Professional Certificate in High Voltage Engineering

High voltage principles and applications

High Voltage Principles and Applications Glossary

Ampere: The unit of electric current, symbolized as A. It represents the rate of flow of electric charge past a point in an electric circuit.

Arc Flash: A type of electrical explosion that results from a low-impedance connection through air to ground or another voltage phase in an electrical system.

Dielectric: A material that does not conduct electricity, typically used to insulate high voltage components.

Earthing: The process of connecting an electrical system to the earth to prevent dangerous voltages from building up.

Electric Field: A region around a charged particle or object within which a force would be exerted on other charged particles.

Electric Potential: The work done in moving a unit positive charge from a reference point to a specific point in an electric field, measured in volts.

Electrostatic Discharge (ESD): The sudden flow of electricity between two electrically charged objects caused by contact, an electrical short, or dielectric breakdown.

Insulator: A material that does not conduct electricity, used to separate conductive materials to prevent electrical current flow.

Load: The device or component in an electrical circuit that consumes power or converts it into another form of energy.

Ohm's Law: A fundamental principle in electrical engineering that states the relationship between voltage, current, and resistance in an electrical circuit: V = IR.

Power Factor: A measure of how effectively electrical power is being used in a circuit, calculated as the ratio of real power to apparent power.

Short Circuit: An abnormal connection between two points in an electric circuit that allows current to flow along an unintended path.

Transformer: A device that transfers electrical energy between circuits through electromagnetic induction, commonly used to increase or decrease voltage levels.

Voltage: The electrical potential difference between two points in a circuit, measured in volts.

Watt: The unit of power in the International System of Units, symbolized as W, equal to one joule per second.

Breakdown Voltage: The minimum voltage at which an insulating material loses its insulating properties and allows current to flow through it.

Capacitance: The ability of a component or circuit to store electrical charge, measured in farads.

Conductor: A material that allows electrical current to flow through it easily, typically made of metals like copper or aluminum.

Coulomb: The unit of electric charge, symbolized as C, equal to the charge transported by a constant current of one ampere in one second.

Current: The flow of electric charge in a circuit, measured in amperes.

Direct Current (DC): Electric current that flows in one direction only, commonly produced by batteries or solar cells.

Electric Shock: The physiological response to electric current passing through the body, which can cause injury or death.

Electromagnetic Field: A physical field produced by electrically charged objects that affects the behavior of other charged objects in the vicinity.

Farad: The unit of capacitance, symbolized as F, equal to one coulomb per volt.

Grounding: Connecting an electrical circuit or device to the earth or a large conducting body to ensure safety and proper operation.

Impedance: The measure of opposition to the flow of alternating current in a circuit, consisting of resistance and reactance.

Inductance: The property of an electrical circuit that opposes any change in current, measured in henries.

Insulation: A material used to prevent the flow of electric current, protecting conductors and components in an electrical system.

Joule: The unit of energy or work in the International System of Units, symbolized as J, equal to one watt-second.

Kirchhoff's Laws: A set of fundamental rules in electrical circuit analysis that govern the conservation of charge and energy in a circuit.

Ohmic Losses: Energy losses in an electrical circuit due to resistance, resulting in the conversion of electrical energy into heat.

Overvoltage: A voltage level in an electrical system that exceeds the specified limit, potentially causing damage to equipment or components.

Reactance: The opposition to the flow of alternating current in a circuit due to inductance or capacitance, measured in ohms.

Resistor: A passive two-terminal electrical component that resists the flow of current, commonly used to control current flow or divide voltage.

Static Electricity: The accumulation of electric charge on an object through friction or induction, resulting in an imbalance of electrons.

Switchgear: Electrical equipment used to control, protect, and isolate electrical circuits and equipment in substations and power systems.

Thermal Runaway: A phenomenon in which the temperature of a component or device increases uncontrollably due to a positive feedback loop.

Transient Voltage: A temporary increase or decrease in voltage levels in an electrical system, often caused by switching operations or lightning strikes.

Varistor: A voltage-dependent resistor used to protect electrical circuits from excessive voltage spikes by limiting the voltage across it.

Wattage: The rate at which electrical energy is consumed or produced in a circuit, measured in watts.

Xenon Flash Lamp: A type of gas-discharge lamp that produces an intense flash of light when triggered, commonly used in photography and high-speed imaging.

Yield Strength: The maximum stress that a material can withstand without permanent deformation or failure, often used in the design of high voltage components.

Zener Diode: A type of diode that permits current flow in the reverse direction when the voltage reaches a certain threshold, commonly used as a voltage regulator.