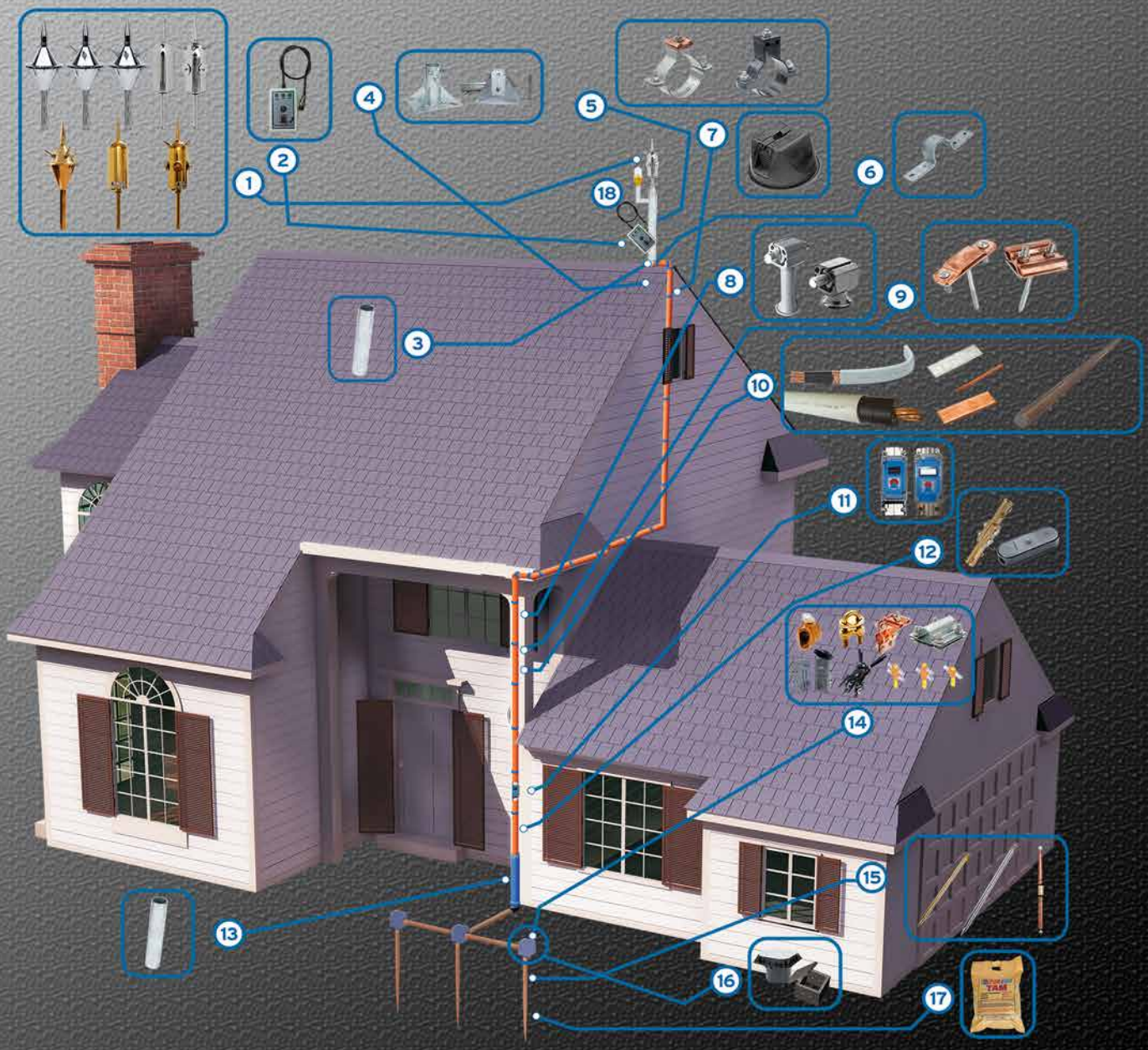
FOREND®
LIGHTNING PROTECTION & EARTHING SYSTEMS

FOREND E.S.E. INSTALLATION DETAILS



ISO 50001:2011

ISO 9001:2015
ISO 10002:2015
ISO 14001:2015
ISO 45001:2018

ACCREDITED®
Management Systems Certification Body

LCOE
LABORATORIO CENTRAL OFICIAL DE ELECTROTECNIA

ICMET

O.D.T.Ü

ELDAS
Elektrik Elektronik Sanayi Tic. A.Ş.

TAEK

The Details of External Lightning Protection Systems

1- E.S.E. Lightning Conductor Head

Early Streamer Emission Lightning Conductor for large area protection.

2- Lightning Conductor Mast

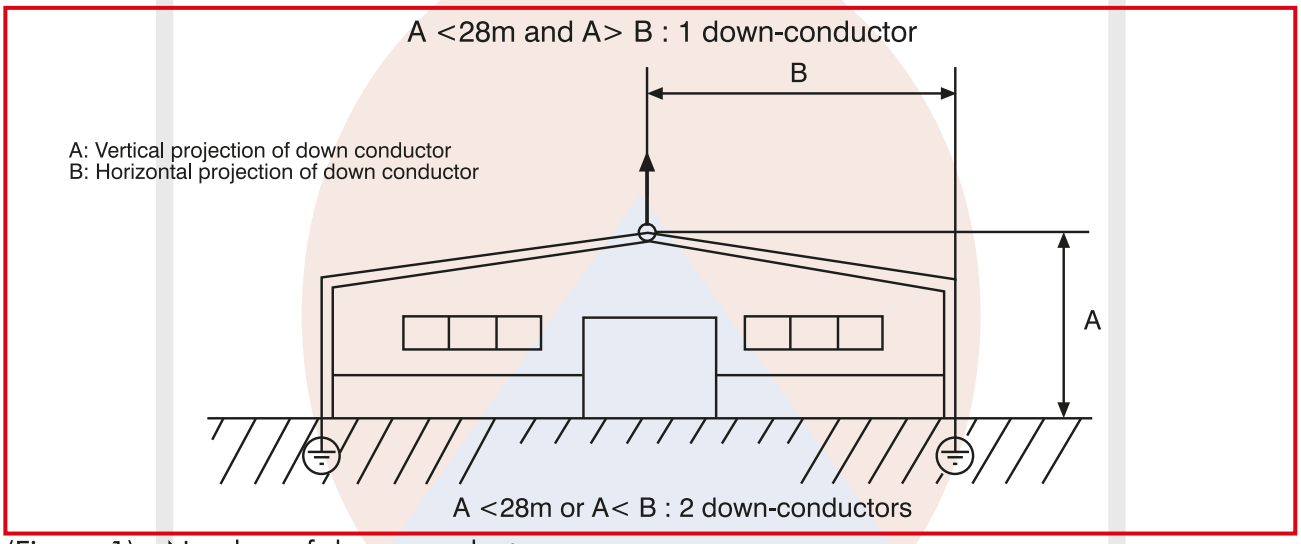
The E.S.E. Lightning Conductor height may be increased by means of an elevation mast.We recommend, Lightning Conductor Mast should be galvanized steel, is to be min. 3 m in length and 60 mm in diameter, down conductors must be fixed with 1 meter max. distance between the conductor spread along the vertical plane.

3- Down and Grounding Conductors

Number of Down - Conductors

Each E.S.E. Lightning Conductor should be connected to the earth termination system by at least one down conductor. Two or more down-conductors are required when:
- The horizontal projection of the conductor is larger than its vertical projection.
- External Lightning Protection is installed on any structures higher than 28m.

The down-conductors should be installed on two different main walls.



(Figure 1) - Number of down-conductors

Down-conductors consist of strips, braided cables, or round sections.Their minimum cross-sectional area of 50 mm^2 is defined in below table.

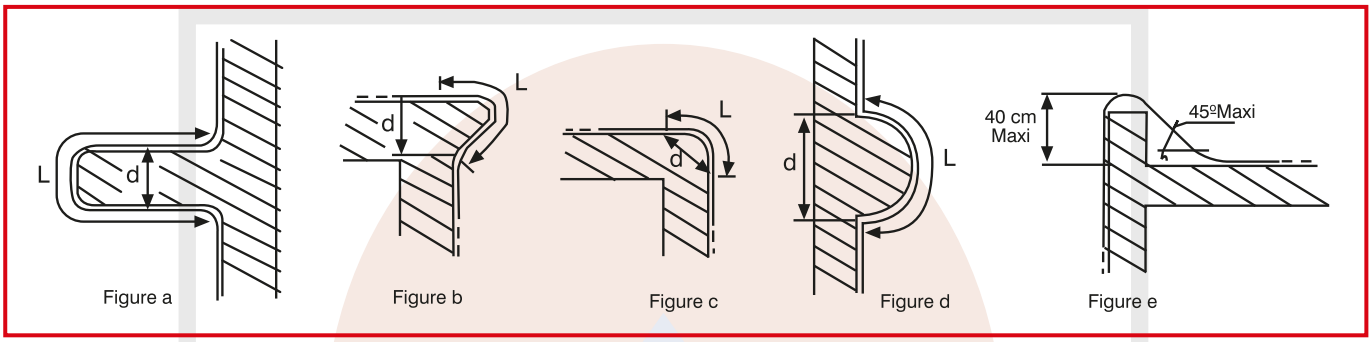
Down-conductors		
Material	Remarks	Minimum dimensions
Bare or tin-plated electrolytic copper (1)	Recommended for its good conductivity and corrosion resistance	Strip: 30x2 mm Round section: 8 mm dia.(2) Braided cable: 30x3,5 mm
18/10–304 stainless steel	Recommended in certain corrosive environments.	Strip : 30x2 mm Round section: 8 mm dia.(2)
A 5/L aluminium	To be used on aluminium surfaces (cladding,curtain- walls)	Strip : 30x3 mm Round section : 10 mm dia.(2)

Notes :

(1) Tin-plated copper is recommended in view of its physical,mechanical and electrical properties (conductivity,malleability,corrosion resistance, etc.)

(2) As the lightning current has an impulse characteristic, the flat conductor is preferred to the round conductor since its outside surface area is larger for a given cross-sectional area.

It must be a fixed mounting surface with conductor fixing internal distance is 1m. It should be installed in such a way that its path is as direct as possible. It should be as straight as possible along the shortest path without sharp bends or upward sections. As seem figure, It is connected d/L. (Figure 2)
Where; d: safety distance, L: the length of conductor according to shock voltages the average max. value, approximately is not be a jumping danger for L < 20 d. The down conductors should not be routed along or across electrical conduits. However, when electrical conduit crossing is unavoidable, the electrical conduit should be placed inside a metal screen which extends 1 m beyond the point of crossing. The screen should be connected to the down conductor.
Routing round parapet walls should be avoided. Provisions should be made to ensure that down conductors paths are as direct as possible.
However, a maximum height increase of 40 cm is permissible for passing over a parapet wall with a slope of 45° or less. (Figure 2)



(Figure 2)

4- Protective Cover

It protects the down-conductors against mechanical damages. You can use U profile or pipe. To prevent the lightning charge down, conductors must be connected to pipe or to U profile.

5- Lightning Strike Counter

When a lightning strike counter is used to match the number of lightning stroke it should be installed on the most direct down conductor above the test clamp and in any case at height of about 2m. above the ground level.

6- Test Clamp

According to down conductor, covered plastic, is provided to measure the earth resistance, in an accessible position on each main earthing conductor between earthing electrode and must be over protective tube.

7- Earth Termination

You should use reliable earth electrodes according to EN 62305-3. They shall be extensible and driven as deep as possible in earth starting from a minimum depth of 50 cm in the earth and located at such distance from one and other that maximum current likely to flow through one as they do not significally effect the potential of the other's (5 m). Earth Resistance is less than 10 Ohm.

8- Mounting

It must be checked after corrosion between different materials and avoided using different materials as much as possible. The wall's surface must not be destroyed to fixing the carrier pole,conductor clips. It must be provided both canal digs for grounding system and ground on which a building must be rebuilt for grounding system.

9- Project

It must be projected to mounting in truth.

10- Test Report

After the installation is finished, earth resistance must be measured by the authorized personel and than it must be reported and approved by an authorized engineer.

Some examples of our installations

Project: Grande Mosquée de Prokhane / Great Mosque of Prokhane, Senegal

Project: Village Hall - Government administration Building in Wheeling IL, USA

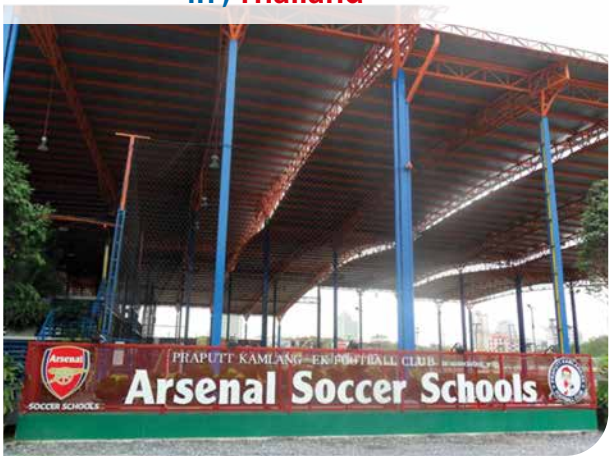
Some examples of our installations

Project: Vodafone Park Beşiktaş J.K. İstanbul, Turkey

Project: Fenerbahçe Ülker Stadium in İstanbul, Turkey

Project: Arsenal Soccer Schools in , Thailand

Project: The Coca Cola Factory in Tarija, Bolivia



Project: The Coca Cola Factory in, Georgia

Some examples of our installations

Project: Telecommunications Towers Camouflaged, Chile

Project: Novosibirsk, Administration Building, Krasny avenue, 17 in Russia

Project: Fishing pier in Rufisque, Senegal

Project: Edificio Residencial Míguez, Uruguay

Some examples of our installations

Project: Hospital LM de La Vega Moreno PCIA. Buenos Aires in Argentina

Project: SOTUVER Factory in Djebel El Ouest, Zaghouan, Tunisia

Project: Tipaza Hospital in Tipaza, Algeria

Project: Vayalpad Temple-TTD in India

Project: Kalutara Vihara Buddhist Temple, Sri Lanka

Some examples of our installations

Project: Praxair project,
Costa Rica

Project: Borjomi mineral water plant in
Georgia

Project: Addax Petroleum Store
in Douala, Cameroon

Project: Hyundai Motor Co.
industrial zone of Kamenka,
St. Petersburg in Russia

Project: Kapchagay Solar Power Plant in
Kazakhstan

Project: National Facility
thermo-electric power-station
MARITZA IZTOK 2 in Bulgaria

Some examples of our installations

The United Arab Emirates Air Force
MBU Building, Dubai

Project: Bureau of Internal Revenue
(Bir) Delta in Quezon Ave.
Quezon City, Philippines

Project: Telecom Tower in Ouagadougou,
Burkina Faso

Project: The clock tower of Dolmabahçe
in İstanbul, Turkey

Some examples of our installations

Project: Phuket International Airport, Phuket Province, Thailand

Project: Sochi International Airport, Sochi, Russia

Project: Garages of Metro Line 12 in Mexico City, Mexico

Project: Orange Line Metro Train Station, Lahore, Pakistan

Quality Certificates

Some of Forend Technical Products

FOREND E.S.E. Lightning Conductors

FOREND PETEX-L | FOREND EU-M | FOREND EU



Lightning Strike Counter

To know you had a lightning strike!!!


Produced according to IP 68
Currents detected from 1 kA to 100 kA
Testable with 9 V battery
Resetable for just Digital Counter

Active Lightning Conductors Tester

FOREND active lightning conductors
can be checked by a FOREND L.C. tester any time.

Cable Lugs

Best quality and best price for your cables!

6 mm² - 600 mm²;
wide range of products

Conductor Fixing Plastic Clamps

Rustproof, light, easy montage



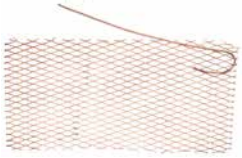
1x50 mm² | 2x50 mm² | 30x3 mm

2.0" - 2x50 mm²

Earthing Grids

The same performance but more economic and lighter than same dimension copper plates.

Dimensions
100x50 cm - 2.00 m



Inspection Pits

For easy resistivity control

- **Endurance against 65 tonnes**
- **Easily transportable**

TAM (Technical Additive Materials)

More effective material to solve
the toughest earthing problems

TAM comes in easy to handle 10 kgs per bag.
TAM lowers resistance to earth.
TAM performans in all soil types.

Led Beacon Lights

Maximum Performance

Produced according to IP 65

	FLB 10 S
Operation Voltage	12 V DC; 24 V DC; 48 V DC; 110 V AC; 220 V AC
Power Consumption	6 W
Max. Operating Life	100 K
Luminous Flux (theoric)	>32cd
Height x Diameter (mm)	215x115
Operating Temperature (°C)	-40 °C to + 85 °C
Weight (kg)	1,45

Forweld Exothermic Welding System

For longer and stronger conductivity
than mechanical connection

Reference Countries

European Union

Bulgaria, Czech Republic, France, Germany, Greece, Ireland, Lithuania, Poland, Portugal, Romania, Slovakia

Eastern European And Eurasian Countries

Azerbaijan, Georgia, Kazakhstan, Russian Federation, Serbia, Ukraine

North America

United States of America

Latin America

Argentina, Bolivia, Chile, Costa Rica, Ecuador, Guatemala, Mexico, Peru, Uruguay

Asia

Bangladesh, Hong Kong, India, Indonesia, Malaysia, Pakistan, Philippines,
Singapore, Sri Lanka, Taiwan, Thailand, Vietnam

Middle East

Iran, Iraq, Jordan, Lebanon, Oman, Syria, United Arab Emirates

Africa

Algeria, Angola, Burkina Faso, Cameroon, Djibouti, Egypt, Ethiopia, Ghana, Ivory Coast,
Madagascar, Morocco, Nigeria, Rwanda, Senegal, South Africa, Tunisia

FOREND®
FOREND ELEKTRİK MALZEMELERİ VE DIŞ TİCARET A.Ş.

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