

World leader in cable system testing

Your laboratory of reference for cables since 1967.

The increasing worldwide demand for electricity in the industrialized and growing countries requires the transmission of relevant quote of energy through cables systems.

Type tests have been developed to verify the design of LV, MV and HV cables and their accessories, and in order to evaluate the reliability of such systems throughout the years, special accelerated ageing tests have also been introduced to simulate tens of years of real use both in AC or DC configuration.



CESI is 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 is a well-recognized Conformity Assessment Body accredited according to ISO / IEC 17020, ISO / IEC 17025 as well as ISO / IEC 17065. Furthermore CESI is a notified body for IECEx Certification Scheme and ATEX.

CESI

Trust the Power of Experience

Testing • Consulting • Engineering • Environment

CESI has been working in Cables tests since 1967, first on oil-insulated systems, then with tests on paper impregnated systems and, since 1993, with extruded insulation systems and composite materials.

CESI also performed the first Prequalification Test in the 90th's: the Berlin 400kV BEWAG project. Based on this project and the strong experience in cable testing, CESI developed its three platforms becoming one of the biggest Prequalification Test Facilities for Extra High Voltage Power Cable Systems worldwide, offering the customer a tailor made loop layout for each need i.e. Buried in soil, concrete covered duct system, joint in sand/salt water, concrete tunnel system.

CESI can provide tests on LV, MV and HV cables and accessories according to internationally recognized standards:

Product	Standard
Cable and Accessories	LV CENELEC HD 361, HD 516 and HD 603
	MV IEC 60502-1, IEC 60502-2, IEC 60502-4, IEC 61442, CENELEC HD628, HD 629.1 and HD 629.2
	HV IEC 60840, IEC 62067

Further tests according national standards, CIGRE guides and specific customer requirements are also available on request.

Our main services

HV Cables and accessories

- Short Circuit tests;
- Internal Arc tests;
- Spike tests;
- On-site tests;
- Development Tests, Type Tests and Prequalification Tests on a HVDC cable systems for power transmission up to 600kV DC;
- Type Tests and PQ tests on HV AC cables (see table below).

Voltage	Type testing	PQ testing
500kV	290/500kV cable systems	290/500kV & up to 1x2500 mm ² cable systems
400kV	230/400kV cable systems	230/400kV & up to 1x2500 mm ² cable systems
220kV	127/220kV cable systems	127/220kV & up to 1x2000 mm ² cable systems

CESI has a special set up to pre-qualify power cables rated up to 500kV: 2 test lines (up to 800kV and up to 500kV) with high flexibility in installation layout (tunnels available). CESI has 3 PQ test lines overall: one 500kV, one 400kV and one 220kV.

Nonstandard tests on cable accessories are fulfilled with the support of proper set-up and investments, like Internal Arc and Electrodynamics tests up to 63kA @ 3 seconds on HV outdoor terminations or Short circuit tests up to 63kA @ 3 seconds on HV joints.

At CESI's facilities at FGH, 5 PQ test lines (1 @ 400kV + 4 @ 220kV) with a new control system for current cycles are now available; furthermore type tests can be carried out, as well as long term tests and tests to assure the quality of the manufacturing process.

CESI premises at IPH offer 1 PQ line for cables up to 500kV.

MV Cables

- Type tests on cables and accessories;
- Short circuit tests;
- on-site tests;
- Cable aging.

LV Cables

- All tests according to IEC and other international standards (see above table).

On site tests

Over the years, CESI's IPH has gradually extended its testing facilities and range of services, now offering consulting and expert advice in addition to tests on HV, MV and LV cables including accelerated ageing test on MV cables and accessories.

Today, IPH is the world's leading provider of on-site cable testing. Moreover the largest mobile cable testing facility in the world for test voltages up to 500kV and test currents up to 240A is available at IPH's.

One single test unit is able to do tests on 110kV and 220kV cable systems. Used in series connection, it allows the testing of 400kV and 500kV cable systems and 504kV GIL. Parallel connection doubles the testable length; e.g. from 5.5 km to 12 km in the case of 220kV cable lines. It is also possible to test short cables with capacitance magnitudes below 20 nF by using additional capacitors.

High-sensitivity measurement, e.g. partial discharges on accessories of installed cables with a sensitivity below 10 pC, is no problem even under heavy-disturbance conditions.

By means of these complete acceptance tests, faults can be detected in time and diagnostic monitoring on the cable system can be delivered.

On site tests parameters

Cable	Test Voltage	Test Cable length	
		1 test unit	2 test unit in parallel
110kV	160kV / 2.5 U_0	22 km	44 km
132kV	190kV / 2.5 U_0	15.5 km	31 km
150kV	220kV / 2.5 U_0	9 km	18 km
220kV	254kV / 2.0 U_0	5.5 km	12 km
400kV	400kV / 1.7 U_0	7 km with 2 test units in series	
500kV	500kV / 1.7 U_0	3.3 km with 2 test units in series	

Data valid with a cable capacitance of 180 nF / km.

Cable	Test Voltage	Test Cable length
400kV	504kV / 0.8 U_{test}	10 km

Data valid with a cable capacitance of 70 nF / km.



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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