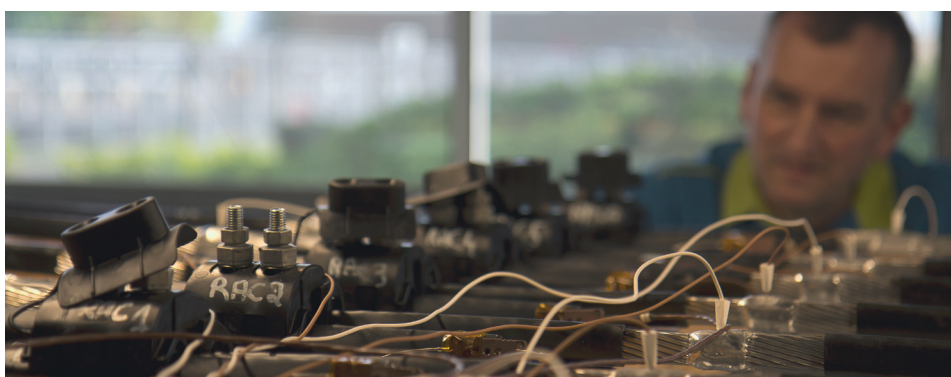




Connection benches allow us to check the thermal and electrical behavior of connectors of the energy cable links (joints, terminations). These accessories correspond to a potential weaknesses in an electrical system.

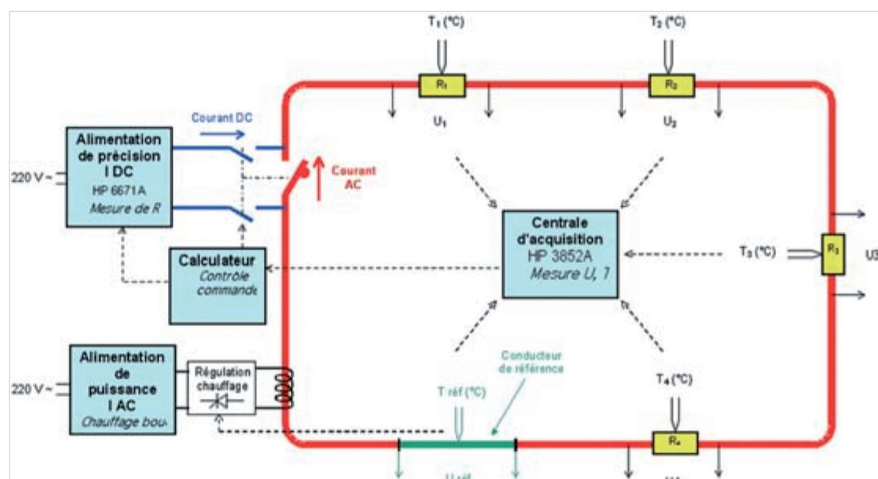
Current cycles simulating the load on a line, combined with short circuit stresses, are applied to the connectors. Their electrical resistance and their temperature are recorded and compared to a reference conductor.



Connector test loop

Three benches are used for LV and MV connectors and a specific test bench is used for conductors with large cross-sections. These benches are installed in ventilated enclosures, themselves in an air conditioned location.

The regulation of power sources and the temperature and resistance measurements are managed entirely by an automated control system.



Outline diagram

Technical characteristics of connection test benches

PARAMETERS	METHOD - RESSOURCES	LOW CROSS-SECTION BENCH	HIGH CROSS-SECTION BENCH
CROSS-SECTION OF CONDUCTOR CORE	Aluminium or copper conductors	16 mm ² to 240 mm ²	240 mm ² to 2500 mm ²
HEATING CURRENT	alternating 50 Hz Thyristor regulation	0 a 2000 A by configurable specification cycles	0 a 6000 A by configurable specification cycles
TEMPERATURE REGULATION	Current-controlled	± 1°C	± 2°C
RESISTANCE MEASUREMENT	Volt-amperemetrical Direct current	± 1,2 % ± 2 µΩ	± 1,2 % ± 2 µΩ
DIMENSIONS OF TEST BENCH	Enclosed and ventilated	4 m x 2 m	6 m x 3 m
TEST CAPACITY	Data acquisition unit 18 connectors per loop	3 loops	1 loop

AC RESISTANCE MEASUREMENT BENCH

The objective is to measure the conductor AC resistance of the cores by alternating current on optimized structures of cores.

Lower losses in any given section reflects a successfully constructed core.

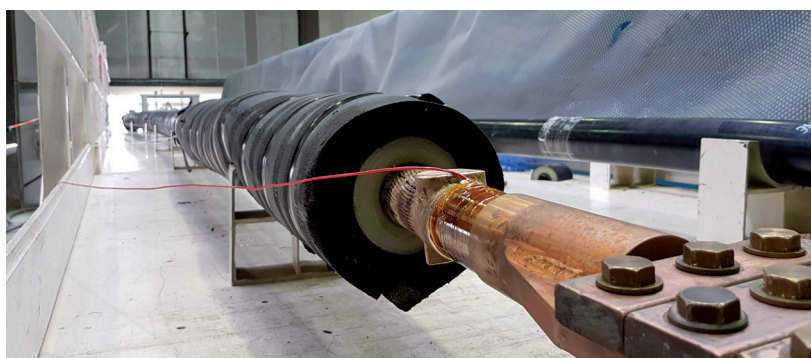
Principle of measurement by electrical method:

- Cancellation of the measured reactive component,
- Use of a lock-in amplifier to measure the current and the voltage,
- High accuracy of resistance measurement: 0.15%,
- The sample temperature is taken into account.

Equipment

A high-performance test bench

- Frequency synthesizer (45 Hz to 60 Hz),
- Amplifier up to 3000 A,
- Current measurement by high-accuracy CT.



RAC bench equipment for DC and AC tests

For cross sections larger than 1200 mm²,
the conductor optimisation allows for a reduction of the resistance greater than 20 %.

