

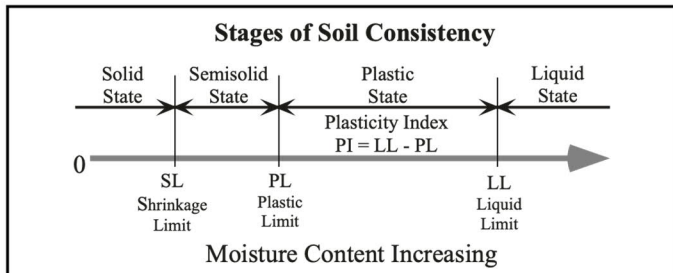
# Silt/Clay Soils - Atterberg Limits

Reinforced soil structures perform best when constructed with granular backfill material. Predictable shear strength, low strain and consolidation characteristics, non-plastic behavior, and better internal drainage make granular soils the superior wall building material. However, most of the site soils in the US consist of less select materials which can challenge the engineer and contractor when utilizing these lower quality site soils due to project imposed economic constraints.

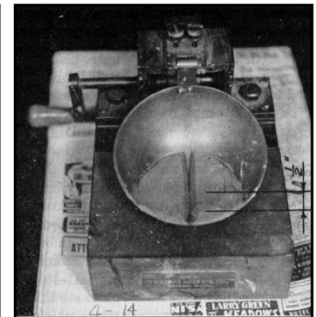
Atterberg limits are a set of index tests performed on fine grained silt/clay soils to determine the relative activity of the soils and their relationship to moisture content. The liquid limit, plastic limit, and shrinkage limits define the relative stages of behavior as indicated below when the soil moves from the solid state to a liquid state. The soil classification of fine grained soils based on these limits is also shown below.

The USC limits of "good clay" vs "bad clay", if there is such a thing, is defined as a Liquid Limit less than 50 and Plasticity Index less than 20 for silts and clays (ML/CL designations). The materials classified as CH, MH, and OH are typically unsuitable for reinforced wall construction and should be avoided. Keystone recommends limiting the  $LL < 40$  and  $PI < 15$  when dealing with plastic soils whenever possible to avoid the transitional zone of normal soil classification.

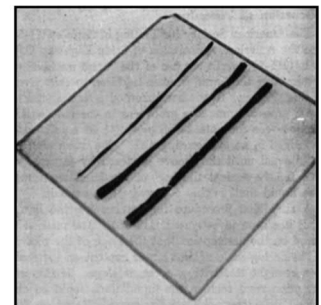
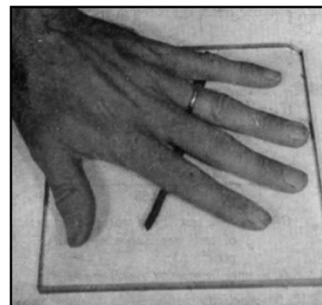
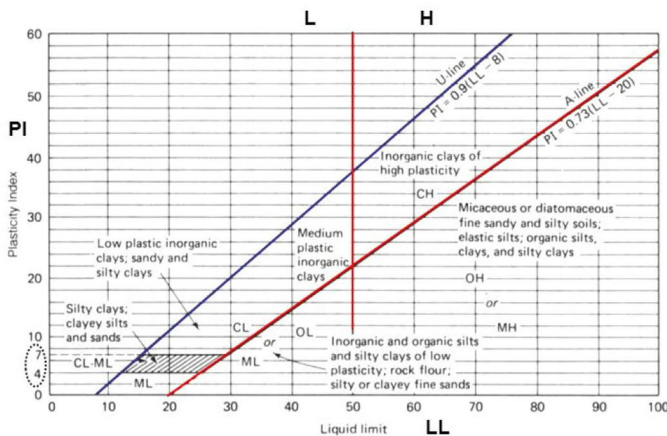
Construction of reinforced soil structures with plastic soils must always proceed carefully due to the potential for wall construction and performance problems and possible long term creep of the soil. Soil drainage issues must also be carefully evaluated. Atterberg limit testing is mandatory for all clay soils and placement and compaction must be carefully monitored.



## Atterberg Limits



## Liquid Limit Test



## Plastic Limit Test