ND T 224 – CORRECTION FOR COARSE PARTICLES IN THE SOIL COMPACTION TEST

Conduct this procedure according to ND T 224.

The NDDOT requires the use of Method A or D when conducting moisture-density relation tests, therefore, a correction is required for the oversize removed.

When Method D is used, a correction shall be applied to soil-aggregates which contain more than 5% by weight of oversize. When the oversized maximum of 30% is exceeded, other methods of compaction control must be used

Consult the current edition of AASHTO for procedure in its entirety and equipment specification details.

SCOPE

This method describes a procedure for adjusting densities of soil and soil-aggregates to compensate for differing percentages of oversize particles retained on the 19.0 mm (3/4") sieve.

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REFERENCED DOCUMENTS

ND T 99 and ND T 180 and AASHTO T 99 and T 180, Moisture Density Relations of Soils
AASHTO T 224, Correction for Coarse Particles in the Soil Compaction Test
ND T 265 and AASHTO T 265, Laboratory Determination of Moisture Content of Soils
ND D 4643 and ASTM D 4643, Determination of Moisture Content of Soil by Microwave Oven Heating

CALCULATIONS

Calculate the Corrected Moisture Content (MC_T)

$$MC_T = [(MC_F) \times (P_f) + (MC_c) \times (P_c)]/100$$

Where:

- MC_T = *corrected moisture content of combined fine and oversized particles, expressed as a percentage of moisture.*
- MC_F = *moisture content of fine particles, expressed as a percentage of moisture.*
- MC_c = *moisture content of oversized particles, expressed as a percentage*

of moisture (2.0%).

- P_f = *percent of fine particles, by weight.*
- P_c = *percent of coarse particles, by weight.*

Calculate moisture content to nearest 0.1%.

Example of Calculation of Corrected Moisture Content:

10.5% = [(12.0 x 85) + (2.0 x 15)]/100

Calculate the Corrected Dry Density of the Total Sample (D_d)

$$D_d = 100 \times (D_f) \times (k)/[(D_f) \times (P_c) + (k) \times (P_f)]$$

Where:

- D_d = *corrected dry density of combined fine and oversized particles, expressed as lbs/ft^3.*
- D_f = *dry density of fine particles expressed as lbs/ft^3, determined in lab.*
- P_c = *percent of coarse particles, by weight.*
- P_f = *percent of fine particles, by weight.*
- *k = 62.4* Bulk Specific Gravity (2.650).*

Calculate in-place dry density to the nearest 0.1 lbs/ft^3.

Example of Calculation of Corrected Dry Density:

127.2 lbs/ft^3 = 100 x 122.0 x 165.4/ [(122.0 x 15) + (165.4 x 85)]

NOTES

Unless the actual moisture content of the oversize particles is known, 2.0% shall be used in calculating corrected moisture. Unless the actual bulk specific gravity of the oversize is known, 2.650 shall be used in calculating corrected dry density.

Each dry density and moisture content shall be calculated and plotted to determine optimum moisture content and maximum dry density, as specified within ND T 99 and ND T 180.