

UT GeoMechanics Lab

Procedure for determining liquid limit and plastic limit of soils (in accordance to ASTM D4318)

Liquid Limit

1. Use the Casagrande cup and multipoint liquid limit method described in sections 11 and 12 of ASTM D4318–10 to obtain the liquid limit of soils.
2. The following **exception to the ASTM procedure** is made:
 - a. Instead of mixing to a low initial water content (where the groove closes between 25 and 35 blows of the Casagrande cup) and then adding water to each successive trial of the test, we mix to a higher initial water content (where the groove closes at about 15 blows) and then allow the material to air-dry on a glass plate between trials. This improves the uniformity of the soil and maintains hydration of the particles (Germaine and Germaine, 2009).
 - b. A fan on the table can assist in air-drying the material between tests.
 - c. Make sure to frequently mix the material on the glass plate in front of the fan in order to avoid inconsistencies in water content throughout the sample and to prevent the soil from drying on the outside and forming a crust.

Plastic Limit

Use the procedure described in sections 15-17 of ASTM D4318-10 with the hand method as outlined in section 16.2.1 to obtain the plastic limit of soils.

Plasticity Index

The plasticity index is calculated as the difference of the liquid limit and the plastic limit as per section 18 of ASTM D4318-10.

Data template

A standard spreadsheet for test data and calculations is found at

`\shannon\All_Access\GeoMechanics_Lab\Tests\Data_Templates\AL\AL_Data_Template.xlsx`

Works Cited

ASTM (2010). *Annual Book of ASTM Standards*, vol. 04.08, *Soil and Rock (I)*. Standard no. D4318-10, “Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils,” ASTM International, West Conshohocken, Pa., 582-595

Germaine, J.T. and Germaine, A.V. (2009) *Geotechnical Laboratory Measurements For Engineers*. John Wiley and Sons, Hoboken, New Jersey.