NEW ZEALAND STANDARD

METHODS OF TESTING SOILS FOR CIVIL ENGINEERING PURPOSES

Part 2
Soil classification tests

TEST 2.4
DETERMINATION OF THE PLASTICITY INDEX

Part 2
Soil classification tests

2.4.1
Scope
This method covers the determination of the plasticity index of a soil.

2.4.2
Related documents
The provisions of Part 1 of this Standard are applicable to, and shall be read in conjunction with, this method of test. Reference is also made to Tests 2.2, 2.3 and 2.5 of this Standard.

2.4.3
Procedure
Determine the liquid limit (LL) and the plastic limit (PL) by the procedures given in Tests 2.2 and 2.3 respectively. The cone penetration limit (CPL) as determined in Test 2.5 may be used in place of the liquid limit provided that its value is less than 50.

2.4.4
Calculations
(See Form 2.2, 2.3, 2.4 and Form 2.5). Calculate the plasticity index (PI). (See Note (1)).

2.4.5
Reporting of results

2.4.5.1
Report the following value:

The plasticity index (PI) as the numerical diffe- rence between the liquid limit and the plastic limit. (See Note (1)).

2.4.5.2
When the plastic limit cannot be determined or when the plastic limit is equal to or greater than the liquid limit, report the material as non-plastic (NP). When the liquid limit cannot be obtained, report not applicable (NA).

2.4.5.3
State whether the material used in the test was whole soil, or fraction passing a 425 μm test sieve.

2.4.5.4
State the history of the sample, for example natural state, air-dried, oven-dried or unknown.

2.4.5.5
State that the result was obtained in accordance with this Standard Test Method.

NOTES ON TEST 2.4

(1) Where the liquid limit or plastic limit, or both have been determined using a 0.01 g balance, the plasticity index shall be reported as a range of values determined as follows:

$$\text{Max. } PI = \text{Max. } LL - \text{Min. } PL$$
$$\text{Min. } PI = \text{Min. } LL - \text{Max. } PL$$

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Form 2.2, 2.3, 2.4
DETERMINATION OF THE LIQUID AND PLASTIC LIMITS, PLASTICITY INDEX AND WATER CONTENT
(Tests 2.2, 2.3 and 2.4)

Job:

Location:

Depth(s):

Test details: *

    Test performed on fraction passing
    425 μm sieve/whole soil

    History: Natural/air-dried/oven-dried/
    unknown

    Soil equilibrated with water for .... h

    Liquid limit machine no.

Sample no.:

Tested by:

Date:

Checked by:

Date:

| Test no.	1	2	3	4	5	6
Type of test †						
No. of blows (liquid limit test)						
Container no.						
Mass of container and wet soil M_2 g						
Mass of container and dried soil M_3 g						
Mass of container M_1 g						
Mass of water $M_2 - M_3$ g						
Mass of dried soil $M_3 - M_1$ g						
Water content $w = \dfrac{M_2 - M_3}{M_3 - M_1} \times 100$ %						

Water content ..... %

Liquid limit ....

Plastic limit ....

Plasticity index ....

* Delete inappropriate words.

† Water content test to be marked w; Liquid Limit, *LL*; and Plastic Limit, *PL*.

Water content (%)

15   20   25   30

Number of blows ↑
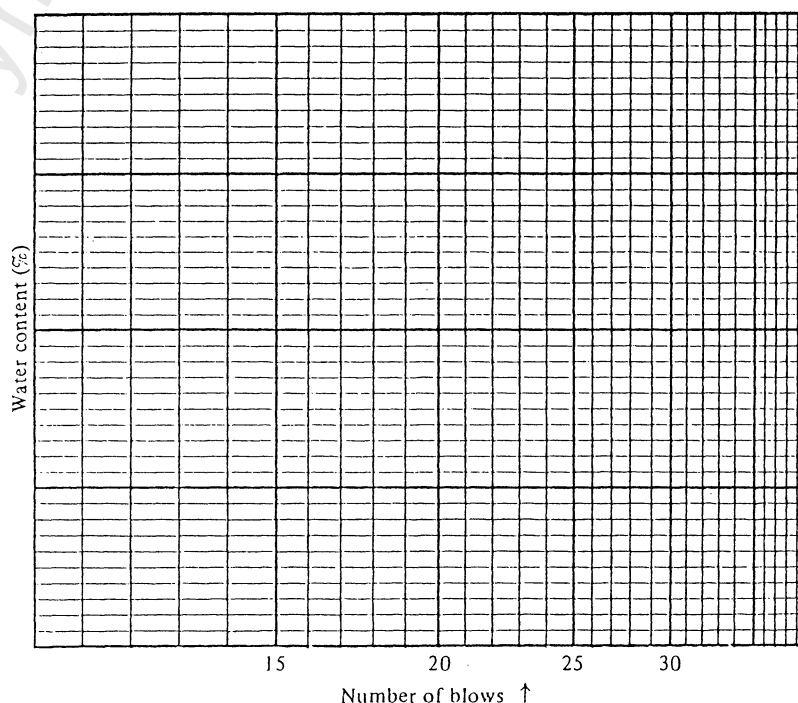
Form 2.5
DETERMINATION OF THE CONE PENETRATION LIMIT AND WATER CONTENT
(Test 2.5)

Job: Sample no.:

Location: Tested by:

Depth(s):   Date:

Test details:*

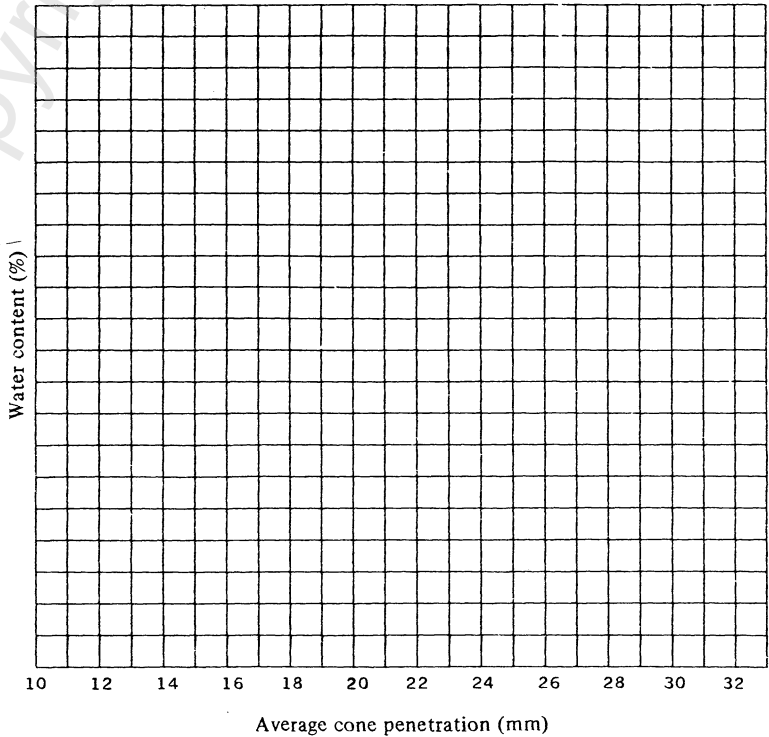   Test performed on fraction passing   Checked by:
    425 μm sieve/whole soil
                                               Date:

    History: Natural/air-dried/oven-dried/
    unknown

    Soil equilibrated with water for .... h

Test no.		1	2	3	4
Initial dial gauge reading	R_1 mm				
Final dial gauge reading	R_2 mm				
Cone penetration	$P = R_2 - R_1$ mm				
Average cone penetration	mm				
Container number					
Mass of container and wet soil	M_2 g				
Mass of container and dried soil	M_3 g				
Mass of container	M_1 g				
Mass of water	$M_2 - M_3$ g				
Mass of dried soil	$M_3 - M_1$ g				
Water content $w = \dfrac{M_2 - M_3}{M_3 - M_1} \times 100$	%				

* Delete inappropriate words.

Water content (%) vs Average cone penetration (mm)

Average cone penetration (mm): 10 12 14 16 18 20 22 24 26 28 30 32

NOTES