Safety Earthing Grid Design

DEHN Services – Engineering Service Datasheet

Service	**Safety Earthing Grid Design acc. Local & International Standards***
Part no.	**E17303**
Description	Electrical earth faults must be safely discharged into the ground until the source of the fault can be isolated by protective devices that monitor earth faults. A detailed design of an earthing system – including dimensioning, placement in soil layers, selection and dimensioning of conductors, and components with sufficient short-circuit withstand capability – ensures that the system can absorb the expected fault current. This protects people and animals from dangerous step and touch voltages. Testing step and touch voltages inside and outside an earthing system is crucial for ensuring safety. Simulating these voltages is a helpful tool for analysing the effects of lightning strikes or short-circuit currents on the earthing system and deducing appropriate protective measures. Field measurement data is required to perform such simulations. **Measurements and tests include:** ○ Step voltage ○ Touch voltage (contact voltage) ○ Electric potential ○ Earth resistance ○ Specific earth resistance ○ Current flow These are performed using a measuring system for step voltages. The simulation is carried out in accordance with the relevant norms and standards. The results of such an investigation – carried out by DEHN, for example – are typically documented in a technical report. This contains all the relevant **technical parameters**, such as: ○ Ground resistance model ○ Fault current to be expected ○ Conductor dimensioning ○ Installation requirements ○ And all simulation results, such as: ○ Ground Potential Rise (GPR) ○ Step voltages ○ Touch voltages In addition, DEHN would also provide technical design drawings and a bill of materials that can be used when constructing a new earthing system or making changes to an existing earthing system.
Normative framework*	IEC 62305 Edition 3.0 – Protection against Lightning (Intl) IEC 60749-1 Edition 1.0 2018 - Effects of current on human beings and livestock - Part 1: General aspects (Intl) IEEE 80-2013 – Safety in AC Substation Grounding (Intl) DIN EN 62305 Edition 2.0 2010-12 – Protection against Lightning (DE)

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	DIN EN 18014 2023-06 – Earthing system for buildings – Design, implementation, documentation (DE) SANS 62305 Edition 2.0 2010-12 – Protection against Lightning (ZA) SANS 10199 Edition 2.02 2016 – Design and installation of earth electrodes (ZA) NFPA 70E® 2024 – Standard for Electrical Safety in the Workplace® (US) **Note: Unless clearly indicated by the customer, the service will be performed in accordance with the latest version of the standard applicable in the country in question. If the service is to be carried out according to a different standard/version, this must be defined before the order is created.**
Scope	○ 3D representation of surface potential ○ 2D and 3D configuration drawings ○ Bills of materials (BOM) ○ Report with all results of the simulation and calculation of the earthing system, as well as conductor and component requirements All documents and drawings created are provided in electronic form as .pdf documents. Other formats on request.
Requirements	○ Ground resistance data measured using the WENNER/Schlumberger method (additional service subject to a fee – part no. E17102) ○ Information on earth fault exposure (magnitude [kA] and time [s]) ○ Transformer rating plate data and structure ○ Geographical location of the project ○ Specific earth resistance ρE All necessary details are requested in a questionnaire for a precise analysis.
Optional additional services	Site inspection services and meeting (part no. E17101) Soil resistivity testing/measurement (part no. E17102) Soil Resistivity Analysis and Report (Part No. E17404).