51	62	98	92	145	122	193
4	6	34	54	64	101	94	149	124	196
6	9	36	57	66	104	96	152	126	199
8	13	38	60	68	108	98	155	128	202
10	16	40	63	70	111	100	158	130	206
12	19	42	66	72	114	102	161	132	209
14	22	44	70	74	117	104	164	134	212
16	25	46	73	76	120	106	168	136	215
18	28	48	76	78	123	108	171	138	218
20	32	50	79	80	127	110	174	140	221
22	35	52	82	82	130	112	177		
24	38	54	85	84	133	114	180		
26	41	56	89	86	136	116	183		
28	44	58	92	88	139	118	187		

The expanded uncertainty of measurement, expressed at the 95% confidence level, is ±5.0 kPa. The coverage factor (k) is 2.

Remarks

When received, this equipment was in good condition.

Measurement results are traceable to the International System of Units (SI), or other recognised references via an unbroken chain of comparisons to the New Zealand National Standards or to the National Standards of other Signatories to the CIPM MRA.

This certificate has been prepared for the benefit of Aurecon New Zealand Ltd, with respect to the particular brief given to us and it cannot be relied upon in other contexts or for any other purpose without our prior review and agreement. Results relate only to the specific equipment described above.

This calibration was performed at 1 Hill Street, Onehunga, Auckland, NZ.

Prepared by

Checked by

Key Technical Person

 **Jesse Richardson**
Calibration Technician

 **Annalyse Ryan**
Metrologist | Team Leader

 **Annalyse Ryan**
Metrologist | Team Leader



All measurements reported herein have been performed in accordance with the laboratory's scope of accreditation



Calibration Certificate

Certificate No: M726487

Certificate Issued To	Aurecon New Zealand Ltd - Auckland		Address	110 Carlton Gore Road Newmarket Auckland 1043		
Purchase Order No	Brent Wilson					
Manufacturer	Geotechnics	Model	Geovane	S/No	3178	
				Unique ID		
Description	Handheld shear vane with matching blade(s)					
Calibration Date	23/05/2025		Temp During Test		19.7 to 20.2 °C	
Method	MCC 5.51c.01 – Handheld Soil Shear Vane Testers (2021), Guideline for Hand Held Shear Vane Test (NZGS, 2001) was used as a guide.					

Results

19 mm Ø Vane Blade

Shear Strength = A × Reading	A (kPa/div)	1.364	Area Ratio	23.9%
------------------------------	-------------	-------	------------	-------

Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)
0	0	30	41	60	82	90	123	120	164
2	3	32	44	62	85	92	125	122	166
4	5	34	46	64	87	94	128	124	169
6	8	36	49	66	90	96	131	126	172
8	11	38	52	68	93	98	134	128	175
10	14	40	55	70	95	100	136	130	177
12	16	42	57	72	98	102	139	132	180
14	19	44	60	74	101	104	142	134	183
16	22	46	63	76	104	106	145	136	186
18	25	48	65	78	106	108	147	138	188
20	27	50	68	80	109	110	150	140	191
22	30	52	71	82	112	112	153		
24	33	54	74	84	115	114	155		
26	35	56	76	86	117	116	158		
28	38	58	79	88	120	118	161		

The expanded uncertainty of measurement, expressed at the 95% confidence level, is ±5.4 kPa. The coverage factor (k) is 2.

Remarks

When received, this equipment was in good condition.

Measurement results are traceable to the International System of Units (SI), or other recognised references via an unbroken chain of comparisons to the New Zealand National Standards or to the National Standards of other Signatories to the CIPM MRA.

This certificate has been prepared for the benefit of Aurecon New Zealand Ltd - Auckland, with respect to the particular brief given to us and it cannot be relied upon in other contexts or for any other purpose without our prior review and agreement. Results relate only to the specific equipment described above.

This calibration was performed at 1 Hill Street, Onehunga, Auckland, NZ.

Prepared by

Checked by

Key Technical Person

 Ivan Caresosa
Calibration Technician

 Annalyse Ryan
Metrologist | Team Leader

 Annalyse Ryan
Metrologist | Team Leader



All measurements reported herein have been performed in accordance with the laboratory's scope of accreditation



GROUNDTEST EQUIPMENT



All measurements
reported herein have
been performed in
accordance with the
laboratory's scope of
accreditation

No 658

CALIBRATION CERTIFICATE SHEAR VANE

CUSTOMER

Certificate No. 5045

Aurecon NZ Ltd
ANZ Centre, Ground Level | 247 Cameron Road | Tauranga

EQUIPMENT CALIBRATED

Torque head type: Geovane
Torque head serial number: 3352
Matched vanes: 3352
Condition: Good
Location: Unit I, 3 Hill Street, Onehunga, Auckland

ENVIRONMENT The temperature was 23 °C

BASIS OF CALIBRATION

The torque head has been calibrated using the Groundtest TM1 Method based on *NZ Geotechnical Society Inc August 2001 Guideline For Hand Held Shear Vane Test* using a calibrated device and verified weights.

The estimated uncertainty of torque measurement expressed at the 95% level of confidence is ± 0.063 N·m. The estimated uncertainty of theoretical shear strength expressed at the 95% level of confidence is ± 2.29 kPa.

Note: The shear strength tables are based on the theoretical shear cylinder formed by the vane rotation, giving the formula $\text{Shear Strength} = \text{Torque} \times (\pi D^2 H / 2) (1 + D / 3H) \times 10^{-6}$. The determination of the relation between this theoretical shear strength and undrained shear strength or any other measure of soil strength is the responsibility of the user. This certificate applies only to the item tested, as identified on this certificate.

Calibrated by


P Puran

Date of Calibration 12-06-2025

Approved Signator


S Lata

Date of Report 12-06-2025

This certificate may only be reproduced in full.

Certificate No: 5045



GROUNDTEST EQUIPMENT

SHEAR VANE LOOKUP CHART

Torque head serial number: 3352
Vane serial number: 3352
Shear strength constant (kPa/Div) **1.75**
Use of this constant increases uncertainty by 2.97%

Reading	kPa	Reading	kPa	Reading	kPa	Reading	kPa
1	1.7	34	53.6	67	104.2	100	177.9
2	3.4	35	55.1	68	106.3	101	179.7
3	5.1	36	56.5	69	108.5	102	181.5
4	6.8	37	58.0	70	110.6	103	183.3
5	8.5	38	59.4	71	112.8	104	185.1
6	10.3	39	60.9	72	114.9	105	186.9
7	12.0	40	62.3	73	117.1	106	188.7
8	13.7	41	63.8	74	119.3	107	190.5
9	15.4	42	65.2	75	121.4	108	192.3
10	17.1	43	66.7	76	123.6	109	194.0
11	18.8	44	68.1	77	125.7	110	195.8
12	20.5	45	69.6	78	128.0	111	197.6
13	22.2	46	71.1	79	130.3	112	199.4
14	23.9	47	72.5	80	132.6	113	201.2
15	25.6	48	74.0	81	134.9	114	203.0
16	27.0	49	75.4	82	137.1	115	204.7
17	28.5	50	77.0	83	139.4	116	206.5
18	30.0	51	78.5	84	141.7	117	208.3
19	31.5	52	80.0	85	144.0	118	210.0
20	33.0	53	81.6	86	146.3	119	211.8
21	34.4	54	83.1	87	148.6	120	213.5
22	35.9	55	84.7	88	150.9	121	215.3
23	37.4	56	86.2	89	153.2	122	217.0
24	38.9	57	87.7	90	155.4	123	218.8
25	40.3	58	89.3	91	157.7	124	220.5
26	41.8	59	90.8	92	160.0	125	222.3
27	43.3	60	92.4	93	162.3	126	224.0
28	44.8	61	93.9	94	164.6	127	225.8
29	46.3	62	95.5	95	166.9	128	227.9
30	47.7	63	97.0	96	169.2	129	230.2
31	49.2	64	98.5	97	171.5	130	232.5
32	50.7	65	100.1	98	173.8	131	234.8
33	52.1	66	102.0	99	176.1	132	237.1



Calibrated by:

P Puran

Date: 12-06-2025

This certificate may only be reproduced in full.

Certificate No: 5045



Calibration Certificate

Certificate No: M726983.02

Certificate Issued To	Aurecon New Zealand Ltd		Address	Level 3 - 110 Carlton Gore Road New Market Auckland 1023		
Purchase Order No	David Bosse					
Manufacturer	Geotechnics	Model	Geovane		S/No	3733
					Unique ID	
Description	Handheld shear vane with matching blade(s)					
Calibration Date	16/07/2025		Temp During Test		19.8 to 20.3 °C	
Method	MCC 5.51c.01 – Handheld Soil Shear Vane Testers (2021), Guideline for Hand Held Shear Vane Test (NZGS, 2001) was used as a guide.					

Results

19 mm Ø Vane Blade

Shear Strength = A × Reading	A (kPa/div)	1.507	Area Ratio	23.0%
------------------------------	-------------	-------	------------	-------

Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)
0	0	30	45	60	90	90	136	120	181
2	3	32	48	62	93	92	139	122	184
4	6	34	51	64	96	94	142	124	187
6	9	36	54	66	99	96	145	126	190
8	12	38	57	68	102	98	148	128	193
10	15	40	60	70	105	100	151	130	196
12	18	42	63	72	108	102	154	132	199
14	21	44	66	74	111	104	157	134	202
16	24	46	69	76	115	106	160	136	205
18	27	48	72	78	118	108	163	138	208
20	30	50	75	80	121	110	166	140	211
22	33	52	78	82	124	112	169		
24	36	54	81	84	127	114	172		
26	39	56	84	86	130	116	175		
28	42	58	87	88	133	118	178		

The expanded uncertainty of measurement, expressed at the 95% confidence level, is ± 4.8 kPa. The coverage factor (k) is 2.

Remarks

When received, this equipment was in good condition.

Measurement results are traceable to the International System of Units (SI), or other recognised references via an unbroken chain of comparisons to the New Zealand National Standards or to the National Standards of other Signatories to the CIPM MRA.

This certificate has been prepared for the benefit of Aurecon New Zealand Ltd, with respect to the particular brief given to us and it cannot be relied upon in other contexts or for any other purpose without our prior review and agreement. Results relate only to the specific equipment described above.

This calibration was performed at 1 Hill Street, Onehunga, Auckland, NZ.

Prepared by

 **Jesse Richardson**
Calibration Technician

Checked by

 **Annalyse Ryan**
Metrologist | Team Leader

Key Technical Person

 **Annalyse Ryan**
Metrologist | Team Leader



All measurements reported herein have been performed in accordance with the laboratory's scope of accreditation



Calibration Certificate

Certificate No: M726920

Certificate Issued To	Aurecon New Zealand Ltd		Address	Aurecon, Level 3 110 Carlton Gore Road Newmarket Auckland 1043		
Purchase Order No	Brent Wilson					
Manufacturer	Geotechnics	Model	Geovane	S/No	DR4938	
				Unique ID		
Description	Handheld shear vane with matching blade(s)					
Calibration Date	14/07/2025		Temp During Test		19.4 to 20.0 °C	
Method	MCC 5.51c.01 – Handheld Soil Shear Vane Testers (2021), Guideline for Hand Held Shear Vane Test (NZGS, 2001) was used as a guide.					

Results

19 mm Ø Vane Blade

Shear Strength = A × Reading	A (kPa/div)	1.486	Area Ratio	23.0%
------------------------------	-------------	-------	------------	-------

Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)
0	0	30	45	60	89	90	134	120	178
2	3	32	48	62	92	92	137	122	181
4	6	34	51	64	95	94	140	124	184
6	9	36	53	66	98	96	143	126	187
8	12	38	56	68	101	98	146	128	190
10	15	40	59	70	104	100	149	130	193
12	18	42	62	72	107	102	152	132	196
14	21	44	65	74	110	104	155	134	199
16	24	46	68	76	113	106	158	136	202
18	27	48	71	78	116	108	160	138	205
20	30	50	74	80	119	110	163	140	208
22	33	52	77	82	122	112	166		
24	36	54	80	84	125	114	169		
26	39	56	83	86	128	116	172		
28	42	58	86	88	131	118	175		

The expanded uncertainty of measurement, expressed at the 95% confidence level, is ±5.4 kPa. The coverage factor (k) is 2.

Remarks

When received, this equipment was in good condition.

Measurement results are traceable to the International System of Units (SI), or other recognised references via an unbroken chain of comparisons to the New Zealand National Standards or to the National Standards of other Signatories to the CIPM MRA.

This certificate has been prepared for the benefit of Aurecon New Zealand Ltd, with respect to the particular brief given to us and it cannot be relied upon in other contexts or for any other purpose without our prior review and agreement. Results relate only to the specific equipment described above.

This calibration was performed at 1 Hill Street, Onehunga, Auckland, NZ.

Prepared by

 Ivan Caresosa
Calibration Technician

Checked by

 Annalyse Ryan
Metrologist | Team Leader

Key Technical Person

 Annalyse Ryan
Metrologist | Team Leader



All measurements reported herein have been performed in accordance with the laboratory's scope of accreditation



Calibration Certificate

Certificate No: M724561

Certificate Issued To	Aurecon New Zealand Ltd		Address	Level 3, Te Tihi 110 Carlton Gore Road, Newmarket Auckland 1023		
Purchase Order No	Tracy Howe					
Manufacturer	Simmons Edeco	Model	Pilcon	S/No	DR4940	
				Unique ID		
Description	Handheld shear vane with matching blade(s)					
Calibration Date	19/09/2024		Temp During Test		19.3 to 19.9 °C	
Method	MCC 5.51c.01 – Handheld Soil Shear Vane Testers (2021), Guideline for Hand Held Shear Vane Test (NZGS, 2001) was used as a guide.					

Results

19 mm Ø Vane Blade

Shear Strength = A × Reading	A (kPa/div)	1.613	Area Ratio	24.0%
------------------------------	-------------	-------	------------	-------

COMMENT : This chart applies to the outer scale of the dial.

Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)
0	0	30	48	60	97	90	145	120	194
2	3	32	52	62	100	92	148	122	197
4	6	34	55	64	103	94	152	124	200
6	10	36	58	66	106	96	155	126	203
8	13	38	61	68	110	98	158	128	206
10	16	40	65	70	113	100	161	130	210
12	19	42	68	72	116	102	164	132	213
14	23	44	71	74	119	104	168	134	216
16	26	46	74	76	123	106	171	136	219
18	29	48	77	78	126	108	174	138	223
20	32	50	81	80	129	110	177	140	226
22	35	52	84	82	132	112	181		
24	39	54	87	84	135	114	184		
26	42	56	90	86	139	116	187		
28	45	58	94	88	142	118	190		

The expanded uncertainty of measurement, expressed at the 95% confidence level, is ±7.6 kPa. The coverage factor (k) is 2.

Remarks

When received, this equipment was in good condition.

Measurement results are traceable to the International System of Units (SI), or other recognised references via an unbroken chain of comparisons to the New Zealand National Standards or to the National Standards of other Signatories to the CIPM MRA.

This certificate has been prepared for the benefit of Aurecon New Zealand Ltd, with respect to the particular brief given to us and it cannot be relied upon in other contexts or for any other purpose without our prior review and agreement. Results relate only to the specific equipment described above.

This calibration was performed at 1 Hill Street, Onehunga, Auckland, NZ.

Prepared by

 **Jesse Richardson**
Calibration Technician

Checked by

 **Annalyse Ryan**
Metrologist | Team Leader

Key Technical Person

 **Annalyse Ryan**
Metrologist | Team Leader



All measurements reported herein have been performed in accordance with the laboratory's scope of accreditation



Calibration Certificate

Certificate No: M727567

Certificate Issued To	Aurecon New Zealand Ltd		Address	110 Carlton Gore Road		
Purchase Order No	Brent Wilson			New Market		
				Auckland		
				1043		
Manufacturer	Simmons Edeco	Model	Pilcon	S/No	DR4940	
				Unique ID		
Description	Handheld shear vane with matching blade(s)					
Calibration Date	6/10/2025		Temp During Test		20.3 to 20.9 °C	
Method	MCC 5.51c.01 – Handheld Soil Shear Vane Testers (2021), Guideline for Hand Held Shear Vane Test (NZGS, 2001) was used as a guide.					

Results

19 mm Ø Vane Blade

Shear Strength = A × Reading	A (kPa/div)	1.772	Area Ratio	23.6%
------------------------------	-------------	-------	------------	-------

COMMENT : This chart applies to the outer scale of the dial.

Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)
0	0	30	53	60	106	90	159	120	213
2	4	32	57	62	110	92	163	122	216
4	7	34	60	64	113	94	167	124	220
6	11	36	64	66	117	96	170	126	223
8	14	38	67	68	121	98	174	128	227
10	18	40	71	70	124	100	177	130	230
12	21	42	74	72	128	102	181	132	234
14	25	44	78	74	131	104	184	134	237
16	28	46	82	76	135	106	188	136	241
18	32	48	85	78	138	108	191	138	245
20	35	50	89	80	142	110	195	140	248
22	39	52	92	82	145	112	198		
24	43	54	96	84	149	114	202		
26	46	56	99	86	152	116	206		
28	50	58	103	88	156	118	209		

The expanded uncertainty of measurement, expressed at the 95% confidence level, is ±9.4 kPa. The coverage factor (k) is 2.

Remarks

When received, this equipment was in good condition.

Measurement results are traceable to the International System of Units (SI), or other recognised references via an unbroken chain of comparisons to the New Zealand National Standards or to the National Standards of other Signatories to the CIPM MRA.

This certificate has been prepared for the benefit of Aurecon New Zealand Ltd, with respect to the particular brief given to us and it cannot be relied upon in other contexts or for any other purpose without our prior review and agreement. Results relate only to the specific equipment described above.

This calibration was performed at 1 Hill Street, Onehunga, Auckland, NZ.

Prepared by

 **Jesse Richardson**
Calibration Technician

Checked by

 **Annalyse Ryan**
Metrologist | Team Leader

Key Technical Person

 **Annalyse Ryan**
Metrologist | Team Leader



All measurements reported herein have been performed in accordance with the laboratory's scope of accreditation



Calibration Certificate

Certificate No: M725350.02

Certificate Issued To	Engeo Limited		Address	124 Montreal Street Sydenham Christchurch 8023		
Purchase Order No	Chanel					
Manufacturer	Geotechnics	Model	Geovane	S/No	1288	
				Unique ID		
Description	Handheld shear vane with matching blade(s)					
Calibration Date	17/12/2024		Temp During Test		20.3 to 20.8 °C	
Method	MCC 5.51c.01 – Handheld Soil Shear Vane Testers (2021), Guideline for Hand Held Shear Vane Test (NZGS, 2001) was used as a guide.					

Results

19 mm Ø Vane Blade

Shear Strength = A × Reading	A (kPa/div)	1.546	Area Ratio	23.3%
------------------------------	-------------	-------	------------	-------

Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)
0	0	30	46	60	93	90	139	120	186
2	3	32	49	62	96	92	142	122	189
4	6	34	53	64	99	94	145	124	192
6	9	36	56	66	102	96	148	126	195
8	12	38	59	68	105	98	151	128	198
10	15	40	62	70	108	100	155	130	201
12	19	42	65	72	111	102	158	132	204
14	22	44	68	74	114	104	161	134	207
16	25	46	71	76	117	106	164	136	210
18	28	48	74	78	121	108	167	138	213
20	31	50	77	80	124	110	170	140	216
22	34	52	80	82	127	112	173		
24	37	54	83	84	130	114	176		
26	40	56	87	86	133	116	179		
28	43	58	90	88	136	118	182		

The expanded uncertainty of measurement, expressed at the 95% confidence level, is ± 4.8 kPa. The coverage factor (k) is 2.

Remarks

When received, this equipment was in good condition.

Measurement results are traceable to the International System of Units (SI), or other recognised references via an unbroken chain of comparisons to the New Zealand National Standards or to the National Standards of other Signatories to the CIPM MRA.

This certificate has been prepared for the benefit of Engeo Limited, with respect to the particular brief given to us and it cannot be relied upon in other contexts or for any other purpose without our prior review and agreement. Results relate only to the specific equipment described above.

This calibration was performed at 1 Hill Street, Onehunga, Auckland, NZ.

Prepared by

Checked by

Key Technical Person

 **Jesse Richardson**
Calibration Technician

 **Annalyse Ryan**
Metrologist | Team Leader

 **Annalyse Ryan**
Metrologist | Team Leader



All measurements reported herein have been performed in accordance with the laboratory's scope of accreditation



Calibration Certificate

Certificate No: M725530

Certificate Issued To	Engeo Limited - Auckland		Address	8 Greydene Place Takapuna Auckland 0622		
Purchase Order No	Simranpal Tagger					
Manufacturer	Geotechnics	Model	Geovane	S/No	2853	
				Unique ID		
Description	Handheld shear vane with matching blade(s)					
Calibration Date	29/01/2025		Temp During Test		20.3 to 20.7 °C	
Method	MCC 5.51c.01 – Handheld Soil Shear Vane Testers (2021), Guideline for Hand Held Shear Vane Test (NZGS, 2001) was used as a guide.					

Results

19 mm Ø Vane Blade

Shear Strength = A × Reading	A (kPa/div)	1.475	Area Ratio	22.8%
------------------------------	-------------	-------	------------	-------

Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)
0	0	30	44	60	89	90	133	120	177
2	3	32	47	62	91	92	136	122	180
4	6	34	50	64	94	94	139	124	183
6	9	36	53	66	97	96	142	126	186
8	12	38	56	68	100	98	145	128	189
10	15	40	59	70	103	100	148	130	192
12	18	42	62	72	106	102	150	132	195
14	21	44	65	74	109	104	153	134	198
16	24	46	68	76	112	106	156	136	201
18	27	48	71	78	115	108	159	138	204
20	30	50	74	80	118	110	162	140	207
22	32	52	77	82	121	112	165		
24	35	54	80	84	124	114	168		
26	38	56	83	86	127	116	171		
28	41	58	86	88	130	118	174		

The expanded uncertainty of measurement, expressed at the 95% confidence level, is ±3.9 kPa. The coverage factor (k) is 2.

Remarks

When received, this equipment was in good condition.

Measurement results are traceable to the International System of Units (SI), or other recognised references via an unbroken chain of comparisons to the New Zealand National Standards or to the National Standards of other Signatories to the CIPM MRA.

This certificate has been prepared for the benefit of Engeo Limited - Auckland, with respect to the particular brief given to us and it cannot be relied upon in other contexts or for any other purpose without our prior review and agreement. Results relate only to the specific equipment described above.

This calibration was performed at 1 Hill Street, Onehunga, Auckland, NZ.

Prepared by

 Nisuli Badana
Calibration Technician

Checked by

 Annalyse Ryan
Metrologist | Team Leader

Key Technical Person

 Annalyse Ryan
Metrologist | Team Leader



All measurements reported herein have been performed in accordance with the laboratory's scope of accreditation



Calibration Certificate

Certificate No: M727156.01

Certificate Issued To	Engeo Limited - Wellington		Address	Level 18, Plimmer Towers 2-6 Gilmer Terrace Wellington 6011		
Purchase Order No						
Manufacturer	Geotechnics	Model	Geovane	S/No	3151	
				Unique ID		
Description	Handheld shear vane with matching blade(s)					
Calibration Date	12/08/2025		Temp During Test		20.9 to 21.3 °C	
Method	MCC 5.51c.01 – Handheld Soil Shear Vane Testers (2021), Guideline for Hand Held Shear Vane Test (NZGS, 2001) was used as a guide.					

Results

19 mm Ø Vane Blade

Shear Strength = A × Reading	A (kPa/div)	1.501	Area Ratio	23.8%
------------------------------	-------------	-------	------------	-------

Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)
0	0	30	45	60	90	90	135	120	180
2	3	32	48	62	93	92	138	122	183
4	6	34	51	64	96	94	141	124	186
6	9	36	54	66	99	96	144	126	189
8	12	38	57	68	102	98	147	128	192
10	15	40	60	70	105	100	150	130	195
12	18	42	63	72	108	102	153	132	198
14	21	44	66	74	111	104	156	134	201
16	24	46	69	76	114	106	159	136	204
18	27	48	72	78	117	108	162	138	207
20	30	50	75	80	120	110	165	140	210
22	33	52	78	82	123	112	168		
24	36	54	81	84	126	114	171		
26	39	56	84	86	129	116	174		
28	42	58	87	88	132	118	177		

The expanded uncertainty of measurement, expressed at the 95% confidence level, is ± 5.0 kPa. The coverage factor (k) is 2.

Remarks

When received, this equipment was in good condition.

Measurement results are traceable to the International System of Units (SI), or other recognised references via an unbroken chain of comparisons to the New Zealand National Standards or to the National Standards of other Signatories to the CIPM MRA.

This certificate has been prepared for the benefit of Engeo Limited - Wellington, with respect to the particular brief given to us and it cannot be relied upon in other contexts or for any other purpose without our prior review and agreement. Results relate only to the specific equipment described above.

This calibration was performed at 1 Hill Street, Onehunga, Auckland, NZ.

Prepared by

 Sinead Venter
Calibration Technician

Checked by

 Herman Wessels
Calibration Technician

Key Technical Person

 Herman Wessels
Calibration Technician



All measurements reported herein have been performed in accordance with the laboratory's scope of accreditation



Calibration Certificate

Certificate No: M727156.02

Certificate Issued To	Engeo Limited - Wellington		Address	Level 18, Plimmer Towers 2-6 Glimer Terrace Wellington 6011		
Purchase Order No						
Manufacturer	Geotechnics	Model	Geovane	S/No	3303	
				Unique ID		
Description	Handheld shear vane with matching blade(s)					
Calibration Date	12/08/2025		Temp During Test		20.8 to 21.2 °C	
Method	MCC 5.51c.01 – Handheld Soil Shear Vane Testers (2021), Guideline for Hand Held Shear Vane Test (NZGS, 2001) was used as a guide.					

Results

19 mm Ø Vane Blade

Shear Strength = A × Reading	A (kPa/div)	1.569	Area Ratio	24.0%
------------------------------	-------------	-------	------------	-------

Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)
0	0	30	47	60	94	90	141	120	188
2	3	32	50	62	97	92	144	122	191
4	6	34	53	64	100	94	147	124	195
6	9	36	56	66	104	96	151	126	198
8	13	38	60	68	107	98	154	128	201
10	16	40	63	70	110	100	157	130	204
12	19	42	66	72	113	102	160	132	207
14	22	44	69	74	116	104	163	134	210
16	25	46	72	76	119	106	166	136	213
18	28	48	75	78	122	108	169	138	216
20	31	50	78	80	125	110	173	140	220
22	35	52	82	82	129	112	176		
24	38	54	85	84	132	114	179		
26	41	56	88	86	135	116	182		
28	44	58	91	88	138	118	185		

The expanded uncertainty of measurement, expressed at the 95% confidence level, is ± 7.8 kPa. The coverage factor (k) is 2.

Remarks

When received, this equipment was in good condition.

Measurement results are traceable to the International System of Units (SI), or other recognised references via an unbroken chain of comparisons to the New Zealand National Standards or to the National Standards of other Signatories to the CIPM MRA.

This certificate has been prepared for the benefit of Engeo Limited - Wellington, with respect to the particular brief given to us and it cannot be relied upon in other contexts or for any other purpose without our prior review and agreement. Results relate only to the specific equipment described above.

This calibration was performed at 1 Hill Street, Onehunga, Auckland, NZ.

Prepared by

Checked by

Key Technical Person

 Sinead Venter
Calibration Technician

 Herman Wessels
Calibration Technician

 Herman Wessels
Calibration Technician



All measurements reported herein have been performed in accordance with the laboratory's scope of accreditation



Calibration Certificate

Certificate No: M725306

Certificate Issued To	Engeo Limited		Address	8 Greydene Place Takapuna Auckland 0622		
Purchase Order No	Engeo - Ben Fleetwood					
Manufacturer	Geotechnics	Model	Geovane		S/No	3331
					Unique ID	
Description	Handheld shear vane with matching blade(s)					
Calibration Date	17/12/2024		Temp During Test		20.4 to 20.9 °C	
Method	MCC 5.51c.01 – Handheld Soil Shear Vane Testers (2021), Guideline for Hand Held Shear Vane Test (NZGS, 2001) was used as a guide.					

Results

19 mm Ø Vane Blade

Shear Strength = A × Reading	A (kPa/div)	1.693	Area Ratio	24.3%
------------------------------	-------------	-------	------------	-------

Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)
0	0	30	51	60	102	90	152	120	203
2	3	32	54	62	105	92	156	122	206
4	7	34	58	64	108	94	159	124	210
6	10	36	61	66	112	96	162	126	213
8	14	38	64	68	115	98	166	128	217
10	17	40	68	70	118	100	169	130	220
12	20	42	71	72	122	102	173	132	223
14	24	44	74	74	125	104	176	134	227
16	27	46	78	76	129	106	179	136	230
18	30	48	81	78	132	108	183	138	234
20	34	50	85	80	135	110	186	140	237
22	37	52	88	82	139	112	190		
24	41	54	91	84	142	114	193		
26	44	56	95	86	146	116	196		
28	47	58	98	88	149	118	200		

The expanded uncertainty of measurement, expressed at the 95% confidence level, is ± 9.1 kPa. The coverage factor (k) is 2.

Remarks

When received, this equipment was in good condition.

Measurement results are traceable to the International System of Units (SI), or other recognised references via an unbroken chain of comparisons to the New Zealand National Standards or to the National Standards of other Signatories to the CIPM MRA.

This certificate has been prepared for the benefit of Engeo Limited, with respect to the particular brief given to us and it cannot be relied upon in other contexts or for any other purpose without our prior review and agreement. Results relate only to the specific equipment described above.

This calibration was performed at 1 Hill Street, Onehunga, Auckland, NZ.

Prepared by

 Jesse Richardson
Calibration Technician

Checked by

 Annalyse Ryan
Metrologist | Team Leader

Key Technical Person

 Annalyse Ryan
Metrologist | Team Leader



All measurements reported herein have been performed in accordance with the laboratory's scope of accreditation

Certificate Issued To	Engeo Limited	Address	8 Greydene Place Takapuna Auckland 0622
Purchase Order No	Ben Fleetwood		
Manufacturer	Geotechnics	Model	Geovane
		S/No	3332
		Unique ID	
Description	Handheld shear vane with matching blade(s)		
Calibration Date	11/07/2025	Temp During Test	19.7 to 20.2 °C
Method	MCC 5.51c.01 – Handheld Soil Shear Vane Testers (2021), Guideline for Hand Held Shear Vane Test (NZGS, 2001) was used as a guide.		

Results

19 mm Ø Vane Blade

Shear Strength $\Delta \times$ Reading	A (kPa/div)	1.623	Area Ratio	23.7%
--	-------------	-------	------------	-------

Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)
0	0	30	49	60	97	90	146	120	195
2	3	32	52	62	101	92	149	122	198
4	6	34	55	64	104	94	153	124	201
6	10	36	58	66	107	96	156	126	204
8	13	38	62	68	110	98	159	128	208
10	16	40	65	70	114	100	162	130	211
12	19	42	68	72	117	102	166	132	214
14	23	44	71	74	120	104	169	134	217
16	26	46	75	76	123	106	172	136	221
18	29	48	78	78	127	108	175	138	224
20	32	50	81	80	130	110	178	140	227
22	36	52	84	82	133	112	182		
24	39	54	88	84	136	114	185		
26	42	56	91	86	140	116	188		
28	45	58	94	88	143	118	191		

The expanded uncertainty of measurement, expressed at the 95% confidence level, is ± 9.1 kPa. The coverage factor (k) is 2.

Remarks

When received, this equipment was in good condition.

Measurement results are traceable to the International System of Units (SI), or other recognised references via an unbroken chain of comparisons to the New Zealand National Standards or to the National Standards of other Signatories to the CIPM MRA.

This certificate has been prepared for the benefit of Engeo Limited, with respect to the particular brief given to us and it cannot be relied upon in other contexts or for any other purpose without our prior review and agreement. Results relate only to the specific equipment described above.

This calibration was performed at 1 Hill Street, Onehunga, Auckland, NZ.

Prepared by

 Jesse Richardson
Calibration Technician

Checked by

 Annalyse Ryan
Metrologist | Team Leader

Key Technical Person

 Annalyse Ryan
Metrologist | Team Leader



All measurements reported herein have been performed in accordance with the laboratory's scope of accreditation



Calibration Certificate

Certificate No: M724149.02

Certificate Issued To	Engeo Limited		Address	Grand Plimmer Tower, Level 18		
Purchase Order No	Callum Whitten			2-6 Gilmer Terrace Wellington 6011		
Manufacturer	Geotechnics	Model	Geovane	S/No	3453	
				Unique ID		
Description	Handheld shear vane with matching blade(s)					
Calibration Date	31/07/2024		Temp During Test		19.4 to 19.9 °C	
Method	MCC 5.51c.01 – Handheld Soil Shear Vane Testers (2021), Guideline for Hand Held Shear Vane Test (NZGS, 2001) was used as a guide.					

Results

19 mm Ø Vane Blade

Shear Strength = A × Reading	A (kPa/div)	1.470	Area Ratio	23.7%
------------------------------	-------------	-------	------------	-------

Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)
0	0	30	44	60	88	90	132	120	176
2	3	32	47	62	91	92	135	122	179
4	6	34	50	64	94	94	138	124	182
6	9	36	53	66	97	96	141	126	185
8	12	38	56	68	100	98	144	128	188
10	15	40	59	70	103	100	147	130	191
12	18	42	62	72	106	102	150	132	194
14	21	44	65	74	109	104	153	134	197
16	24	46	68	76	112	106	156	136	200
18	26	48	71	78	115	108	159	138	203
20	29	50	74	80	118	110	162	140	206
22	32	52	76	82	121	112	165		
24	35	54	79	84	124	114	168		
26	38	56	82	86	126	116	171		
28	41	58	85	88	129	118	173		

The expanded uncertainty of measurement, expressed at the 95% confidence level, is ± 4.8 kPa. The coverage factor (k) is 2.

Remarks

When received, this equipment was in good condition.

Measurement results are traceable to the International System of Units (SI), or other recognised references via an unbroken chain of comparisons to the New Zealand National Standards or to the National Standards of other Signatories to the CIPM MRA.

This certificate has been prepared for the benefit of Engeo Limited, with respect to the particular brief given to us and it cannot be relied upon in other contexts or for any other purpose without our prior review and agreement. Results relate only to the specific equipment described above.

This calibration was performed at 1 Hill Street, Onehunga, Auckland, NZ.

Prepared by

Checked by

Key Technical Person

 Sinead Venter
Calibration Technician

 Annalyse Ryan
Metrologist | Team Leader

 Annalyse Ryan
Metrologist | Team Leader



All measurements reported herein have been performed in accordance with the laboratory's scope of accreditation



Calibration Certificate

Certificate No: M727491

Certificate Issued To	Engeo Limited		Address	Level 18, Plimmer Towers 2-6 Gilmer Terrace Wellington 6011		
Purchase Order No	Callum Whitten					
Manufacturer	Geotechnics	Model	Geovane	S/No	3453	
				Unique ID		
Description	Handheld shear vane with matching blade(s)					
Calibration Date	25/09/2025		Temp During Test		19.8 to 20.3 °C	
Method	MCC 5.51c.01 – Handheld Soil Shear Vane Testers (2021), Guideline for Hand Held Shear Vane Test (NZGS, 2001) was used as a guide.					

Results

19 mm Ø Vane Blade

Shear Strength = A × Reading	A (kPa/div)	1.586	Area Ratio	23.6%
------------------------------	-------------	-------	------------	-------

Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)
0	0	30	48	60	95	90	143	120	190
2	3	32	51	62	98	92	146	122	194
4	6	34	54	64	102	94	149	124	197
6	10	36	57	66	105	96	152	126	200
8	13	38	60	68	108	98	155	128	203
10	16	40	63	70	111	100	159	130	206
12	19	42	67	72	114	102	162	132	209
14	22	44	70	74	117	104	165	134	213
16	25	46	73	76	121	106	168	136	216
18	29	48	76	78	124	108	171	138	219
20	32	50	79	80	127	110	174	140	222
22	35	52	82	82	130	112	178		
24	38	54	86	84	133	114	181		
26	41	56	89	86	136	116	184		
28	44	58	92	88	140	118	187		

The expanded uncertainty of measurement, expressed at the 95% confidence level, is ±5.8 kPa. The coverage factor (k) is 2.

Remarks

When received, this equipment was in good condition.

Measurement results are traceable to the International System of Units (SI), or other recognised references via an unbroken chain of comparisons to the New Zealand National Standards or to the National Standards of other Signatories to the CIPM MRA.

This certificate has been prepared for the benefit of Engeo Limited, with respect to the particular brief given to us and it cannot be relied upon in other contexts or for any other purpose without our prior review and agreement. Results relate only to the specific equipment described above.

This calibration was performed at 1 Hill Street, Onehunga, Auckland, NZ.

Prepared by

Checked by

Key Technical Person

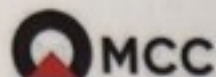
 **Jesse Richardson**
Calibration Technician

 **Annalyse Ryan**
Metrologist | Team Leader

 **Annalyse Ryan**
Metrologist | Team Leader



All measurements reported herein have been performed in accordance with the laboratory's scope of accreditation



Calibration Certificate

Certificate No: M727353.01

Certificate Issued To	Engeo Limited	Address	Level 18, Pimmer Towers 2-6 Gilmer Terrace Wellington 6011		
Purchase Order No	Kees Jansen				
Manufacturer	Geotechnics	Model	Geovane	S/No	3556
				Unique ID	
Description	Handheld shear vane with matching blade(s)				
Calibration Date	29/08/2025	Temp During Test		19.8 to 20.3 °C	
Method	MCC 5.51c.01 – Handheld Soil Shear Vane Testers (2021), Guideline for Hand Held Shear Vane Test (NZGS, 2001) was used as a guide.				
Results					

19 mm Ø Vane Blade

Shear Strength = A × Reading	A (kPa/div)	1.504	Area Ratio	23.8%
------------------------------	-------------	-------	------------	-------

Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)
0	0	30	45	60	90	90	135	120	180
2	3	32	48	62	93	92	138	122	183
4	6	34	51	64	96	94	141	124	186
6	9	36	54	66	99	96	144	126	189
8	12	38	57	68	102	98	147	128	192
10	15	40	60	70	105	100	150	130	195
12	18	42	63	72	108	102	153	132	198
14	21	44	66	74	111	104	156	134	201
16	24	46	69	76	114	106	159	136	204
18	27	48	72	78	117	108	162	138	208
20	30	50	75	80	120	110	165	140	211
22	33	52	78	82	123	112	168		
24	36	54	81	84	126	114	171		
26	39	56	84	86	129	116	174		
28	42	58	87	88	132	118	177		

The expanded uncertainty of measurement, expressed at the 95% confidence level, is ±4.4 kPa. The coverage factor (k) is 2.

Remarks

When received, this equipment was in good condition.

Measurement results are traceable to the International System of Units (SI), or other recognised references via an unbroken chain of comparisons to the New Zealand National Standards or to the National Standards of other Signatories to the CIPM MRA.

This certificate has been prepared for the benefit of Engeo Limited, with respect to the particular brief given to us and it cannot be relied upon in other contexts or for any other purpose without our prior review and agreement. Results relate only to the specific equipment described above.

This calibration was performed at 1 Hill Street, Onehunga, Auckland, NZ.

Prepared by

 Sinead Venter
Calibration Technician

Checked by

 Annalyse Ryan
Metrologist | Team Leader

Key Technical Person

 Annalyse Ryan
Metrologist | Team Leader

 All measurements
have been performed in
accordance with the
MCC's internal control
system.



Calibration Certificate

Certificate No: M725838

Certificate Issued To	Pattle Delamore Partners Limited - Auckland		Address	Level 2 - 109 Fanshawe Street Auckland Central 1010		
Purchase Order No						
Manufacturer	Geotechnics	Model	Geovane	S/No	3946	
				Unique ID		
Description	Handheld shear vane with matching blade(s)					
Calibration Date	5/03/2025		Temp During Test		19.7 to 20.1 °C	
Method	MCC 5.51c.01 – Handheld Soil Shear Vane Testers (2021), Guideline for Hand Held Shear Vane Test (NZGS, 2001) was used as a guide.					

Results

19 mm Ø Vane Blade

Shear Strength = A × Reading	A (kPa/div)	1.403	Area Ratio	22.8%
------------------------------	-------------	-------	------------	-------

Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)
0	0	30	42	60	84	90	126	120	168
2	3	32	45	62	87	92	129	122	171
4	6	34	48	64	90	94	132	124	174
6	8	36	51	66	93	96	135	126	177
8	11	38	53	68	95	98	137	128	180
10	14	40	56	70	98	100	140	130	182
12	17	42	59	72	101	102	143	132	185
14	20	44	62	74	104	104	146	134	188
16	22	46	65	76	107	106	149	136	191
18	25	48	67	78	109	108	152	138	194
20	28	50	70	80	112	110	154	140	196
22	31	52	73	82	115	112	157		
24	34	54	76	84	118	114	160		
26	36	56	79	86	121	116	163		
28	39	58	81	88	123	118	166		

The expanded uncertainty of measurement, expressed at the 95% confidence level, is ±4.5 kPa. The coverage factor (k) is 2.

Remarks

When received, this equipment was in good condition.

Measurement results are traceable to the International System of Units (SI), or other recognised references via an unbroken chain of comparisons to the New Zealand National Standards or to the National Standards of other Signatories to the CIPM MRA.

This certificate has been prepared for the benefit of Pattle Delamore Partners Limited - Auckland, with respect to the particular brief given to us and it cannot be relied upon in other contexts or for any other purpose without our prior review and agreement. Results relate only to the specific equipment described above.

This calibration was performed at 1 Hill Street, Onehunga, Auckland, NZ.

Prepared by

 Nisuli Badana
Calibration Technician

Checked by

 Annalyse Ryan
Metrologist | Team Leader

Key Technical Person

 Annalyse Ryan
Metrologist | Team Leader



All measurements reported herein have been performed in accordance with the laboratory's scope of accreditation



Calibration Certificate

Certificate No: M724021.02

Certificate Issued To	WSP New Zealand Limited		Address	Level 3, The Westhaven 100 Beaumont Street Auckland 1010		
Purchase Order No	86629					
Manufacturer	Geotechnics	Model	Geovane	S/No	506	
				Unique ID		
Description	Handheld shear vane with matching blade(s)					
Calibration Date	17/07/2024		Temp During Test		20.1 to 20.7 °C	
Method	MCC 5.51c.01 – Handheld Soil Shear Vane Testers (2021), Guideline for Hand Held Shear Vane Test (NZGS, 2001) was used as a guide.					

Results

19 mm Ø Vane Blade

Shear Strength = A × Reading	A (kPa/div)	1.626	Area Ratio	23.6%
------------------------------	-------------	-------	------------	-------

Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)
0	0	30	49	60	98	90	146	120	195
2	3	32	52	62	101	92	150	122	198
4	7	34	55	64	104	94	153	124	202
6	10	36	59	66	107	96	156	126	205
8	13	38	62	68	111	98	159	128	208
10	16	40	65	70	114	100	163	130	211
12	20	42	68	72	117	102	166	132	215
14	23	44	72	74	120	104	169	134	218
16	26	46	75	76	124	106	172	136	221
18	29	48	78	78	127	108	176	138	224
20	33	50	81	80	130	110	179	140	228
22	36	52	85	82	133	112	182		
24	39	54	88	84	137	114	185		
26	42	56	91	86	140	116	189		
28	46	58	94	88	143	118	192		

The expanded uncertainty of measurement, expressed at the 95% confidence level, is ± 7.4 kPa. The coverage factor (k) is 2.

Remarks

When received, this equipment was in good condition.

Measurement results are traceable to the International System of Units (SI), or other recognised references via an unbroken chain of comparisons to the New Zealand National Standards or to the National Standards of other Signatories to the CIPM MRA.

This certificate has been prepared for the benefit of WSP New Zealand Limited, with respect to the particular brief given to us and it cannot be relied upon in other contexts or for any other purpose without our prior review and agreement. Results relate only to the specific equipment described above.

This calibration was performed at 1 Hill Street, Onehunga, Auckland, NZ.

Prepared by

Lucas Clark
Calibration Technician

Checked by

Annalyse Ryan
Metrologist | Team Leader

Key Technical Person

Annalyse Ryan
Metrologist | Team Leader



All measurements reported herein have been performed in accordance with the laboratory's scope of accreditation



Calibration Certificate

Certificate No: M727889.02

Certificate Issued To	WSP New Zealand Limited		Address	Level 3 - The Westhaven 110-120 Beaumont Street Auckland Central Auckland 1010		
Purchase Order No	87614					
Manufacturer	Geotechnics	Model	Geovane		S/No	506
					Unique ID	
Description	Handheld shear vane with matching blade(s)					
Calibration Date	6/11/2025		Temp During Test		19.6 to 20.0 °C	
Method	MCC 5.51c.01 – Handheld Soil Shear Vane Testers (2021), Guideline for Hand Held Shear Vane Test (NZGS, 2001) was used as a guide.					

Results

19 mm Ø Vane Blade

Shear Strength = A × Reading	A (kPa/div)	1.575	Area Ratio	23.6%
------------------------------	-------------	-------	------------	-------

Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)
0	0	30	47	60	94	90	142	120	189
2	3	32	50	62	98	92	145	122	192
4	6	34	54	64	101	94	148	124	195
6	9	36	57	66	104	96	151	126	198
8	13	38	60	68	107	98	154	128	202
10	16	40	63	70	110	100	157	130	205
12	19	42	66	72	113	102	161	132	208
14	22	44	69	74	117	104	164	134	211
16	25	46	72	76	120	106	167	136	214
18	28	48	76	78	123	108	170	138	217
20	31	50	79	80	126	110	173	140	220
22	35	52	82	82	129	112	176		
24	38	54	85	84	132	114	180		
26	41	56	88	86	135	116	183		
28	44	58	91	88	139	118	186		

The expanded uncertainty of measurement, expressed at the 95% confidence level, is ± 7.2 kPa. The coverage factor (k) is 2.

Remarks

When received, this equipment was in good condition.

Measurement results are traceable to the International System of Units (SI), or other recognised references via an unbroken chain of comparisons to the New Zealand National Standards or to the National Standards of other Signatories to the CIPM MRA.

This certificate has been prepared for the benefit of WSP New Zealand Limited, with respect to the particular brief given to us and it cannot be relied upon in other contexts or for any other purpose without our prior review and agreement. Results relate only to the specific equipment described above.

This calibration was performed at 1 Hill Street, Onehunga, Auckland, NZ.

Prepared by

Checked by

Key Technical Person

 **Jesse Richardson**
Calibration Technician

 **Annalyse Ryan**
Metrologist | Team Leader

 **Annalyse Ryan**
Metrologist | Team Leader





Calibration Certificate

Certificate No: M727889.01

Certificate Issued To	WSP New Zealand Limited		Address	Level 3 - The Westhaven 110-120 Beaumont Street Auckland Central Auckland 1010		
Purchase Order No	87614					
Manufacturer	Geotechnics	Model	Geovane	S/No	1558	
				Unique ID		
Description	Handheld shear vane with matching blade(s)					
Calibration Date	6/11/2025		Temp During Test		19.6 to 20.1 °C	
Method	MCC 5.51c.01 – Handheld Soil Shear Vane Testers (2021), Guideline for Hand Held Shear Vane Test (NZGS, 2001) was used as a guide.					

Results

19 mm Ø Vane Blade

Shear Strength = A × Reading	A (kPa/div)	1.485	Area Ratio	23.0%
------------------------------	-------------	-------	------------	-------

Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)
0	0	30	45	60	89	90	134	120	178
2	3	32	48	62	92	92	137	122	181
4	6	34	51	64	95	94	140	124	184
6	9	36	53	66	98	96	143	126	187
8	12	38	56	68	101	98	146	128	190
10	15	40	59	70	104	100	149	130	193
12	18	42	62	72	107	102	152	132	196
14	21	44	65	74	110	104	154	134	199
16	24	46	68	76	113	106	157	136	202
18	27	48	71	78	116	108	160	138	205
20	30	50	74	80	119	110	163	140	208
22	33	52	77	82	122	112	166		
24	36	54	80	84	125	114	169		
26	39	56	83	86	128	116	172		
28	42	58	86	88	131	118	175		

The expanded uncertainty of measurement, expressed at the 95% confidence level, is ±5.0 kPa. The coverage factor (k) is 2.

Remarks

When received, this equipment was in good condition.

Measurement results are traceable to the International System of Units (SI), or other recognised references via an unbroken chain of comparisons to the New Zealand National Standards or to the National Standards of other Signatories to the CIPM MRA.

This certificate has been prepared for the benefit of WSP New Zealand Limited, with respect to the particular brief given to us and it cannot be relied upon in other contexts or for any other purpose without our prior review and agreement. Results relate only to the specific equipment described above.

This calibration was performed at 1 Hill Street, Onehunga, Auckland, NZ.

Prepared by

 **Jesse Richardson**
Calibration Technician

Checked by

 **Annalyse Ryan**
Metrologist | Team Leader

Key Technical Person

 **Annalyse Ryan**
Metrologist | Team Leader



All measurements reported herein have been performed in accordance with the laboratory's scope of accreditation



Calibration Certificate

Certificate No: M724978

Certificate Issued To	WSP New Zealand Limited		Address	Level 3 - 100 Beaumont Street Auckland Central Auckland 1010		
Purchase Order No	87775					
Manufacturer	Geotechnics	Model	Geovane	S/No	2183	
				Unique ID		
Description	Handheld shear vane with matching blade(s)					
Calibration Date	12/11/2024		Temp During Test	20.3 to 20.7 °C		
Method	MCC 5.51c.01 – Handheld Soil Shear Vane Testers (2021), Guideline for Hand Held Shear Vane Test (NZGS, 2001) was used as a guide.					

Results

19 mm Ø Vane Blade

Shear Strength = A × Reading	A (kPa/div)	1.482	Area Ratio	23.9%
------------------------------	-------------	-------	------------	-------

Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)
0	0	30	44	60	89	90	133	120	178
2	3	32	47	62	92	92	136	122	181
4	6	34	50	64	95	94	139	124	184
6	9	36	53	66	98	96	142	126	187
8	12	38	56	68	101	98	145	128	190
10	15	40	59	70	104	100	148	130	193
12	18	42	62	72	107	102	151	132	196
14	21	44	65	74	110	104	154	134	199
16	24	46	68	76	113	106	157	136	202
18	27	48	71	78	116	108	160	138	205
20	30	50	74	80	119	110	163	140	207
22	33	52	77	82	122	112	166		
24	36	54	80	84	124	114	169		
26	39	56	83	86	127	116	172		
28	41	58	86	88	130	118	175		

The expanded uncertainty of measurement, expressed at the 95% confidence level, is ± 4.4 kPa. The coverage factor (k) is 2.

Remarks

When received, this equipment was in good condition.

Measurement results are traceable to the International System of Units (SI), or other recognised references via an unbroken chain of comparisons to the New Zealand National Standards or to the National Standards of other Signatories to the CIPM MRA.

This certificate has been prepared for the benefit of WSP New Zealand Limited, with respect to the particular brief given to us and it cannot be relied upon in other contexts or for any other purpose without our prior review and agreement. Results relate only to the specific equipment described above.

This calibration was performed at 1 Hill Street, Onehunga, Auckland, NZ.

Prepared by

 **Jesse Richardson**
Calibration Technician

Checked by

 **Annalyse Ryan**
Metrologist | Team Leader

Key Technical Person

 **Annalyse Ryan**
Metrologist | Team Leader



All measurements reported herein have been performed in accordance with the laboratory's scope of accreditation



Calibration Certificate

Certificate No: M727973

Certificate Issued To	WSP New Zealand Limited		Address	Level 3, The Westhaven 100 Beaumont Street Auckland 1010		
Purchase Order No	91471					
Manufacturer	Geotechnics	Model	Geovane	S/No	2183	
				Unique ID		
Description	Handheld shear vane with matching blade(s)					
Calibration Date	12/11/2025		Temp During Test		19.8 to 20.3 °C	
Method	MCC 5.51c.01 – Handheld Soil Shear Vane Testers (2021), Guideline for Hand Held Shear Vane Test (NZGS, 2001) was used as a guide.					

Results

19 mm Ø Vane Blade

Shear Strength = A × Reading	A (kPa/div)	1.348	Area Ratio	24.1%
------------------------------	-------------	-------	------------	-------

Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)
0	0	30	40	60	81	90	121	120	162
2	3	32	43	62	84	92	124	122	164
4	5	34	46	64	86	94	127	124	167
6	8	36	49	66	89	96	129	126	170
8	11	38	51	68	92	98	132	128	173
10	13	40	54	70	94	100	135	130	175
12	16	42	57	72	97	102	138	132	178
14	19	44	59	74	100	104	140	134	181
16	22	46	62	76	102	106	143	136	183
18	24	48	65	78	105	108	146	138	186
20	27	50	67	80	108	110	148	140	189
22	30	52	70	82	111	112	151		
24	32	54	73	84	113	114	154		
26	35	56	76	86	116	116	156		
28	38	58	78	88	119	118	159		

The expanded uncertainty of measurement, expressed at the 95% confidence level, is ± 4.6 kPa. The coverage factor (k) is 2.

Remarks

When received, this equipment was in good condition.

Measurement results are traceable to the International System of Units (SI), or other recognised references via an unbroken chain of comparisons to the New Zealand National Standards or to the National Standards of other Signatories to the CIPM MRA.

This certificate has been prepared for the benefit of WSP New Zealand Limited, with respect to the particular brief given to us and it cannot be relied upon in other contexts or for any other purpose without our prior review and agreement. Results relate only to the specific equipment described above.

This calibration was performed at 1 Hill Street, Onehunga, Auckland, NZ.

Prepared by

Lucas Clark
Calibration Technician

Checked by

Ivan Caresosa
Calibration Technician

Key Technical Person

Ivan Caresosa
Calibration Technician



All measurements reported herein have been performed in accordance with the laboratory's scope of accreditation



Calibration Certificate

Certificate No: M726813.02

Certificate Issued To	WSP New Zealand Limited		Address	Level 3 - The Westhaven 110 - 120 Beaumont Street Auckland 1010		
Purchase Order No	#89930					
Manufacturer	Simmons Edeco	Model	Pilcon	S/No	DR1254	
				Unique ID		
Description	Handheld shear vane with matching blade(s)					
Calibration Date	3/07/2025		Temp During Test		20.1 to 20.6 °C	
Method	MCC 5.51c.01 – Handheld Soil Shear Vane Testers (2021), Guideline for Hand Held Shear Vane Test (NZGS, 2001) was used as a guide.					

Results

19 mm Ø Vane Blade

Shear Strength = A × Reading	A (kPa/div)	1.682	Area Ratio	23.6%
------------------------------	-------------	-------	------------	-------

COMMENT : This chart applies to the outer scale of the dial.

Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)
0	0	30	50	60	101	90	151	120	202
2	3	32	54	62	104	92	155		
4	7	34	57	64	108	94	158		
6	10	36	61	66	111	96	161		
8	13	38	64	68	114	98	165		
10	17	40	67	70	118	100	168		
12	20	42	71	72	121	102	172		
14	24	44	74	74	124	104	175		
16	27	46	77	76	128	106	178		
18	30	48	81	78	131	108	182		
20	34	50	84	80	135	110	185		
22	37	52	87	82	138	112	188		
24	40	54	91	84	141	114	192		
26	44	56	94	86	145	116	195		
28	47	58	98	88	148	118	199		

The expanded uncertainty of measurement, expressed at the 95% confidence level, is ±5.7 kPa. The coverage factor (k) is 2.

Remarks

When received, this equipment was in good condition.

Measurement results are traceable to the International System of Units (SI), or other recognised references via an unbroken chain of comparisons to the New Zealand National Standards or to the National Standards of other Signatories to the CIPM MRA.

This certificate has been prepared for the benefit of WSP New Zealand Limited, with respect to the particular brief given to us and it cannot be relied upon in other contexts or for any other purpose without our prior review and agreement. Results relate only to the specific equipment described above.

This calibration was performed at 1 Hill Street, Onehunga, Auckland, NZ.

Prepared by

 Sinead Venter
Calibration Technician

Checked by

 Annalyse Ryan
Metrologist | Team Leader

Key Technical Person

 Annalyse Ryan
Metrologist | Team Leader



All measurements reported herein have been performed in accordance with the laboratory's scope of accreditation