POWER CONSULTING

Overvoltage protection and insulation coordination
Insulation coordination studies

Lightning strokes or switching operations can cause overvoltages, which can damage the insulation of the system equipment. With an insulation coordination study we’re helping you to protect your equipment against such overvoltages.

Do you know, if your system equipment are protected against overvoltages? Are you aware of your potentials for optimization? We have the right answers to these questions.

Our offer
We calculate possible maximum overvoltages for existing, new and future installations in consideration of specific operational system conditions. We determine network situations, which can lead to insulation failures of your system equipment. We develop overvoltage protection concepts as type and location of surge arresters to minimize these risks.

For that, we offer following studies:
• Lightning overvoltage study
• Investigation of overvoltages in case of switching small inductive currents, in particular for special cases such as arc furnaces or compensation reactors and definition of overvoltage protection devices
• Investigation of overvoltages in case of energizing of no-load transformers, long cables or overhead lines
• Ferro resonance study
• Determination of circuit-breaker breaking capability
• Definition of overvoltage protection as surge arresters
• Study of the recovery overvoltages after a fault clearance
**Definition of insulation coordination (acc. to IEC 60071-1)**
Selection of the dielectric strength of equipment in relation to the operating voltage and overvoltages, which can appear on the system, for which the equipment is intended and taking into account the service environment and the characteristics of the available preventing and protective devices.

**Our team**
We are a world-wide operating team of ABB experts with more than 1500 system studies for industrial customers, distribution and transmission system operators in the last 40 years.

Whether you’re talking about lightning strokes, faults or switching operations - with an insulation coordination study we’re helping you to protect your equipment.

**Principle**
The purpose of insulation coordination is to compare the actual electrical stress of system equipment with their dielectric withstand strength determined by simulations. Its final objective is to analyze, if the insulation of the network components are protected against overvoltages of various origins.

**Typical stresses**
Electrical equipment are particularly exposed to various stresses, what they have to be designed for. Various types of overvoltages are as followings:
- Power frequency overvoltages
- Temporary overvoltages caused by earth faults, load scheduling or resonances
- Slow front overvoltages caused by switching operations
- Fast front overvoltages caused by lightning
- Very fast front overvoltages

**Aim of the studies**
Insulation coordination aims at minimizing probability of an insulation failures by developing overvoltage protection concepts taking into account the specific system configuration, but also economical aspects.