

The high grade solution in high voltage DC tests

CESI presents the **state of the art** for **tests and certifications** on **HVDC** cables and accessories.

CESI presents one of the largest HVDC cables and accessories test laboratories in the world, where Development Tests, Type Tests and Prequalification Tests can be carried out on a HVDC cable systems for power transmission up to 600 kV DC.

This new environment is ideal to take advantages from high level experts technicians, from normative & sound testing techniques point of view, thus giving the opportunity to our Clients to shorten the time to market and improving the quality of the products. Customized solutions can be defined to cover International and National Standards or Specification in order to reduce the amount of work needed for testing and certification processes.

The laboratory is equipped with cutting edge testing equipment, offices with high speed internet access, up to 3 independent testing halls; high importance is given to the privacy for the equipment and products of the customers.



CESI is a worldwide leader in third party Conformity Assessment Services, Testing, Inspection and Certification of electromechanical components. Our certificates and reports are internationally recognized by first parties (manufacturers or seller) and second parties (purchaser or user). CESI and its subsidiaries IPH and FGH are well-recognized Conformity Assessment Body accredited according to ISO IEC 17025, and branded Certification Body accredited according to ISO / IEC 17020 and ISO / IEC 17065. Furthermore CESI is notified body for IECEx Certification Scheme and ATEX.

CESI

Trust the Power of Experience

Testing • Consulting • Engineering • Environment

Features:

- 3 HVDC generators 800 kV, 1,200kV and 1,600kV; 20mA
- 3,000 kVpk 300 kJ impulse generator
- 600 kV AC Source
- Invensys heating/cooling control system for wireless measuring systems for cable temperature
- Hall size 60 x 26 x 21 (L x W x H) meters; up to 3 independent areas (26 x 20 m each) separated by movable walls
- Cable loop setup according to customer specification, including special laying conditions indoor (up to 32,000 m³) and outdoor (6,000 m²) to simulate salt water, low or high temperature, can be applied on request
- Cable ducts for cable installation in the outdoor areas (PQ test)
- Electromagnetic shielding for PD measurement
- Customers' offices with high speed internet access close to the laboratory
- Commodities for customer's personnel
- 2 cranes for cable and accessories handling, 10 tons each
- On request: Handling and storage of the cable drums within CESI area, cable termination scaffolding and excavation works
- Workshop for mechanical interventions
- Non electrical type test according to Customer's request or main IEC Standards.

Products to be tested

HVDC Cable (extruded or mass impregnated/oil insulated) systems and their accessories, e.g. Fig. 1.

Applicable standards

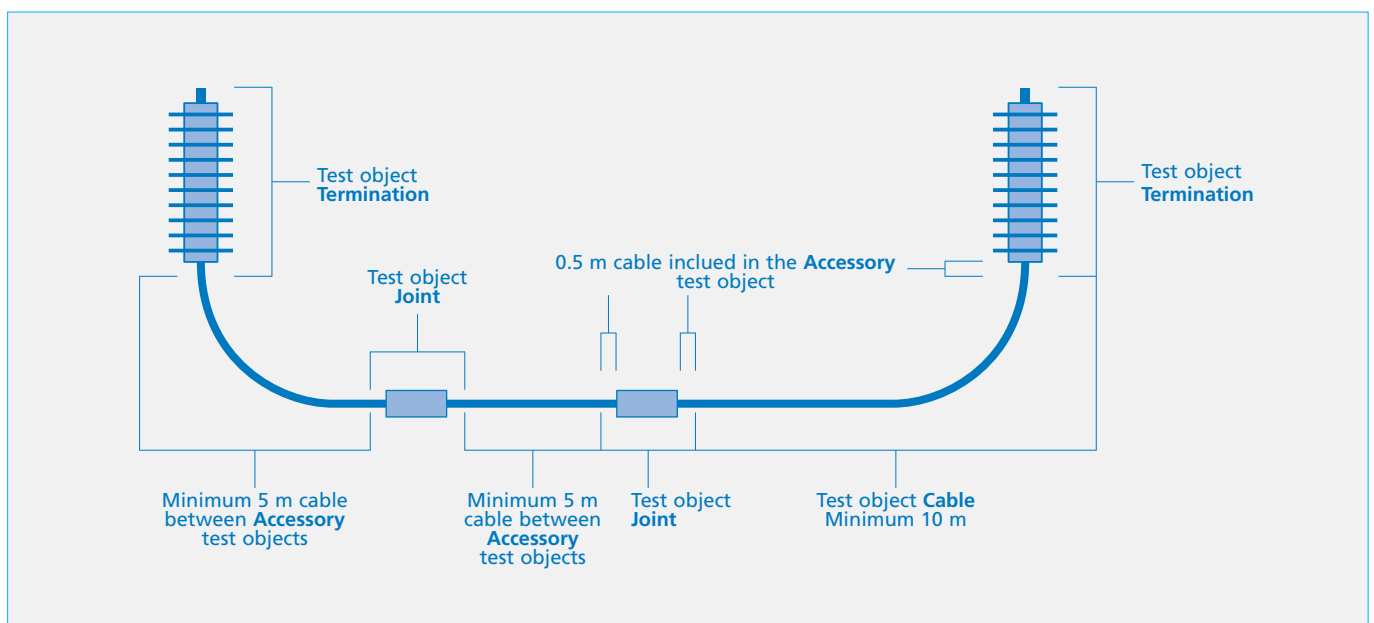
Relevant IEC standards

The most updated CIGRE Technical Recommendations e.g. CIGRE TB 496 – 2012 or CIGRE SC B1DOC 11/21 or based on specific tailor made solutions.

The range of tests to be performed is not limited to:

- Load Cycle tests and superimposed impulse voltage test (both LCC & VSC systems), and long duration voltage tests and superimposed switching impulse voltage tests;
- but also includes mechanical tests (inspection services to customer's premises), short circuit tests and internal arc tests. The latter tests are increasingly requested by utilities for safety reasons.

Figure 1: Example of configuration of test objects within a test loop



Additional services

Climatic Tests

| Test chamber size | Temperature Range |
|--------------------|-------------------|
| 700 m ³ | -30 / +65 °C |
| 400 m ³ | -30 / +65 °C |

Pollution Tests

| Tests | Ratings |
|---------------------------------------|-------------------------------|
| Pollution tests (IEC 61245) | Up to 600 kV DC |
| Pollution tests (IEC 60507) | Up to 600 kV AC |
| Tracking and erosion test (IEC 62217) | Up to 120 kV |
| Weather ageing test | Up to 120 kV |
| Humidity test (IEC 61442) | Up to 120 kV 1 ph; 45 kV 3 ph |
| Salt Fog test (IEC 61442) | Up to 120 kV 1 ph; 45 kV 3 ph |

Structural Tests

| Tests / Applicable Standards | Laboratory general characteristics | |
|--|------------------------------------|----------------|
| IEEE / IEC / EDF / TRANSELEC / MIL STD | Dimensions | 56 x 14 m |
| BELLCORE / ASTM / LR / RINA | Bridge cranes | 2 (200/100 kN) |
| ENEL / EDF | Height under hook | 11.35 m |

Six degrees of freedom shaking table

| Master | Laboratory general characteristics | |
|---|------------------------------------|---------|
| To be used for structural dynamics and earthquake engineering | Dimensions | 4 x 4 m |
| | Max Specimen Dead Weight | 300 kN |



CESI's Business Areas:

- **Testing, Inspection** and **Certification** services for HV, MV and LV electrical components;
- **Engineering** and **Consulting** services for power systems and markets, transmission and distribution grids, generation plants, renewable and hydro plants;
- **Environmental** Consulting and **Structural Engineering** services for Energy, T&D, Industry and Transport sectors;
- Production of **Solar Cells** for Space and Terrestrial (CPV) applications.

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