

# Design of Insulations

The fundamental consideration in the design of insulation of transformer

- ⊕ Electrical
- ⊕ Mechanical
- ⊕ Thermal

## Electrical consideration

✓ Consideration of voltage

between individual turns

between coil or layers

between core and windings and tank

✓ Test- sustained frequency high voltage test and impulse test

✓ To check- the strength of insulation between the various parts

- to ensure reasonable life (avg 20 years)

- able to withstand under abnormal condition lighting , switching surges and other transient phenomenon.

## Mechanical Consideration

- ✓ The insulation must be capable of withstanding the mechanical stresses imposed on it during the manufacturing process.
- ✓ The insulation must be able to withstand stresses which are developed in the winding due to electromagnetic phenomenon
  - forces small during normal conditions
  - hundred times during fault conditions

## Thermal Consideration

- ✓ Material type
- ✓ Selection of safe maximum operating temperature
- ✓ Types of cooling method

## The insulation of transformer is divided into four types

- ✓ Major insulation
- ✓ Minor insulation
- ✓ Insulation relative to tank
- ✓ Insulation between phases

## Major insulation

The insulation between winding and core and the insulation between the winding of the same phase is called major insulation.

## Minor insulation

Insulation between different parts of one winding i.e. Insulation between turns ,coils, and layers. Etc is called minor insulation