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**Q.1) What is the difference between standard test and standard penetration test?**

**Ans :** The standard penetration test (SPT) is an in-situ dynamic penetration test designed to provide information on the geotechnical engineering properties of soil. This test is the most frequently used subsurface exploration drilling test performed worldwide. The test provides samples for identification purposes and provides a measure of penetration resistance which can be used for geotechnical design purposes. Many local and widely published international correlations which relate blow count, or N-value, to the engineering properties of soils are available for geotechnical engineering purposes.

The **procter compaction test** is a laboratory method of experimentally determining the optimal moisture content at which a given soil type will become most dense and achieve its maximum dry density. The test is named in honor of **Ralph Roscoe Procter**, who in 1933 showed that the dry density of a soil for a given compactive effort depends on the amount of water the soil contains during soil compaction. His original test is most commonly referred to as the standard procter compaction test; his test was later updated to create the modified Procter compaction test.

These laboratory tests generally consist of compacting soil at known moisture content into a cylindrical mold with a collar of standard dimensions of height and diameter using a compactive effort of controlled magnitude.

**Q.2) What is the classification of soil based on free swell index?**

**Ans.** Free swell or differential free swell, also termed as free swell index, is the increase in volume of soil without any external constraint when subjected to submergence in water. The apparatus used:

- i. Is Sieve of size 425µm
- ii. Oven
- iii. Balance, with an accuracy of 0.01g
- iv. Graduated glass cylinder- nos., each of 100ml capacity

Strong > procedure to determine Free Swell Index Of Soil

- i. Take two specimens of 10g each of pulverized soil passing through 425um IS Sieve and oven-dry.
- ii. Pour each soil specimen into a graduated glass cylinder of 100ml capacity.
- iii. Pour distilled water in one and kerosene oil in the other cylinder upto 100ml mark.
- iv. Remove entrapped air by gently shaking or stirring with a glass rod.
- v. Allow the suspension to attain the state of equilibrium (for not less than 24hours).
- vi. Final volume of soil in each of the cylinder should be res out.

**Containing distilled water.**

$V_k$  = volume of soil specimen read from the graduated cylinder containing kerosene.

Free Swell Index	Degree of Expensiveness	LL	PL	SL
<20	Low	0.50	0-35%	>17%
20-35	Modrerate	40-60%	25-50%	8-18%
35-50%	High	50-75%	35-65%	6-12%
>50	Very high	>60%	<45%	<10%

**Q.3) Why is permeability test for soil important?**

**Ans.** The constant head permeability test is a laboratory experiment conducted to determine the permeability of soil. The soils that are suitable for this test are sand and gravels. Soils with silt content cannot be tested with this method. The test can be employed to test granular soils either reconstituted or disturbed.

**Objective and Scope:**

The objective of constant head permeability test is to determine the coefficient of a soil.