

SHIELDED ROOMS FOR HIGH-VOLTAGE TESTING

- Very low PD background noise level
- Complete solution including test systems and project planning
- High manufacturing quality and long service life

SHIELDED ROOMS



Fig. 1 Shielded room SSC 15/9/5.6 with integrated AC resonant test system WRU 10000/350-200-100 for routine testing of high-voltage cables

FACTS IN BRIEF

Partial discharge (PD) measurements form a major part of the high-voltage testing procedure in the context of quality assurance plans for all components of power supply systems. Since high-voltage tests are typically integrated into production workflows, radiated and line-conducted interferences may enter the measuring circuit and distort the measuring signal. This is why an environment with very low PD background noise level, often lower than 1 pC, is required for partial discharge measurements. Partial discharge measurements must thus be carried out in a shielded room, i.e. in a Faraday cage. Radiated interferences are attenuated due to the shielding effect of the shielding elements. In addition, line-conducted interferences are attenuated by a specially designed filter system and an earthing system that is adapted to the actual application. Due to HIGHVOLT's long-standing experience in either attenuation mechanism, a background noise level of ≤ 1 pC can generally be achieved.

BENEFITS

- LOW BACKGROUND NOISE LEVEL
- SAVING TIME AND COSTS DUE TO TURNKEY SOLUTION
- MAINTENANCE-FREE DESIGN
- CABLE DUCT SYSTEMS FOR A HIGH LEVEL OF SAFETY

APPLICATION

The shielded rooms are used for routine, type as well as research and development (R&D) tests of power engineering components. As stipulated in IEC 60270, partial discharge measurements are performed in a frequency range of between 30 kHz and 1 MHz. The shielded rooms were developed for this frequency range. Since very high demands are placed on the testing of high-voltage cables in terms of PD background noise level, the shielded rooms are particularly optimised for this task. Shielded rooms can also be used for testing other components, such as transformers or switchgear.

No matter which object is tested, the shielded rooms offer the following user-friendly detail solutions:

- Fully shielded and fast running roll-up door
- Human-engineered concept for high throughput of tested units
- Floor suitable for any means of transportation
- Innovative, interference-free lighting system

- COUNTRY-SPECIFIC ELECTRIC EQUIPMENT
- OPTIMIZED LOGISTICS CONCEPT
- HIGH THROUGHPUT OF TESTED UNITS
- HIGH-QUALITY COMPONENTS



Fig. 2 Shielded room SSC 35/26/17 (incl. optional features) with integrated AC resonant test system WRM 5570/800 for type testing of high-voltage cables

SYSTEM AND COMPONENTS

The shielded rooms consist of the following components:

- Steel structure
- Shielding panels
- Shielded roll-up door for tested units
- Shielded personnel doors
- Electrical installation
- Bushings for various media, such as water, air, oil and energy
- Natural ventilation of the shielded room and control room
- Air-conditioned control room

The steel structure and shielding panels are galvanized and made to the highest German quality standards. The manufacturing standards that HIGHVOLT complies with ensure a long service life of the shielded room.

- GALVANIZED SUPPORTING STEEL-CONSTRUCTION AND SHIELDING PANELS
- NON-DEFORMING SHIELDING ELEMENTS
- ACCESS POSSIBLE FOR ANY MEANS OF TRANSPORTATION

The 1-mm-thick trapezoidal shielding panels are arranged in an overlapping manner so to guarantee the very high shielding efficiency. Organic materials, such as wood, are not used as structural elements. Deformation caused by moisture, which would effect a reduction in shielding efficiency, is thus prevented even in the long term.

The shielded room is consistently isolated from the surrounding building. It features an earthing system that is individually adapted to the test system used. This is how the very low background noise level is reached.

The design of the test station, in particular the arrangement of test systems and tools, cable ducts, earthing boxes, electrical equipment and lighting, follows widely recognized human engineering principles. This ensures operator-friendly testing operations.

The shielded roll-up door is fully automatically controlled. The door passageway is suitable for any means of transportation up to 80 tons load capacity, including air cushion and forklift truck operations. The low-wear multi-layer floor does not show much wear out even after many years of usage.

Large rooms can be fitted with an overhead crane with a lifting capacity of up to 1 ton. Heavy cable ends and testing auxiliaries can thus be handled with ease when preparing for a test.

The control room and the personnel doors are integrated into the shielding concept and safety system. The test personnel can oversee the test process very well from the air-conditioned control room.

As an alternative to the self-supporting standard structures, shielded rooms can also be fitted to existing buildings.

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TECHNICAL PARAMETERS

Standard shielded rooms (mainly for testing high-voltage cables)

- Routine tests: 200 kV, 350 kV, 500 kV and 700 kV test voltage
- Type tests and tests during research & development up to 700 kV test voltage

Individually adapted shielded rooms for

- Power transformers
- Distribution transformers
- Bushings
- Submarine cables
- Universities
- Test institutes

Technical data

- PD background noise level ≤ 1 pC in the shielded room, in accordance with IEC 60270
- Standard floor load capacity up to 80 t
- Shielding optimised for a frequency range of between 30 kHz and 1 MHz

Planning steps for a complete solution comprising shielded room and test system

- Optimum integration of the shielded room into the surrounding building
- Configuration designed to match customers' workflows
- Complete shielding and earthing concept
- Coordinated assembly of shielded room and test system

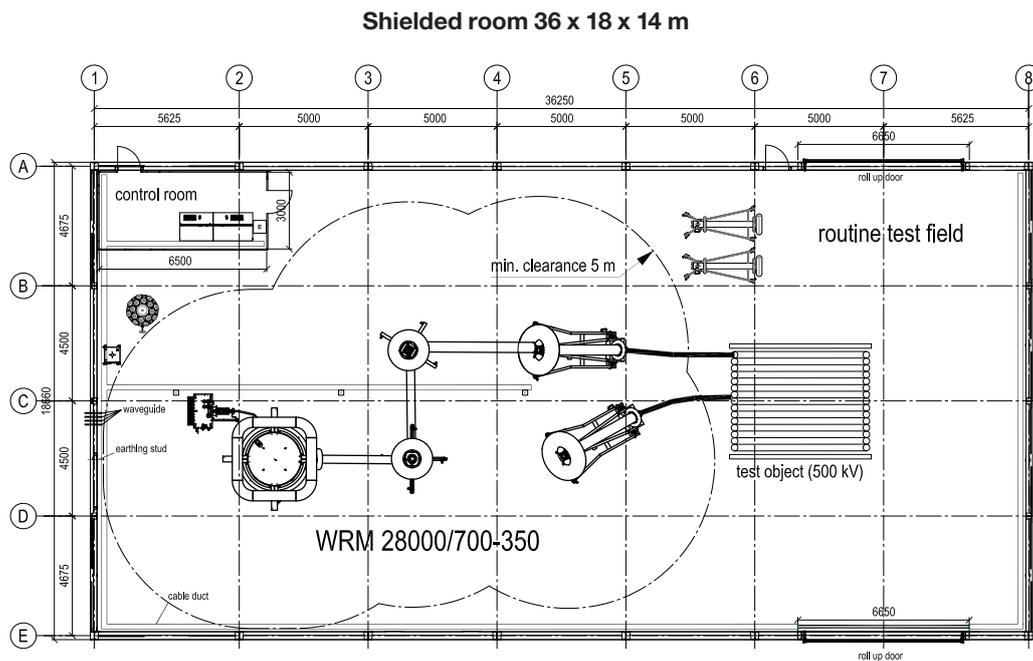


Fig. 3 Layout plan of a routine test field for high-voltage cables tailored to customer requirements

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