



TECHNICAL REPORT ON
HYDROMETER and SOLID DENSITY
TEST PROFICIENCY 2019

CETANZ Technical Report	TR 12
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Associated Test Method(s)	NZS 4402: 1986 Test 2.8.4 & Test 2.7.2

Our Ref: 1100105.0.0.0/REP01

Customer Ref: N/A

19 December 2019

Attention: Proficiency participant

Dear Participant

CETANZ Hydrometer and Solid Density Proficiency Test Report

Thank you for taking part in proficiency testing for:

- NZS 4402:1986 Test 2.7.2 – Solid density (Vacuum)
- NZS 4402:1986 Test 2.8.4 – Particle size distribution (Hydrometer)

The following laboratories returned test results:

- a Geotechnics - *Auckland*
- b Geotechnics - *Christchurch*
- c Stevensons - *Drury*
- d Envirolab Geotest - *Auckland*
- e Coffey - *Auckland*
- f WSP - *Whanganui*
- g Fulton Hogan - *Tauranga*
- h Geocivil - *Whangarei*
- i WSP - *Hamilton*
- j Fulton Hogan - *Christchurch*
- k WSP - *Auckland*
- l Babbage - *Auckland*

KEY	
Z Score	Colour
-1 to 1	Green
-2 to -1 and 1 to 2	Yellow
<-2 and >2	Red

LAB ID	Sample	2mm		0.6mm		0.2mm		0.06mm		0.02mm		0.006mm		0.002mm		Solid Density 3dp		Solid Density 2dp	
		Result % Passing	Z Score	Result % Passing	Z Score	Result % Passing	Z Score	Result % Passing	Z Score	Result % Passing	Z Score	Result % Passing	Z Score	Result % Passing	Z Score	Result (t/m3)	Z Score	Result (t/m3)	Z Score
1	1	100	0	100	0	100	0.72	97	0.52	44	0.10	21	0.55	12	-0.68	2.723	0.66	2.72	0.32
1	2	100	0	100	0	100	0.72	97	0.52	44	0.10	21	0.55	12	-0.68	2.718	0.24	2.72	0.32
2	1	100	0	100	0	100	0.72	97	0.52	40	-1.18	20	-0.18	12	-0.68	2.720	0.41	2.72	0.32
2	2	100	0	100	0	100	0.72	97	0.52	39	-1.49	18	-1.64	13	0.45	2.716	0.07	2.72	0.32
6	1	100	0	100	0	100	0.72	98	1.48	48	1.37	20	-0.18	15	2.72	2.703	-1.04	2.70	-1.35
8	1	100	0	100	0	99	-1.33	96	-0.43	49	1.68	21	0.55	13	0.45	2.727	1.00	2.73	1.15
8	2	100	0	100	0	99	-1.33	95	-1.38	46	0.73	21	0.55	12	-0.68	2.734	1.60	2.73	1.15
8	3	100	0	100	0	99	-1.33	95	-1.38	44	0.10	19	-0.91	11	-1.81	2.728	1.09	2.73	1.15
8	4	100	0	100	0	99	-1.33	95	-1.38	42	-0.54	17	-2.37	11	-1.81	2.718	0.24	2.72	0.32
9	1	100	0	100	0	100	0.72	97	0.52	48	1.37	21	0.55	13	0.45	2.708	-0.61	2.71	-0.51
12	1	100	0	100	0	100	0.72	96	-0.43	43	-0.22	19	-0.91	13	0.45	2.700	-1.29	2.70	-1.35
12	2	100	0	100	0	100	0.72	96	-0.43	50	2.00	22	1.28	13	0.45	2.710	-0.44	2.71	-0.51
13	1	100	0	100	0	99	-1.33	98	1.48	39	-1.49	19	-0.91	13	0.45	2.732	1.43	2.73	1.15
13	2	100	0	100	0	99	-1.33	97	0.52	41	-0.86	20	-0.18	13	0.45	2.726	0.92	2.73	1.15
13	3	100	0	100	0	99	-1.33	96	-0.43	42	-0.54	20	-0.18	13	0.45	2.725	0.83	2.73	1.15
14	1	100	0	100	0	100	0.72	97	0.52	44	0.10	22	1.28	13	0.45	2.691	-2.06	2.69	-2.18
19	1	100	0	100	0	100	0.72	94	-2.33	42	-0.54	20	-0.18	12	-0.68	2.698	-1.46	2.70	-1.35
25	1	100	0	100	0	100	0.72	97	0.52	43	-0.22	22	1.28	12	-0.68	2.705	-0.87	2.71	-0.51
25	2	100	0	100	0	100	0.72	97	0.52	44	0.10	22	1.28	13	0.45	2.714	-0.10	2.71	-0.51
26	1	100	0	100	0	100	0.72	97	0.52	42	-0.54	20	-0.18	13	0.45	2.707	-0.70	2.71	-0.51
7	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.716	0.07	2.72	0.32

	2mm	0.6mm	0.2mm	0.06mm	0.02mm	0.006mm	0.002mm	Solid Density 3dp	Solid Density 2dp
Average	100	100	99.65	96.45	43.70	20.25	12.60	2.715	2.72
SD	0	0	0.49	1.05	3.15	1.37	0.88	0.012	0.01
Min	100	100	99	94	39	17	11	2.691	2.69
Max	100	100	100	98	50	22	15	2.734	2.73
Range	0	0	1	4	11	5	4	0.043	0.04

The Z-score (standard score) is the (signed) number of standard deviations an observation is above or below the mean. Thus, a positive Z-score represents a value above the mean, while a negative Z-score represents a value below the mean. It is a dimensionless quantity obtained by subtracting the population mean from an individual score and then dividing the difference by the population standard deviation. This conversion process is called standardising. A Z-score between -2 and 2 inclusive is considered satisfactory, a Z-score greater than 2 but less than or equal to 3 (or $-2 > Z > -3$) is considered questionable, and a Z-score greater than 3 (or $Z < -3$) is considered unsatisfactory.

General Remarks

This report compiles all results and provides average and range calculations only. The comparative results provided above will allow you to

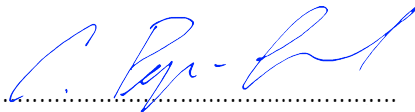
- evaluate your performance;
- implement improvements or changes as necessary; and
- calculate Uncertainty of Measurement for your laboratory.

Please note that we requested results for the solid density test to be reported to three decimal places, however the standard specifies two decimal places. For this reason, we have presented both sets of data for your reference.

If we can be of any further assistance, feel free to get in touch. Contact details are provided at the bottom of the letterhead page.

GEOTECHNICS LTD

Report prepared by:



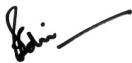
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19-Dec-19

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