JUPITER PRIME

Consulting • Training • Advisory

جوبيتر برايم للاستشارات والتدريب

COURSE BROCHURE

Power Cable Manufacturing and Testing Training Course

jupiterprime.uk

info@jupiterprime.uk

Registered in the United Kingdom and Saudi Arabia

Power Cable Manufacturing and Testing Training Course

Power Cable Manufacturing and Testing Training Course is a 1-week training course for electrical engineers, quality assurance managers and plant asset specialists who evaluate cable designs and leave with a complete cable manufacturing and inspection dossier. Modern power networks demand extruded dielectric cables that withstand severe electrical stresses and thermal loads without premature breakdown. Jupiter Prime Training delivers this Power Cable Manufacturing and Testing Training Course to provide technical clarity across production lines and laboratory halls.

Why Power Cable Manufacturing and Testing Matters Now

Power transmission and distribution networks are expanding rapidly across utility grids and industrial process plants, placing unprecedented demands on insulated cable reliability. Unnoticed voids, contaminants or irregular crosslinking during extrusion cause localised dielectric breakdown, leading to expensive unplanned outages and replacement programmes. Engineering leaders must verify that fabrication methods and factory acceptance routines satisfy international standards to prevent early asset retirement. The subject relies on IEC 60502-1 and IEC 60502-2 for medium-voltage specifications, IEC 60840 for high-voltage systems up to 150 kV, IEC 62067:2022 for extra-high-voltage systems, and IEC 60811 for material screening.

Who Gains Most from Power Cable Manufacturing and Testing

- Engineers who specify conductor sizing, insulation thickness and metallic shielding for medium- and high-voltage distribution projects
- Quality assurance specialists who witness factory acceptance testing, evaluate material conformity and inspect extrusion facilities
- Substation and plant technical leads who review test certificates and define pre-commissioning field test procedures
- Procurement engineering officers who evaluate supplier technical submittals against international dielectric performance standards

Owner-operator engineering departments and electrical EPC delivery groups gain the greatest benefit when cross-functional project teams attend together to establish unified quality acceptance benchmarks.

Power Cable Manufacturing and Testing Capabilities

Participants develop actionable technical competence to evaluate cable fabrication quality and verify insulation integrity across every lifecycle stage.

- Assess continuous catenary vulcanisation line parameters — crosslinking uniformity across extruded insulation layers
- Align factory acceptance test schedules with IEC 60502-2 and IEC 60840 — client specification compliance
- Weigh degassing duration against volatile byproduct dissipation — premature electrical treeing prevention
- Design site acceptance testing programmes incorporating very low frequency methods — pre-energisation cable verification
- Calculate conductor direct current resistance using IEC 60228 — thermal rating and voltage drop limitation
- Specify routine and type test acceptance criteria — supplier qualification and tender technical adjudication

Key Power Cable Manufacturing and Testing Terms

- Continuous catenary vulcanisation — an extrusion line process that applies conductor screening, insulation and insulation screening in a single pass under pressure.
- Crosslinked polyethylene — a thermoset polymer insulation offering high dielectric strength, low dielectric loss and continuous thermal stability up to ninety degrees.
- Degassing — a post-vulcanisation thermal conditioning process that removes volatile byproducts generated during crosslinking to prevent cavity discharge.
- Hot set test — an evaluation under IEC 60811 measuring elongation under load and permanent set to determine material crosslinking degree.
- Partial discharge — a localised electrical breakdown within an insulation cavity that does not completely bridge the space between conductors.
- Water treeing — a slow moisture-induced degradation mechanism that forms microscopic dendritic defects in extruded dielectric insulation under electrical stress.
- Time-domain reflectometry — a diagnostic pulse reflection technique used to identify structural irregularities, impedance changes and fault locations along cables.

Power Cable Manufacturing and Testing Day by Day

Day 1: Conductor Design and Raw Material Processing

- IEC 60228 Conductor Resistance Standards — Selecting Copper And Aluminium Stranding Configurations
- Triple Extrusion Tooling Systems — Mitigating Microscopic Cavities At Insulation Interfaces
- Polymer Compounding And Handling — Preventing Contaminant Ingress In Cleanroom Extrusion
- Water-Blocking Tapes And Powders — Preventing Longitudinal Moisture Migration In Wet Environments
- Conductor Screen Geometry — Eliminating Electrical Stress Concentrations On Stranded Cores

Day 2: Extrusion, Crosslinking and Sheathing Methods

- Continuous Catenary Vulcanisation Tubes — Controlling Nitrogen Pressure And Thermal Curing Gradients
- Degassing Chamber Residence Schedules — Dissipating Volatile Byproducts Before Metallic Sheathing
- IEC 60811 Hot Set Protocols — Measuring Permanent Set And Crosslinking Density
- Metallic Screen And Sheath Application — Balancing Short-Circuit Capacity Against Eddy Current Losses
- IEC 60229 Oversheath Extrusion — Ensuring Mechanical Protection And Outer Sheath Integrity

Day 3: Factory Acceptance and Material Qualification Testing

- IEC 60502-2 Routine Electrical Testing — Verifying Factory Quality On Medium-Voltage Cable Drums
- IEC 60840 High-Voltage Test Procedures — Managing Type Test Sequences Up To 150 Kilovolts
- Partial Discharge Measurement Systems — Detecting Insulation Voids Below Five Picocoulombs Threshold
- High-Voltage Alternating Current Withstand Tests — Confirming Dielectric Margin Prior To Despatch
- Tensile And Elongation Ageing Tests — Validating Long-Term Sheath Thermal Endurance

Day 4: System Prequalification and Diagnostic Evaluation

- IEC 62067:2022 System Prequalification — Validating Extra-High-Voltage Cables And Accessories Durability
- CIGRE Working Group Prequalification Criteria — Subjecting Cable Systems To Long-Term Thermal Cycles
- AEIC CS8 Performance Standards — Evaluating Extruded Shielded Power Cable Tolerances
- Tan Delta Dielectric Loss Measurements — Identifying Bulk Insulation Degradation And Moisture Absorption
- Time-Domain Reflectometry Signal Interpretation — Mapping Impedance Discontinuities Across Manufacturing Drum Lengths

Day 5: Site Acceptance Testing and Quality Dossier Formulation

- Direct Current Sheath Integrity Testing — Detecting Mechanical Damage In Underground Installations
- Very Low Frequency High-Voltage Withstand — Executing Safe Pre-Energisation Field Inspections
- Routine Versus Type Test Audit Checklists — Adjudicating Discrepancies In Mill Inspection Records
- Root Cause Analysis Of Dielectric Breakdown — Isolating Manufacturing Defects From Jointing Errors
- Cable Manufacturing And Inspection Dossier — Finalising The Technical Acceptance Protocol For Project Procurement

Applying Power Cable Manufacturing and Testing After the Course

- Audit a prospective cable manufacturer factory acceptance test certificate against IEC 60502-2 and IEC 60840 mandatory thresholds.
- Establish an incoming reel inspection protocol combining direct current sheath integrity verification with very low frequency testing for capital projects.

Power Cable Manufacturing and Testing Questions FAQ

What is power cable manufacturing and testing, and why does it matter now?

Power cable manufacturing and testing covers the extrusion, crosslinking, quality control and electrical testing of insulated power cables. It matters now because transmission and distribution assets face rising electrical loads and require flawless dielectric integrity to prevent catastrophic outages and costly premature line replacements.

Which roles gain most from power cable manufacturing and testing?

Electrical project engineers, quality surveillance inspectors, substation asset managers and procurement specialists responsible for specifying, auditing or accepting medium-, high- and extra-high-voltage power cables gain the most practical value from this course.

How does a power cable manufacturing and testing course differ from a cable jointer course?

This course focuses on factory extrusion chemistry, material crosslinking, international design standards and rigorous factory acceptance testing. A cable jointer course teaches hands-on artisanal splicing and accessory fitting techniques rather than plant-level quality assurance and dielectric qualification.

What do you bring back from power cable manufacturing and testing training?

You bring back a complete cable manufacturing and inspection dossier. This structured technical artefact equips your engineering team to audit supplier factory test reports, scrutinise extrusion quality records and enforce rigorous site acceptance protocols on newly laid circuits.

Power Cable Manufacturing and Testing: The Way Forward

The cable manufacturing and inspection dossier informs the technical evaluation of supplier bids and the approval of factory acceptance testing reports. Quality assurance leads and project engineers use it to verify compliance against international standards before releasing shipments. After completing the first factory audit cycle, revisit the testing criteria to adapt inspection checklists to emerging supplier technologies.