Electric Fence Specifications

Technical Specifications

Generally electric fence installation on the wall top is preferred if the wall height is appropriate. General guidelines for such installation are:-

1. Electric fence comprising of 2-3 strands covering walls on the outer side from top down to prevent climbing using ladder or any other support.
2. 8-10 strands high fence on top of the wall using steel posts with top portion inclined outwards.
3. Access to wall top must be prevented. When installation on the outer face of the wall is not possible top or bottom bent posts are good options to cover the wall top.
4. Gap between the strands should be 4 inches and low resistance, corrosion resistant Aluminum Alloy wire should be used with operational life of over ten years.
5. Each strand should be tensioned at around 20Kgs each to prevent stretching the gaps between wires and avoid controlled electrical bypass.
6. Protection over the gates with gate status sensors.
7. For large compounds, the parameter should be divided into detection zones to indicate tempering or intrusion location which will facilitate quick and accurate reaction by the guards.
8. Limits of each Zone should be defined based on clearly visible landmarks. Other factor like bend to bend, reaction capability, visibility and intervening features on the parameter wall should be considered while selecting these zones.
9. When integrated with Climb Detection Systems or Seismic Sensors, each Zone shall have an alarm device installed for each zone to indicate intrusion or fault on the perimeter without assistance of Central Control Room. This arrangement eliminates **Single Point of Failure** which otherwise exists in the form of guard on duty in the control room by directly alerting the guards on the perimeter.
10. Optionally the abovementioned arrangement can be fitted triggers to activate perimeter lights to illuminate the affected zone(s). Independent power backup for such security light can ensure failsafe operation of these lights for the critical duration when grid or generator power is not available
11. The system shall be capable of providing minimum ***5 joules of shock energy anywhere on the fence.*** **For 4 joules energizers this value will be 3-3.5 Joules.**
12. Mimic panel showing status of each zone equipped with visual and audio alarms.
13. PC running management software to control fence energizers and detailed event logging. With this arrangement the controls can extended to any geographical location over the Internet.

14. GSM modem fully integrated with fence energizer to SMS all alerts with details to **multiple mobile subscribers** on intrusions. This will keep the guards and other security staff on duty always alert.
15. Management software can be linked to surveillance cameras to activate and pop up display of cameras installed in the affected zone.
16. Other devices like sirens, security lights can also be triggered through the fence controller.
17. Fiber Optic based Climb Detection Systems and Seismic Detectors can be integrated in solutions for high security areas to detect wall scaling or tunneling attempts even before the actual electrified wires are tampered.

Material Specifications

Material	Specifications
Energizer	• Specification of the energizer will be in accordance with IEC 60335-2-76 the International • Standard Peak value of input voltage must be above 7.5kV, but not exceeding 10kV • Maximum energy delivered to a load of 500Ω must not be less than 7.5 Joule. • Minimum interval between impulses should not be less than 1.0 Second • Impulse duration must not exceed be 50ms • Shock energy delivered anywhere on the fence should not be less than 3/5 Joules depending upon the energizer selected • For multi-zone systems the energizer must be able to energize the fence from both ends. This will ensure that the fence will still be live and able to deliver shock when a fence wire is cut from any point on the perimeter • Multiple energizers must synchronize their output in order to be regarded as one energizer with multiple outputs, all firing at the same time, as one single pulse • In order to provide optimum protection against lightning, all energizers must be installed in a dedicated lockable room inside the access control building • The energizer must have its own stand-by DC power and be programmable for up to 20 zones

Fence wires	• For larger perimeter and corrosive environment all conductor wires must be manufactured from aluminum 1.6mm, as it has a very good corrosion resistance by building up its own protection with an oxide layer, and in addition has a very low electrical resistance (33Ω/km), resulting in optimum energy availability with a maximum deterrence effect, along the energized perimeter fence, together with the highest degree of resistance to all inclement weather/atmospheric conditions • For smaller compounds like individual houses 1.0mm Aluminum wire would be suitable meeting the security as well aesthetic needs • Places where higher tensile strength is desirable 1.6mm high tensile hot dipped galvanized steel wire is the option. This wire offers same electrical resistance as 1.0mm Aluminum i.e. 100Ω/Km but has >200kg of tensile strength • Each fence conductor wire must be pulled in position with a force of about 20Kgs but not exceeding 25Kg
High Tension (HT) Insulated Cables	• Double insulated HT cables must be used to connect the energizer output connectors to the fence conductor wires of the energized perimeter fence • Insulation of HT cables should be UV stabilized for outdoor installation • The HT cables must be run through a 32mm conduit for added protection and facilitate future repairs
Crimp Ferrules /Split Bolts	• The fence wire and the High Voltage cable should be connected with suitable aluminum crimp ferrules or Stainless Steel split bolts. These components shall have the same material composition as the fence wire and the High Voltage cable
Insulators	• The insulators should be made from a UV resistant material • The insulator surface should not be damaged by flash over • The insulators should retain their rated mechanical strength over the temperature range of -10ºC to +60ºC. The insulators should not become brittle or soft under any ambient temperature conditions. • The insulator should be designed as such that the fence wire cannot be removed once installed • Tested to withstand a minimum arcing voltage of min 15kV when applied between the mounting screw and the 1.6mm aluminum conductor wire. During the test, insulators must be soaked with a 2 % saline solution, in order to simulate coastal conditions

	• No arcing may occur during the test. Strain insulators when fastened to a fixed point with its standard attachment screw, must withstand a pulling force of 300kg at 45°C when applied to a 2.24mm steel wire attached to the insulator
Tensioning Devices	• A non-metallic tensioning device should be used to tension the electric fence wires • The tensioning devices should be able to withstand at least five times the maximum installed wire tension of 20kg • The tensioning device should allow for the accurate tensioning of the fence wires to the required tension. It should only be possible to tension the fence wires by means of a special made tool which should indicate the correct wire tension
Strain posts	• All strain posts should be manufactured from 50mm x 50mm square tubing • Strain posts should be fully galvanized/powder coated. All holes should be pre-drilled before galvanizing/coating
Intermediate posts	• All intermediate posts will be manufactured from 25mm x 25mm square tubing • Intermediate posts should be fully galvanized/powder coated. All holes should be pre-drilled before galvanizing/coating
Lightning Protection Specifications	• The electric fence should be fitted with the appropriate lightning protection system in accordance with SANS 62305 Protection against lightning • Protection should be provided on both the high voltage output as well as the 230VAC input • A common earth point at the enclosure for both the high voltage and 230VAC input lightning protection systems
Earthing	• Earth pegs must be used at the beginning or end of each zone, at a maximum distance of 50m apart. Earth pegs must be connected to the main earth rod, the fence posts and earth conductors of the fence • Three (3) earth pegs, 1.8m apart in a triangle layout, must be installed at both sides of the Access Control Building (ACB). The pegs must be connected to the main earth rod and the first post on each side of the fence