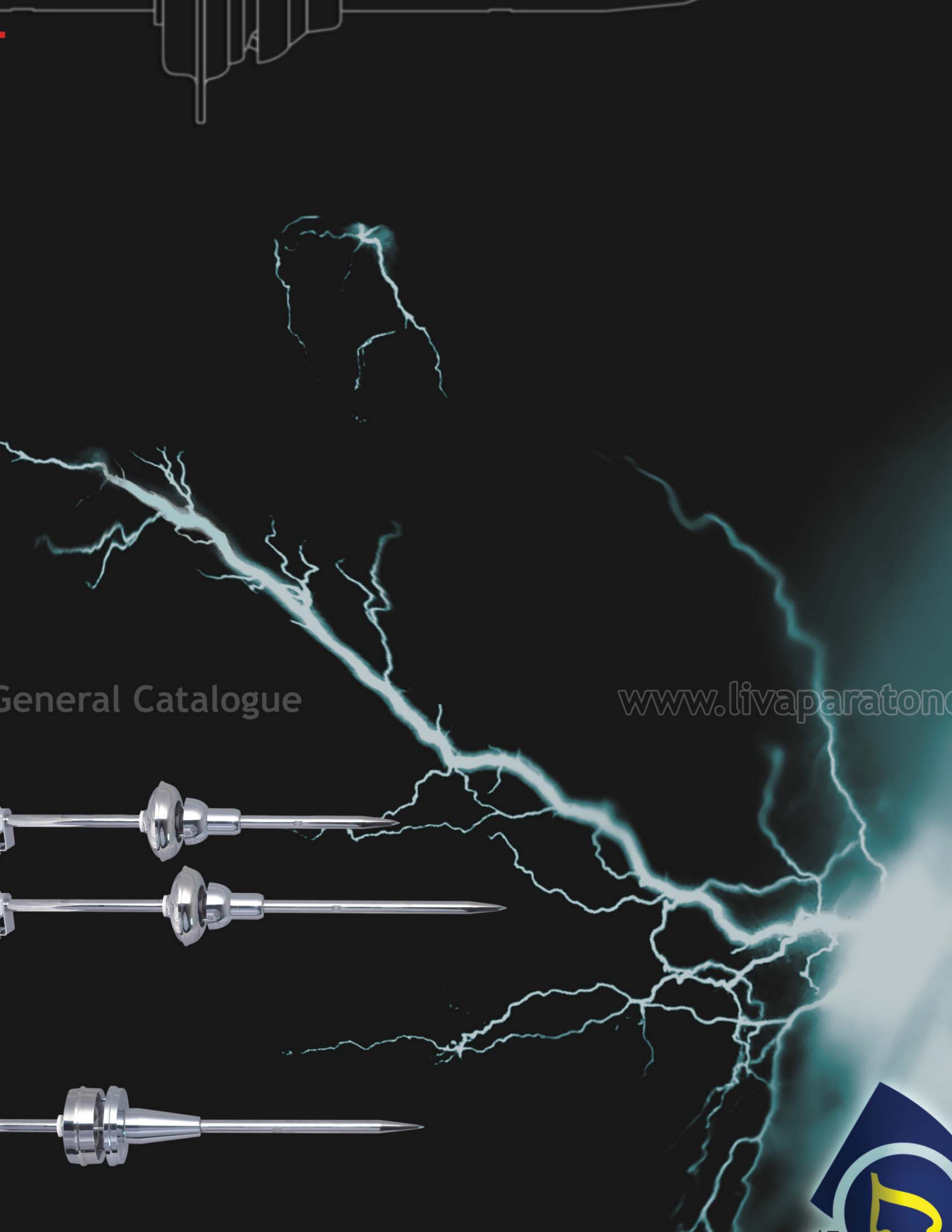

General Catalogue
www.livaparatone

The Liva Group, which was carrying on business on the subjects of projection, contracting, engineering and technical consultancy in the areas of Electricity and Automation in its first years, started works regarding with production sector in the following years and is continuing its investments in this field every passing day. The Liva Group gained its legal entity as "LIVA GROUP Electric, Electronic, Construction Contract Industry and Trade Limited Company" on March 12, 2004 with the aim of completing its "Institutionalization" period. In the same period, our company, which registered " LIVA " brand on behalf of LIVA GROUP from the Turkish Patent Institute Trademarks Department, has become one of the forenamed leader brands in the home and overseas electricity market by producing currently in production "Protecting Systems from Lightning (Active Lightning Rods, Faraday Cage/Franklin Catching Rod and Equal Potential Lightning Rod System Materials) and Installation Materials, Grounding Systems (Grounding, Main Grounding Materials, Soil Resistance Dropper Chemical Materials) and Installation Materials with the brand of "LIVA".

While our company is enriching its growing structure and developing product range in the frame of European Union Rules, it has certified its studyings at the international standards. While the company is supplying more qualified products to its customers with this aim, it has set up Quality Management System to provide production and control at the healthy, Standard quality and to make LIVA a leader brand in its sector and deserved to take the TS EN ISO 9001:2000 Quality Management System Certificate in AUGUST 2004.

Liva Group is a sensitive company of improved environmental conscious which has adopted the principle of respect for the environment in its production. Our company certified its sensibility for the subject by taking DAS ISO 14001:2005 Environment Management System Certificate on SEPTEMBER 24, 2008 in the direction of this principle.

Liva group is going on its studyings each passing day to develop its production quality and in the name of certificating it. The company has taken "CE" certificate by registrating its production quality for the production in the European Standards with CE Declaration of Conformity and "GOST" certificate which approves the quality standards of Russia and its dependent countries.

Our Operating Areas

The Liva Group operates in four different lines of business.

* Electrical Systems
* Automation
* Security Systems
* Lightning Rod and Grounding Systems

Electrical Systems : Our company serves and produces solutions on the matter of Electrical Systems for Projecting, Contracting, Periodical Maintenance/Measurements and Engineering and Technical Consultancy which are related with the Low voltage systems and Medium Voltage and High Voltage Systems of businesses.

Automation Systems : Our company serves and produces solutions on the matter of Automation Systems for Projecting, Contracting, Engineering and

produces solutions on the matter of
Production, Projecting, Contra
Maintenance/Measurements and
which are related with Lightning Rod
matters of structures, establishments

Our Production Groups

You can see our production groups.

* Liva Active Lightning Rod
* Catching Rod (Franklin Rod) / Cage S
* Lightning Rod Systems Assembling M
* Grounding Systems and Assembling M
*Soil Conductivity Depressor Chem

The Liva Group has chosen the
customer satisfaction. The certificate
the indicators of this. The Minist
Administration of Protection of Consu
applied for this purpose, gave 30-y
Lightning Rods.

Meanwhile our Liva Active
Technical University) Electric Electron
Laboratory ;

* Was tested with " Standard Ligh
and Negative(-) and Positive (+) high volta

* Was tested with Lightning Jum
March 20,2007. (Detection of early catch
catching rod)

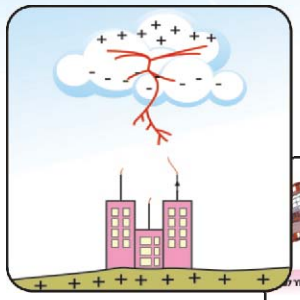
* Was tested with Lightning Strik
2007. (25 kA-lightning-strike is passed th
the product.

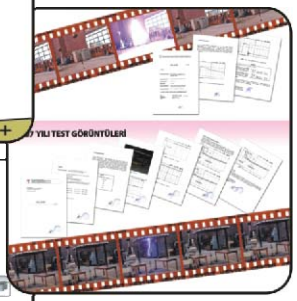
* Was tested with Lightning J
C)Standard on November 15, 2008(Our
gain which is supplied according to a norma

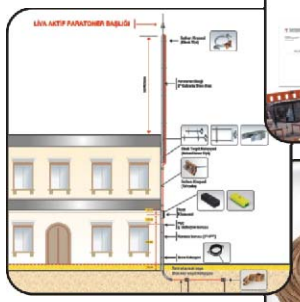
The Liva Group is one of the nu
in Turkey on Lightning Protection Sys
"Radioactive Originating Lightning R
using and having are prohibited by T
this purpose, our company has take
November 08,2004 to disassem
Originating Lightning Rods.

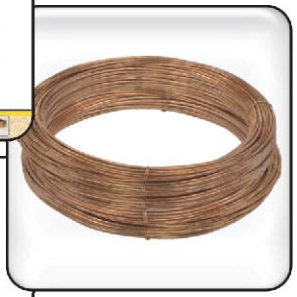
The Liva Group resumes its ste
the aim of being a leader company in
this area. The Liva Group, which co
help taken from its solution partne
today has become a power which
structure, improve its dealer network
increasing production volume and p
offer qualified products to its custome
better products for more suitable price

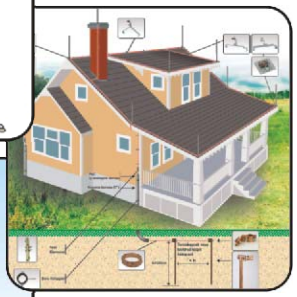
ELEKTRİK ELEKTRONİK İNŞAAT
TAAHHÜT SAN. ve TİC. LTD. ŞTİ.

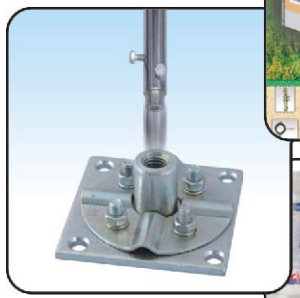


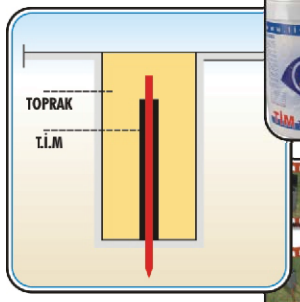












1- DEFINITIONS RELATING TO LIGHTNING

Lightning : Electrical discharge between an electric charged cloud and earth.

Flash : Electrical discharge between an electric charged cloud and another cloud.

2- FORMATION OF A LIGHTNING

For the formation of a lightning, first of all the formation of a lightning cloud and then electrically charging of this cloud are required. At the present day,even if the formation of a lightning cloud can be explained with ease,there is no definite information about how this cloud charges electrically.But this situation can be explained with some theories today.

2.1- Formation of a Lightning Cloud

Presence of high amount of moisture in the atmosphere and formation of charged clouds with the help of hot air currents is the exit point of lightning discharge.Air currents come into being by greatly heating of air layers close to the ground.This air layer switches its place with cold air coming down from very high altitudes.Moisture forms by evaporating at high temperature.Air cools while going up and reaches to a temperature to saturate with water vapor at a specific altitude.Rising upwards more causes condensation and clouds come into being. Three stages are point at issue in formation of lightning cloud.

Youth; At this stage, air currents increase from bottom to top and edges to center.This situation lasts about 10-15 minutes.

Maturity; Rainfalls form at this stage.Cloud bearing force which decreases relatively at temperatures close to zero causes heavy rainfalls.In the meantime, cold wind moving from top to bottom are seen. This situation lasts about 15-30 minutes.

Old Age; At this stage, air currents come to an end anyhow. This situation lasts about 30 minutes.

2.2- Formation of electric charges in lightning cloud

It is not known clearly how electric charges form in lightning clouds yet.Along the history,it has been tried to explain the charging of clouds with various theories on this matter.Simpson and Lomonosow are two scientists who researched how electric charges form and defended the same theory on this matter.According to these two researchers,charges in clouds form with the help of air current.Air current which results from switching of hot and cold air stimulates water droplets in clouds. Moving water droplets charge by rubbing each other.Air currents in clouds cause water droplets to diffuse and combine again.In the laboratory studies, it is observed that small diffusing droplets are charged negatively and big diffusing droplets are charged positively.

parts of the cloud charge positively.
positive polarized lightning discharge
95% of discharges are polarized p
theory can't explain thorougly the fo
clouds.

A second theory on this
Geitel.According to them,the charg
electrification.If the electric charge
water droplets in this charge are pol
negatively on the upper edges.The b
by the effect of gravity get close to th
in the meantime while the positive ba
the negative ion of the air,it also pu
water droplets become negative e
particles which are polarized in th
absorb the positive ions of the air a
droplets become positive electrified p

According to this theory, there
of the cloud.Although the theory s
lightning discharges,in fact there are
lightning cloud is made up of ice crys
droplets,the probability of polarizatio
is rather low with the electrified area

A third theory on this matter
Frenkel,because the ions marked w
electric charges of the world are in
positive electric charges of the İonos
event to reinforce the increas
continuously.Negative lightning disch
stabilizing the electric charge of
ambience which is composed of tiny
is composed of ions marked with bo
that the negative ions of the air are
crystals.According to this,the cloud i
droplets and air with positive ions.
droplets.)

Whether the theories are diffe
natural events like lightning and fla
deed.

2.3- Formation of ligh

Charging of cloud electrically
and flash are defined as "orage" in
known that as every cloud will not ma
sufficient conditions form in clou
orage.Approximately a 500kV/m-
cloud.This generates very forceful v
like this approaches to the Earth
(heat,moisture etc.) are suitable,the

ers, skyscrapers, etc.),in that case,

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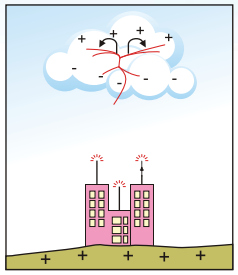

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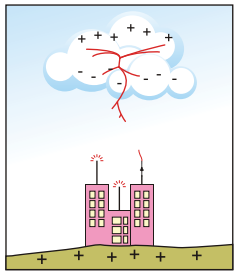

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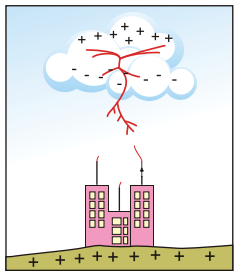


ric charges
rge of the
.While this
e capture
from the
this event
tive canal-
arges may
ultrasonic
nd a direct current stroke that exists
vations that it is to the value of 100

the topics below generally.

3.1. Electrodynamic Effects

In case that a part of lightning current path is in the magnetic field of another part,major forces form.In result of this effect,events like bruise on thin antenna pipes,collision on parallel conductors,dismantling of conductive crochets occur.

3.2. Pressure and Sound Effect

By diminishing of this current,the pressure resulting from electrodynamic forces in the lightning canal forms thunders by expanding the air in the form of blast.This noise may create blast effect to people nearby.Events like breaking glass may be encountered.Forming rather huge and sudden expanding of heat energy is another cause of thunder.

3.3. Electrochemical Effect

As a result of electrolyte break-up, metals like iron, zinc, lead come out in huge current force.

3.4. Illuminating Effect

The conductive canal formed during the lightning discharge emits a very luminous light around.This light may form dazzle or temporary loss of vision in close distance.

3.5. Thermal Effect

Thermal Effect of the lightning discharge is to cause a thermal increase on conductors in which current flows.Although the current is at high values, a huge thermal increase doesn't turn out because of very short period.

4. LIGHTNING PROTECTION

It is beneficial to know that the lightning is a powerful electric current between a cloud and the earth and this current must discharge to the earth in the shortest and safe way. Therefore, the lightning protection systems must be installed on buildings.

Lightning protection is not only to protect a building from the direct strike of a lightning in deed.So,when the effects of a lightning are analyzed, it is seen that a substantial portion of existing damages (if there is no lightning protection system) originates from the direct effects of a lightning and the other part originates from indirect effects which the lightning has formed them after falling.For this reason,"Lightning Protection" can be examined under two topics generally.In the table below,some information about lightning protection systems has been given in detail.

PROTECTION OF LIGHTNING

EXTERNAL LIGHTNING PROTECTION | **INTERNAL LIGHTNING PROTECTION**

5. LIGHTNING PROTECTION REQUIREMENT LEVEL CALCULATION (*)

If a lightning protection system will be projected for an installation, the "lightning protection requirement level calculation" needs to be done primarily.Protection level must be chosen and projected according to this.

Lightning Protection Requirement Level Calculation is given below.

1. THE WIDTH, LENGTH AND HEIGHT OF A BUILDING AND THE HEIGHT OF THE LIGHTNING ROD FROM THE ROOF ARE DETERMINED :

a) LENGTH OF A BUILDING — a (meter)
b) WIDTH OF A BUILDING — b (meter)
c) THE HEIGHT OF THE LIGHTNING ROD FROM THE ROOF — h (meter)

2. C QUOTIENTS ARE CHOSEN FROM THE TABLES :
(An option is chosen from every table)

3. EFFECT EQUIVALENT FIELD IS CALCULATED : Ae

$$Ae = a \,.\, b + 6 \,.\, h \,.\, (a+b) + 9 \,.\, n \,.\, h^2$$

4. LIGHTNING DENSITY : Ng

$$Ng = 0{,}04 \,.\, Nk \,.\, 1{,}25$$

Nk : Number of days with lightning (Consult the map)

5. NUMBER OF LIGHTNING EXPECTED FOR THE INSTALLATION : Nd

$$Nd = Ng \,.\, Ae \,.\, C1 \,.\, 10\text{-}6$$

6. EXEMPLIFIED NUMBER OF LIGHTNING STROKE FOR THE INSTALLATION : Nc

$$Nc = 5{,}5 \,.\, 10\text{-}3 \,/\, C$$

$$C = C2 \,.\, C3 \,.\, C4 \,.\, C5$$

(*) If you want to calculate for protection automaticly from lightning, you can click "www.livaparatoner.com" adress for calculation screen.

C1 TABLE (ENVI
Surrounded by structures or trees of the
Surrounded by smaller structures
Isolated no other structures within a dis
Isolated on top of a hill

C2 TABLE (STR
Structure metallic / Roof metallic
Structure metallic / Roof with tile
Structure metallic / Roof flammable
Structure brick, concrete / Roof metallic
Structure brick, concrete / Roof with til
Structure brick, concrete / Roof flamma
Structure flammable / Roof metallic
Structure flammable / Roof with tile
Structure flammable / Roof flammable

C3 TABLE (ST
No volue and non flammable
Standart volue or normally flamble
High volue particulary flammable
Exceptional value, irreplaceable or high

C4 TABLE (STR
Unoccupied
Normally occupied
Difficult evacuation

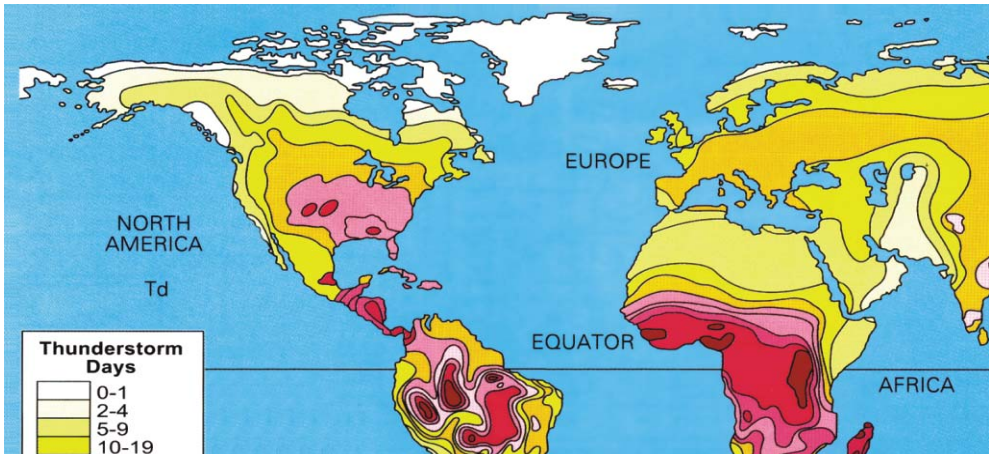
C5 TABLE (CONSIDERABLE O
Service continuity not required
Service continuity required without con
Consequences on the environment

CONCLUSION:

- If Nd ≤ Nc Protection is opsional
- If Nd > Nc Protection is neces

appropriate level (You can calculate l
You can calculate level of protection v

EFFICIENCY
E>0,98
0,95<E≤ 0,98
0,90<E≤ 0,95
0,80<E≤ 0,90
E ≤ 0,80



ECTION SYSTEM: It is the Lightning
ightning strike directly and allows it to

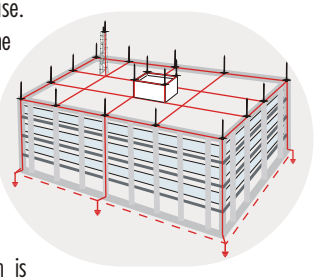
Systems
e the oldest of the Lightning Protection
the lightning and are not of using sharp

passive lightning conductor systems.

made by using Franklin Rod; later on,
1884's and frequently used Faraday

pturing Rod)
Rod, the capturing discharge made by
sharp tip performs the protection only
to the length of the Franklin Rod.
sing sharp rods and without the feature
he oldest in the Lightning Protection
on this matter were done by Franklin in
he first lightning protection system by
arp tip on the structure required to be
o the ground with conductors.

1.2. Faraday Cage
n Faraday determined the electrical
ero in a conductive cage with studies
he did, Melsens launched the idea of
taking the volume needs to be
protected in a conductive cage. This
cage system which would be set up
a copper cage by coiling with good
ally on the roof and side walls. Vertical
ssions on the roof and the conductors
se.



n is
em loses its
pplication and wrong application made

houghts like using fewer conductors,

4.1.2.1. Radioactive Lightning Rods

By using Ra-226 and Am-241 radioactive elements on their heads, these lightning rods attract strikes towards themselves through the ions that are emitted by these elements.

At the present day, the production and assembly of the Radioactive Lightning Rods are stopped in our country and in developed countries because of falling, losing or being stolen of the radioactive materials they have in their heads due to natural disasters like earthquake, fire and flood and with the concern that their radioactive effect affects negatively the life of living organisms for a long time especially concerning the potential risks they make on next generation. Besides, the companies that produce radioactive elements say that the ion emitting life of these elements is 10 years in the best weather conditions (dry, not wearing).However, it is known that the harms of the rays which are emitted by radioactive elements (as for lightning rods) to the health of human beings and other organisms continue rather long years.

During assembly and periodic maintenance of them, it is required to be careful even while getting close and absolutely not to touch with bare hands and if possible these rods require to be got close with special hand gloves and suits but unfortunately in our country, they behave unconsciously without paying attention to these matters and from time to time some undesirable events may be lived.

Using of Radioactive Lightning Rods is prohibited in Europe and in the USA since 1982 and in our country; first, the import of elements that are used in production of radioactive lightning rods is prohibited with the official paper of TAEK dated on 31 MARCH 2000 and then in 2001, use of lightning rod with Radium-226 element is prohibited. Following this progress, the prohibition of AM-241 will become true in near future.

WARNING: If there is a "Radioactive Lightning Rod" in your installation, contact with an authorized firm absolutely. If the lightning rod in your installation is with the source of Radium-226 one, you need to give it back to TAEK as soon as possible.

TAEK (Turkish Atomic Energy Agency) is the only association to collect and abolish the radioactive lightning rods and you need to get the firms with the certificate of "Radioactive Sourced Lightning Rod Disassembling License" and authorization from TAEK to disassemble by making source determination.

INFO: Our Company is one of the authorized firms on this matter in our country. You may contact with our firm for your demands on this matter.

NOT: You may have extensive information related to radioactive lightning rods and notices of TAEK at our web address (www.livaparatoner.com).

4.1.2.2. Active Lightning Rods

Active Lightning Rods get their energy from the changes of electrostatic field density forming in the air. This structure makes a natural generator charging dependently on electrical field around itself.

It is a protection system whose active head is made up of three parts. These are;

- Franklin Rod
- Electro Atmospheric Ion Generator
- Grounding Electrode

ods. You can see all models from this catalogue. They are;

ghtning Rod Head" operates on the principle of Early Streamer Emision (E.S.E.). Metal parts ut of stainless steel against (Inox) chemical interaction and corrosion. This feature provides against heavy natural conditions for a long time as it is on the first day.

50 LIVA Active Lightning Rod Head with Electro atmospheric Field Effect works on the principal ts its energy from the changes of electrostatic and electromagnetic field density that form in picture- is grounded, insulated from the middle shaft, and on the contrary it has a High-tension

er in the atmoshere rises up to 10 – 20 kV/m in conditions orage clouds form with dense hes values at which lightning may fall because of orage clouds (above 50 kV/m), lightning rtesy of Electroatmospheric Energy Block and starts to form high-tension strokes in quick scharging into the ion tunnel by way of 3 ion electrodes. Ions spreading towards orage loaded harge path between the head and a cloud. When electric field diffusion has changed or electric charge strokes that are rising from the air terminal and lowering from the cloud increase by charge strokes that provide the lightning rod to catch the lightning and it proceeds until the

tivates the electric field power between the cloud and the earth just in case of lightning risk by This structure provides the energy block to send out ions at high level. After the catching Rod gets ready to start a new cycle.

n used in lightning rod head by thinking of heavy natural conditions.
tainless steel 24 mm.in diameter portion that intercepts the lightning. Electroatmospheric igh-tension stroke generator that is dependant from the center shaft.
odes that high-tension strokes which are produced in the high-tension stroke generator are

: A stainless steel 24 mm.in diameter portion that transfers the electric load formed by ers and ground.
on that lightning rod is connected to a 2''pipe without using any apparatus.

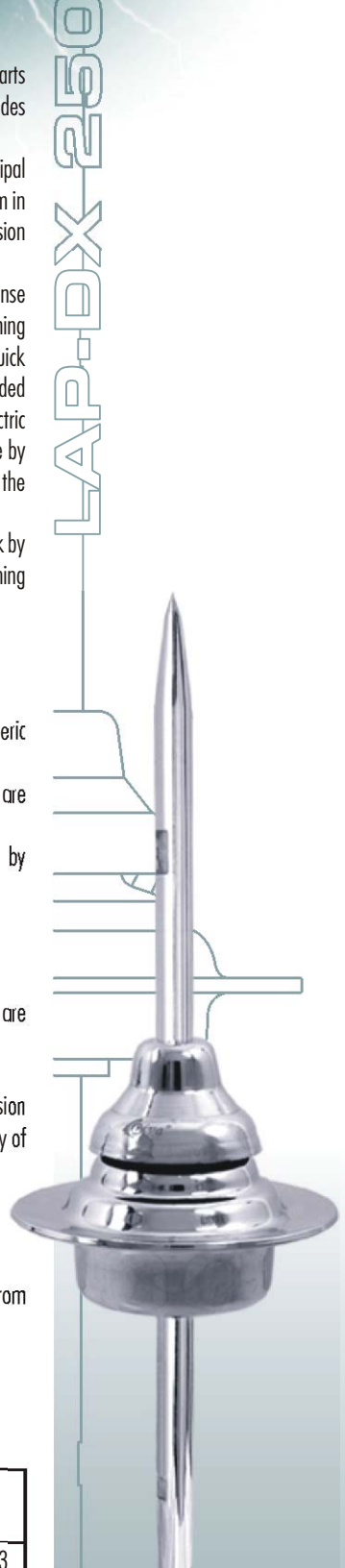
s proved its quality by being undergone various tests in a laboratory environment. Tests are

ng Time (Δt) Test of the Lightning Rod: The lightning rod's lightning tension t) has been tested by NFC 17-102 (Appendix C) standards in the High-tension Laboratory of lovember 2008 and the lightning rod has been certified to be suitable related standards.

"GOST" certificate. Date is 12 September 2008.
" that EC Declaration of Conformity certificate. Date is 23 February 2009.
Warranty" certificate from the Ministry of Industry and Trade. To read the information from ure or here. (For Türkiye)

DEVICE

PACKING DIMENSIONS	Δt Early Streamer Warning Time (By NFC 17-102 Standard) (*)	Protection Diameter (By NFC 17-102 Standard) (**)		
		Level-1	Level-2	Level-3



LIVA "LAP AX-210" Active Lightning Rod Head" operates on the principle of E that are bearing the lightning were made out of stainless steel against (Inox) chemical inte solidity and endurance for the lightning rod against heavy natural conditions for a long time as

WORKING SYSTEM: LAP AX-210 LIVA Active Lightning Rod Head with Electro at of Early Streamer Emission (E.S.E.) and gets its energy from the changes of electrostatic an the air. The air terminal -as it is seen on the picture- is grounded, insulated from the middle sha Stroke Generator with free potential.

OPERATION : Electric field power in the atmoshere rises up to 10 – 20 kV/m i electric charge. When the electric field reaches values at which lightning may fall because of rod air terminal stores this energy by courtesy of Electroatmospheric Energy Block and st succession. These strokes expose ions by discharging into the ion tunnel by way of 3 ion electr clouds from the ion tunnel form a leading charge path between the head and a cloud. When e field power has increased, the leading discharge strokes that are rising from the air termina growing. These strokes are the leading discharge strokes that provide the lightning rod to c lightning will have been formed.

LAP AX-210 Active Lightning Rod activates the electric field power between the cloud a courtesy of high-tension stroke generator. This structure provides the energy block to send process has occured, LIVA Active Lightning Rod gets ready to start a new cycle.

FEATURES OF THE DEVICE

Metal Used: "Stainless Steel" has been used in lightning rod head by thinking of heavy n
Lightning Intercepting Rod: A stainless steel 24 mm.in diameter portion that in
Energy Block: The portion within the high-tension stroke generator that is dependant fro
Ion Electrodes: These are the electrodes that high-tension strokes which are produce provided by them to form ion.
Earthing Connection Electrode: A stainless steel 24 mm.in diameter portion lightning through terminal blocks to conducters and ground.
Pipe Connection Adapter: A portion that lightning rod is connected to a 2''-pipe wit

TESTS AND CERTIFICATES

LAP AX-210 Active Lightning Rod has proved its quality by being undergone various t given below.

Standard Lightning Strike Tension Jumping Test of the Lightning Ro standard strikes lightning tension tested with 1020 -1065 kV, (+) positive and (-) negati Electric-Electronic Section on July 01, 2003 and the lightning rod has been suitable related sta
Lightning Strike Tension Jumping Time (Δt) Test of the Lightning jumping (Early Streamer Warning) time (Δt) has been tested by NFC 17-102 (Appendix C) METU Electric-Electronic Section on March 15-20, 2007 and the lightning rod has been certifie
Strike Tension High Current Strike (Short Circuit kA) Test of the Lig tested with 25kA-current strikes in the High-tension Laboratory of METU Electric-Electronic S certified that there are no changes or failures in its features.
Gost Certificate: Lightning Rod have "GOST" certificate. Date is 12 September 2008.
CE Certificate: Lightning Rod have "CE" that EC Declaration of Conformity certificate. Dat
Warranty Period: It has *"30 Years Warranty"* certificate from the Ministry of Indust the catalogue, click on the lightning rod picture or here. (For Türkiye)

PHYSICAL CHARACTERICTICS OF DEVICE

ORDER CODE	DIMENSIONS	PACKING DIMENSIONS	Δt Early Streamer Warning (By NFC 17-102 Standard) (*
	Length:100 cm		

ghtning Rod Head" operates on the principle of Early Streamer Emision (E.S.E.). Metal parts ut of stainless steel against (Inox) chemical interaction and corrosion. This feature provides against heavy natural conditions for a long time as it is on the first day.

75 LIVA Active Lightning Rod Head with Electro atmospheric Field Effect works on the principal ts its energy from the changes of electrostatic and electromagnetic field density that form in picture- is grounded, insulated from the middle shaft, and on the contrary it has a High-tension

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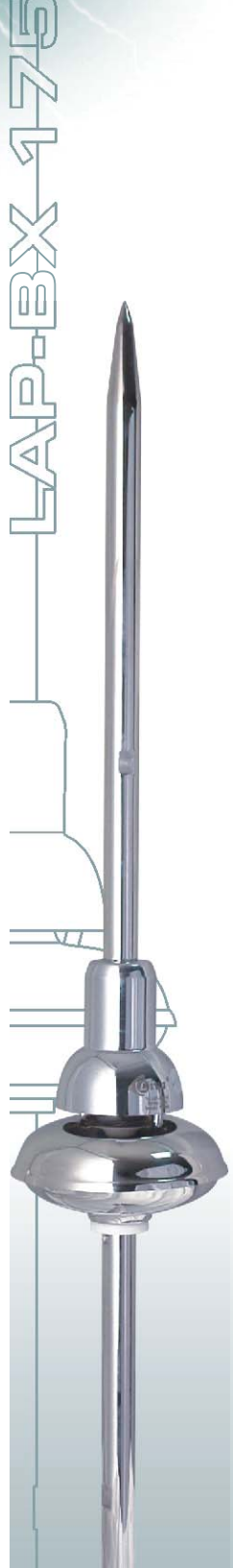
: A stainless steel 24 mm.in diameter portion that transfers the electric load formed by ers and ground.
on that lightning rod is connected to a 2''-pipe without using any apparatus.

s proved its quality by being undergone various tests in a laboratory environment. Tests are

ng Time (Δt) Test of the Lightning Rod: The lightning rod's lightning tension t) has been tested by NFC 17-102 (Appendix C) standards in the High-tension Laboratory of 5-20, 2007 and the lightning rod has been certified to be suitable related standards.
ike (Short Circuit kA) Test of the Lightning Rod: The lightning rod has been h-tension Laboratory of METU Electric-Electronic Section on June 15, 2007 and it has been s in its features.
"GOST" certificate. Date is 12 September 2008.
" that EC Declaration of Conformity certificate. Date is 23 February 2009.
Warranty" certificate from the Ministry of Industry and Trade. To read the information from ure or here. (For Türkiye)

DEVICE

PACKING DIMENSIONS	Δt Early Streamer Warning Time (By NFC 17-102 Standard) (*)	Protection Diameter (By NFC 17-102 Standard) (**)		
		Level-1	Level-2	Level-3



LIVA "LAP BX-125" Active Lightning Rod Head" operates on the principle of Ea
that are bearing the lightning were made out of stainless steel against (Inox) chemical inte
solidity and endurance for the lightning rod against heavy natural conditions for a long time as

WORKING SYSTEM: LAP BX-125 LIVA Active Lightning Rod Head with Electro atm
of Early Streamer Emission (E.S.E.) and gets its energy from the changes of electrostatic an
the air. The air terminal -as it is seen on the picture- is grounded, insulated from the middle sha
Stroke Generator with free potential.

OPERATION : Electric field power in the atmoshere rises up to 10 – 20 kV/m i
electric charge. When the electric field reaches values at which lightning may fall because of
rod air terminal stores this energy by courtesy of Electroatmospheric Energy Block and st
succession. These strokes expose ions by discharging into the ion tunnel by way of 3 ion electr
clouds from the ion tunnel form a leading charge path between the head and a cloud. When e
field power has increased, the leading discharge strokes that are rising from the air termina
growing. These strokes are the leading discharge strokes that provide the lightning rod to c
lightning will have been formed.

LAP BX-125 Active Lightning Rod activates the electric field power between the cloud a
courtesy of high-tension stroke generator. This structure provides the energy block to send
process has occured, LIVA Active Lightning Rod gets ready to start a new cycle.

FEATURES OF THE DEVICE

Metal Used: "Stainless Steel" has been used in lightning rod head by thinking of heavy n
Lightning Intercepting Rod: A stainless steel 24 mm.in diameter portion that in
Energy Block: The portion within the high-tension stroke generator that is dependant fro
Ion Electrodes: These are the electrodes that high-tension strokes which are produce
provided by them to form ion.
Earthing Connection Electrode: A stainless steel 24 mm.in diameter portion
lightning through terminal blocks to conducters and ground.
Pipe Connection Adapter: A portion that lightning rod is connected to a 2''pipe with

TESTS AND CERTIFICATES

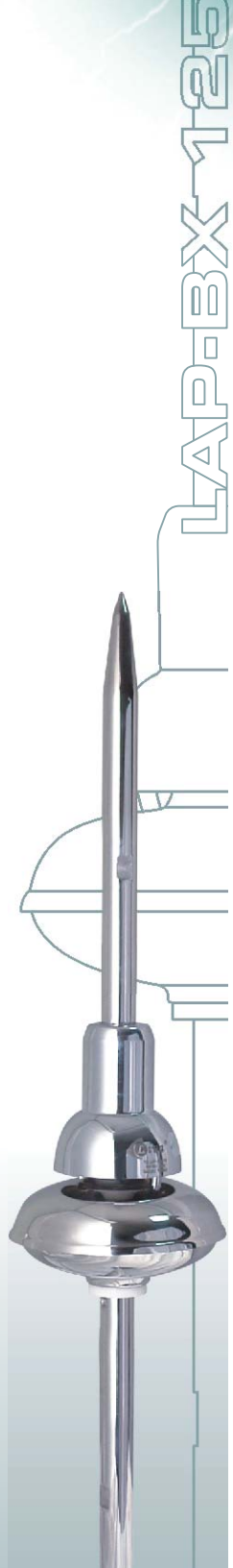
LAP BX-125 Active Lightning Rod has proved its quality by being undergone various t
given below.

Lightning Strike Tension Jumping Time (Δt) Test of the Lightning R
jumping (Early Streamer Warning) time (Δt) has been tested by NFC 17-102 (Appendix C)
METU Electric-Electronic Section on 15-20 November 2008 and the lightning rod has been cer

Gost Certificate: Lightning Rod have "GOST" certificate. Date is 12 September 2008.
CE Certificate: Lightning Rod have "CE" that EC Declaration of Conformity certificate. Dat
Warranty Period: It has *"30 Years Warranty"* certificate from the Ministry of Indust
the catalogue, click on the lightning rod picture or here. (For Türkiye)

PHYSICAL CHARACTERICTICS OF DEVICE

ORDER CODE	DIMENSIONS	PACKING DIMENSIONS	Δt Early Streamer Warning T (By NFC 17-102 Standard) (*)
	Length: 80 cm		



ghtning Rod Head" operates on the principle of Early Streamer Emision(E.S.E.).Metal parts out of stainless steel against (Inox) chemical interaction and corrosion.This feature provides against heavy natural conditions for a long time as it is on the first day.

70 LIVA Active Lightning Rod Head with Electro atmospheric Field Effect works on the principal ets its energy from the changes of electrostatic and electromagnetic field density that form in picture- is grounded, insulated from the middle shaft,and on the contrary it has a High-tension

er in the atmoshere rises up to 10 – 20 kV/m in conditions orage clouds form with dense es values at which lightning may fall because of orage clouds (above 50 kV/m), lightning rod sy of Electroatmospheric Energy Block and starts to form high-tension strokes in quick scharging into the ion tunnel by way of 3 ion electrodes.Ions spreading towards orage loaded harge path between the head and a cloud. When electric field diffusion has changed or electric harge strokes that are rising from the air terminal and lowering from the cloud increase by charge strokes that provide the lightning rod to catch the lightning and it proceeds until the

ivates the electric field power between the cloud and the earth just in case of lightning risk by his structure provides the energy block to send out ions at high level.After the catching process eady to start a new cycle.

n used in lightning rod head by thinking of heavy natural conditions.
tainless steel 20 mm.in diameter portion that intercepts the lightning. Electroatmospheric igh-tension stroke generator that is dependant from the center shaft.
odes that high-tension strokes which are produced in the high-tension stroke generator are

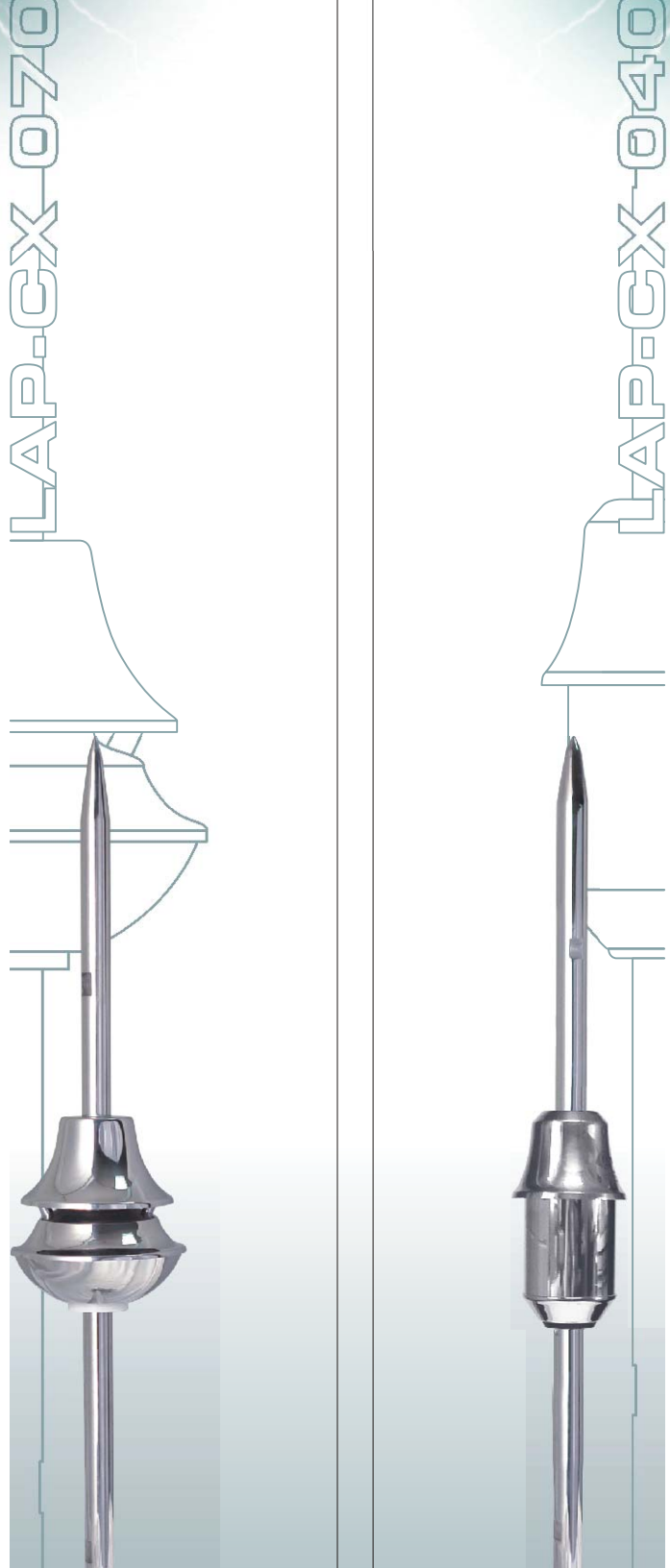
: A stainless steel 20 mm.in diameter portion that transfers the electric load formed by ters and ground.
on that lightning rod is connected to a 2''-pipe without using any apparatus.

s proved its quality by being undergone various tests in a laboratory environment.Tests are

ing Time (Δt) Test of the Lightning Rod: The lightning rod's lightning tension t) has been tested by NFC 17-102 (Appendix C) standards in the High-tension Laboratory of 5-20, 2007 and the lightning rod has been certified to be suitable related standards.
ike (Short Circuit kA) Test of the Lightning Rod: The lightning rod has been h-tension Laboratory of METU Electric-Electronic Section on June 15, 2007 and it has been s in its features.
'GOST" certificate. Date is 12 September 2008.
" that EC Declaration of Conformity certificate. Date is 23 February 2009.
Warranty" certificate from the Ministry of Industry and Trade. To read the information from ure or here. (For Türkiye)

DEVICE

PACKING DIMENSIONS	Δt Early Streamer Warning Time (By NFC 17-102 Standard) (*)	Protection Diameter (By NFC 17-102 Standard) (**)		
		Level-1	Level-2	Level-3



LIVA "LAP CX-040" Active Lightning Rod Head" operates on the principle of E that are bearing the lightning were made out of stainless steel against (Inox) chemical inte solidity and endurance for the lightning rod against heavy natural conditions for a long time as

WORKING SYSTEM: LAP CX-040 LIVA Active Lightning Rod Head with Electro atm of Early Streamer Emission (E.S.E.) and gets its energy from the changes of electrostatic an the air.The air terminal -as it is seen on the picture- is grounded, insulated from the middle sha Stroke Generator with free potential.

OPERATION : Electric field power in the atmoshere rises up to 10 – 20 kV/m i electric charge.When the electric field reaches values at which lightning may fall because of or air terminal stores this energy by courtesy of Electroatmospheric Energy Block and sta succession.These strokes expose ions by discharging into the ion tunnel by way of 3 ion elect clouds from the ion tunnel form a leading charge path between the head and a cloud. When e field power has increased, the leading discharge strokes that are rising from the air termina growing.These strokes are the leading discharge strokes that provide the lightning rod to c lightning will have been formed.

LAP CX-040 Active Lightning Rod activates the electric field power between the cloud a courtesy of high-tension stroke generator.This structure provides the energy block to send out has occured,LIVA Active Lightning Rod gets ready to start a new cycle.

FEATURES OF THE DEVICE

Metal Used: "Stainless Steel" has been used in lightning rod head by thinking of heavy n
Lightning Intercepting Rod: A stainless steel 20 mm.in diameter portion that i
Energy Block: The portion within the high-tension stroke generator that is dependant fro
Ion Electrodes: These are the electrodes that high-tension strokes which are produce provided by them to form ion.
Earthing Connection Electrode: A stainless steel 20 mm.in diameter portion lightning through terminal blocks to conducters and ground.
Pipe Connection Adapter: A portion that lightning rod is connected to a 2''-pipe wit

TESTS AND CERTIFICATES

LAP CX-040 Active Lightning Rod has proved its quality by being undergone various given below.
Lightning Strike Tension Jumping Time (Δt) Test of the Lightning R jumping (Early Streamer Warning) time (Δt) has been tested by NFC 17-102 (Appendix C) METU Electric-Electronic Section on 15-20 November 2008 and the lightning rod has been cer

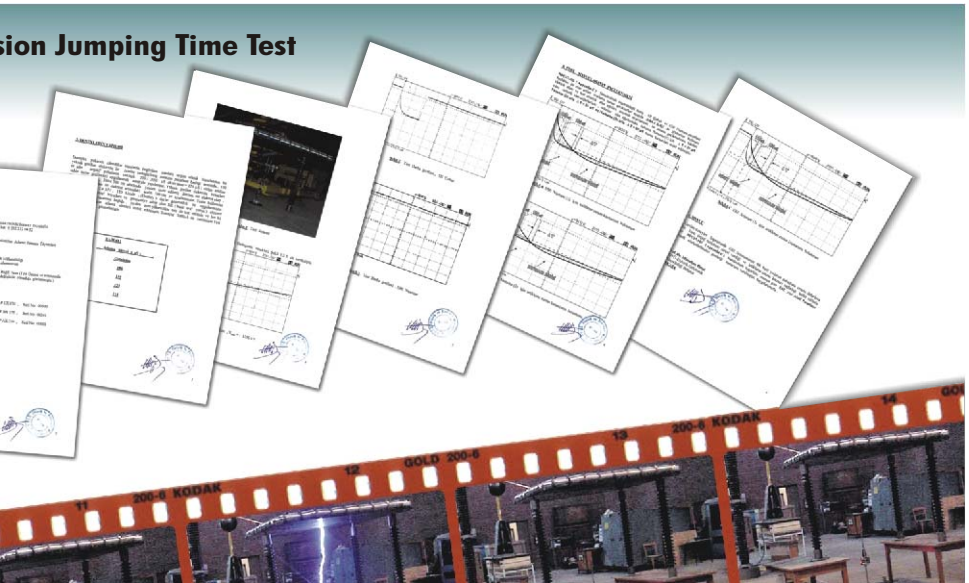
Gost Certificate: Lightning Rod have "GOST" certificate. Date is 12 September 2008.
CE Certificate: Lightning Rod have "CE" that EC Declaration of Conformity certificate. Dat
Warranty Period: It has *"30 Years Warranty"* certificate from the Ministry of Indust the catalogue, click on the lightning rod picture or here. (For Türkiye)

PHYSICAL CHARACTERICTICS OF DEVICE

ORDER CODE	DIMENSIONS	PACKING DIMENSIONS	Δt Early Streamer Warning T (By NFC 17-102 Standard) (*)
	Length: 70 cm		

LIVA LIGHTNING RODS
rike Test

sion Jumping Time Test



CALCULATION FOR PROTECTION FIELDS OF ACTIVE LIGHTNING RODS

The protection fields of Active Lightning Rods can be calculated with the formula below.

$Rp=\sqrt{h(2D-h)}+\Delta L\ (2D+\Delta L)\ h \geq 5m$

In this formula;

Rp: radius of protection in a horizontal plane situated at a vertical distance h of the rod.

h: height of the top of the point of the rod above the area to protect.

D: Lightning advancement step or leaping interval of lightning along the way.

For this reason it is the protection level parameter.

"D" value;

·For level I protection D=20 m

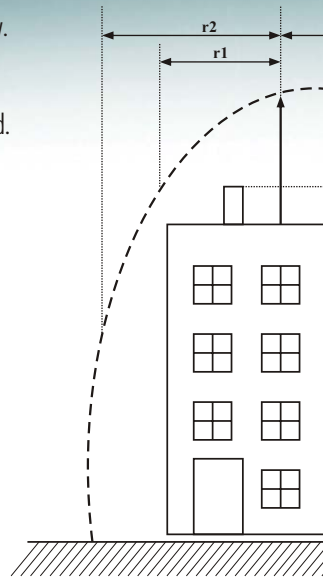
·For level II protection D=45 m

·For level III protection D=60 m

DL: is the distance to catch the lightning in ΔT period.

[ΔL (m) = V (m/μs). ΔT (μs) (V=1m/ μs)]

ΔT: is early ionization time period.



PROTECTION LEVEL

According to NFC 17-102 and UNE 21186-96 standards

Protection Levels;

Level-1: High Protection

Level-2: Medium Protection

Level-3: Standard Protection

ACTIVE LIGHTNING PROTECTION SYSTEMS CALCULATION OF PROTECTIVE AREA

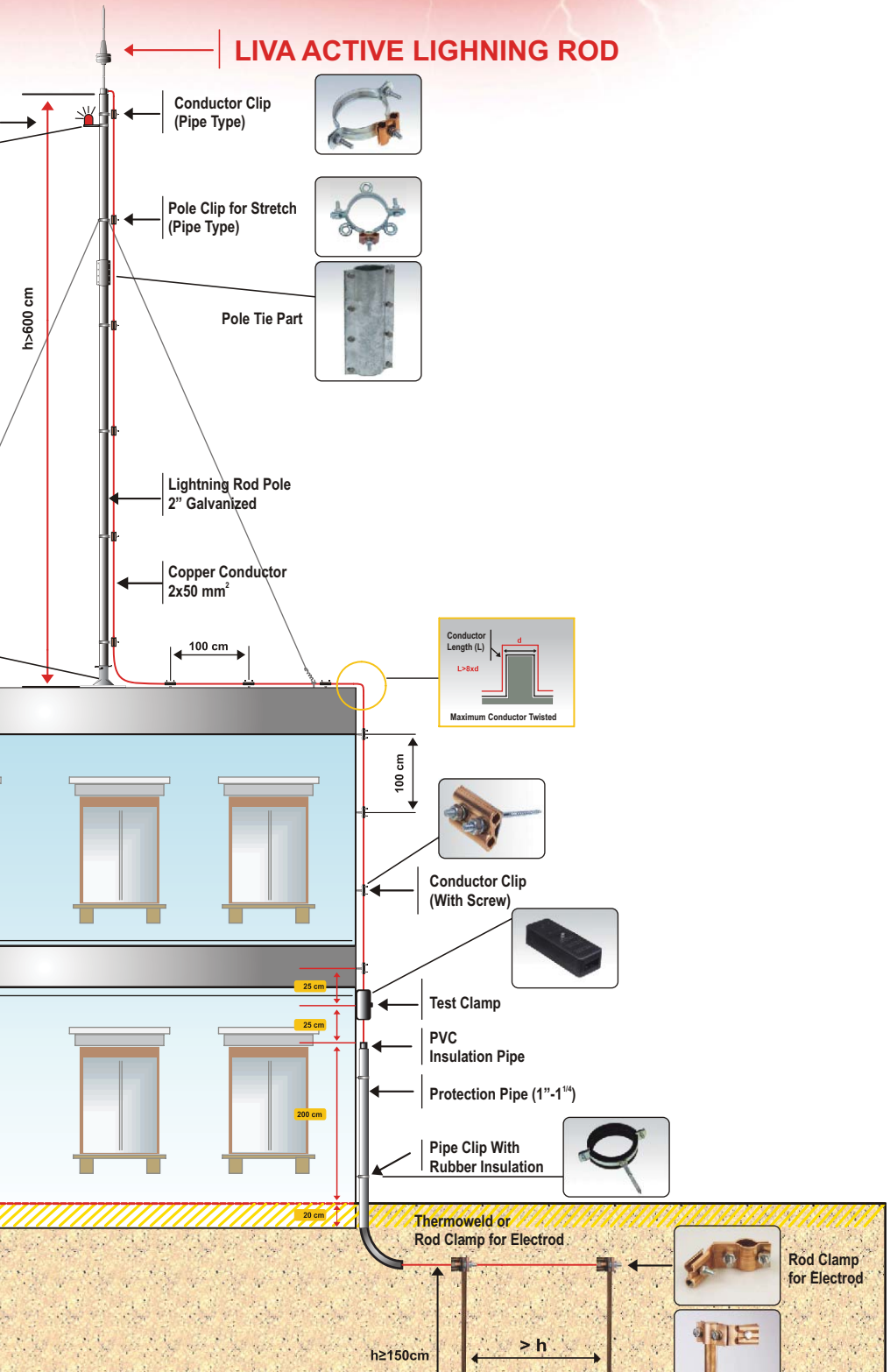
$Rp2=H.(2D-H)+\Delta L(2D+\Delta L) \quad H \geq 5$ meter

LIVA ACTIVE LIGHTNING PROTECTION SYSTEMS CALCULATION OF PROTECT

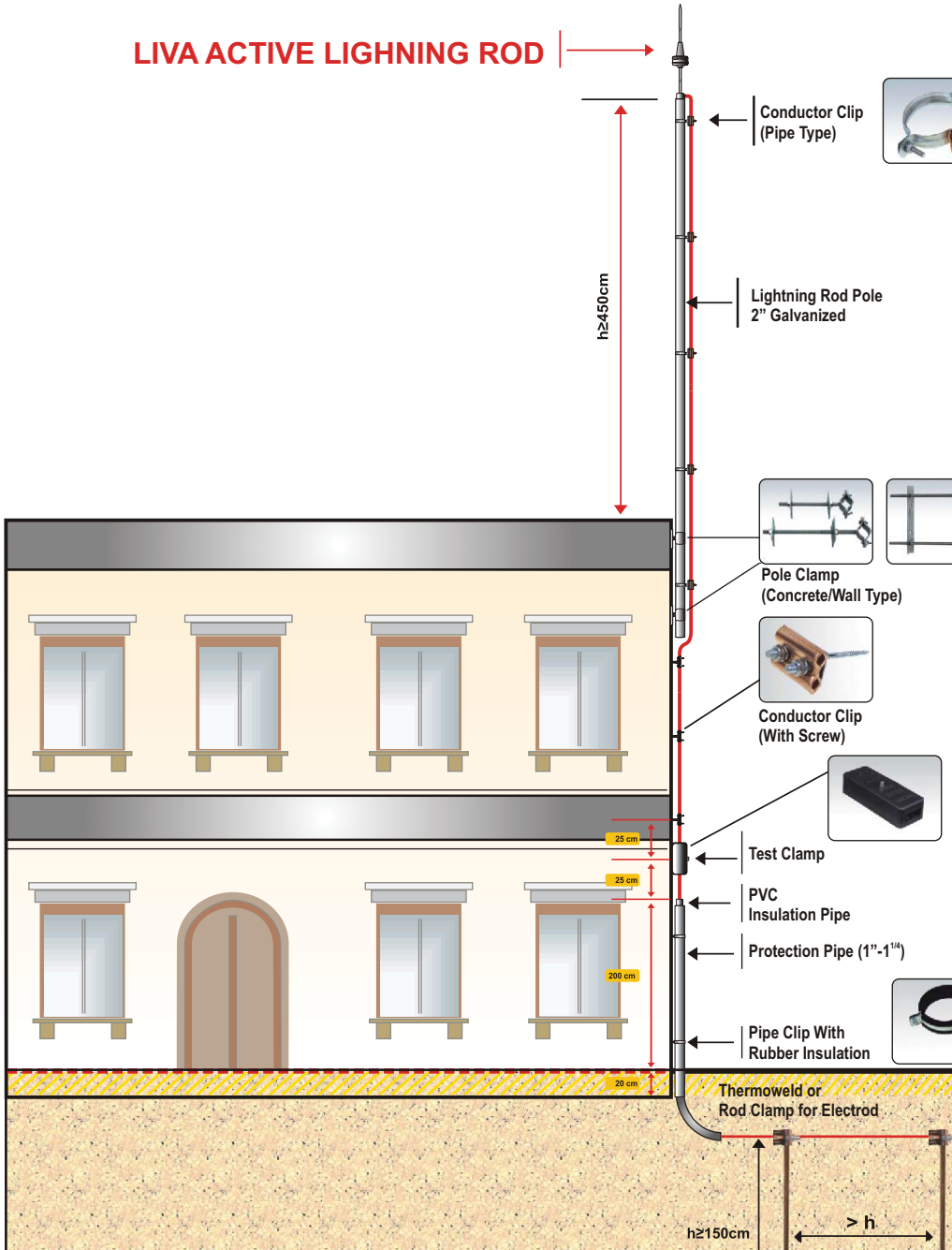
Protection Level		Level - 1						Level - 2						
Type of Lightning Rod		LAP-AX 210	LAP-BX 175	LAP-BX 125	LAP-CX 070	LAP-CX 040	LAP-DX 250	LAP-AX 210	LAP-BX 175	LAP-BX 125	LAP-CX 070	LAP-CX 040	LAP-DX 250	LAP-AX 210
		Protection Area Radius (m)						Protection Area Radius (m)						P
Pole Length (m)	4	100	73	57	47	39	113	120	91	74	64	53	130	130
	5	101	73	58	48	39	114	121	92	75	65	54	131	131
	6	101	74	58	49	40	115	121	92	76	65	54	131	131
	8	102	74	59	50	41	115	122	93	77	66	55	132	132
	10	102	74	59	50	41	116	122	94	78	67	57	133	133
	15	102	75	60	51	42	116	123	95	80	70	60	133	135
	20	102	75	60	51	42	118	125	97	81	72	62	135	136

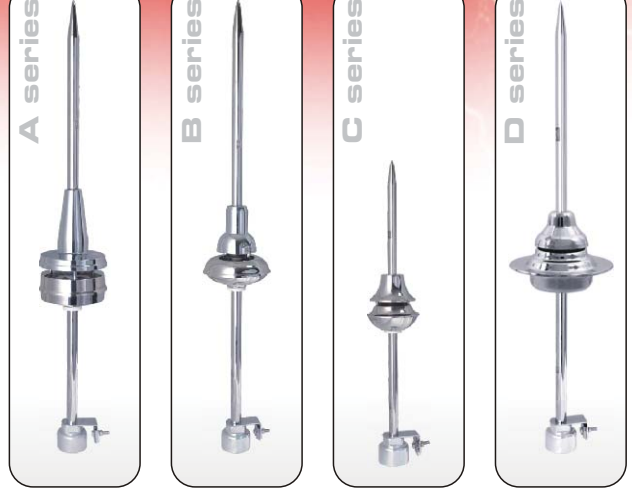

MENDERES

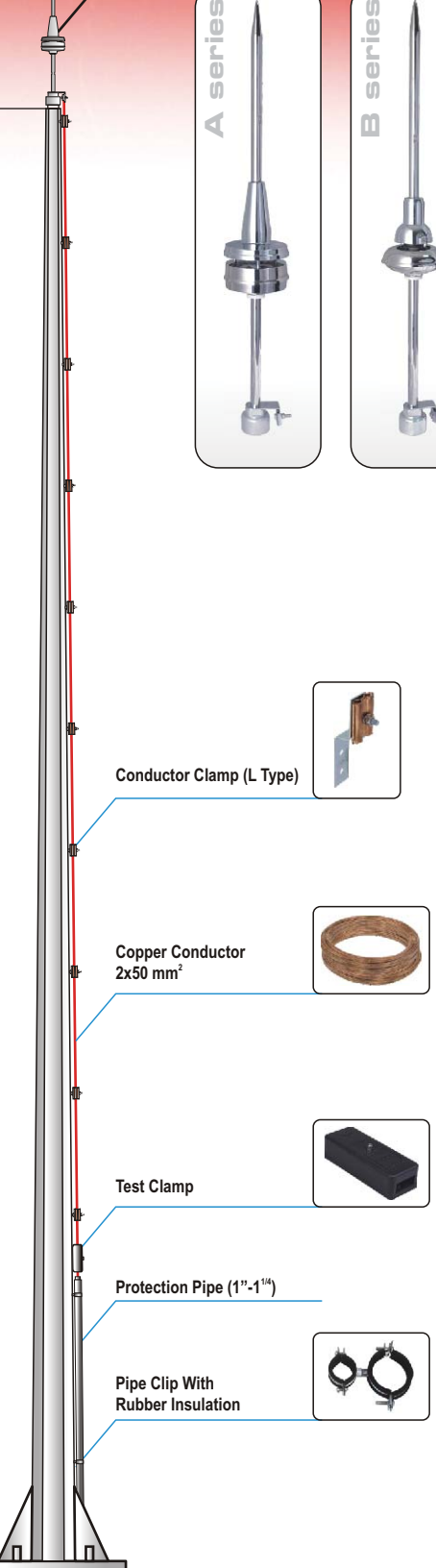
LIVA ACTIVE LIGHNING ROD



LIVA ACTIVE LIGHNING ROD







Conductor Clamp (L Type)

Copper Conductor
2x50 mm^2

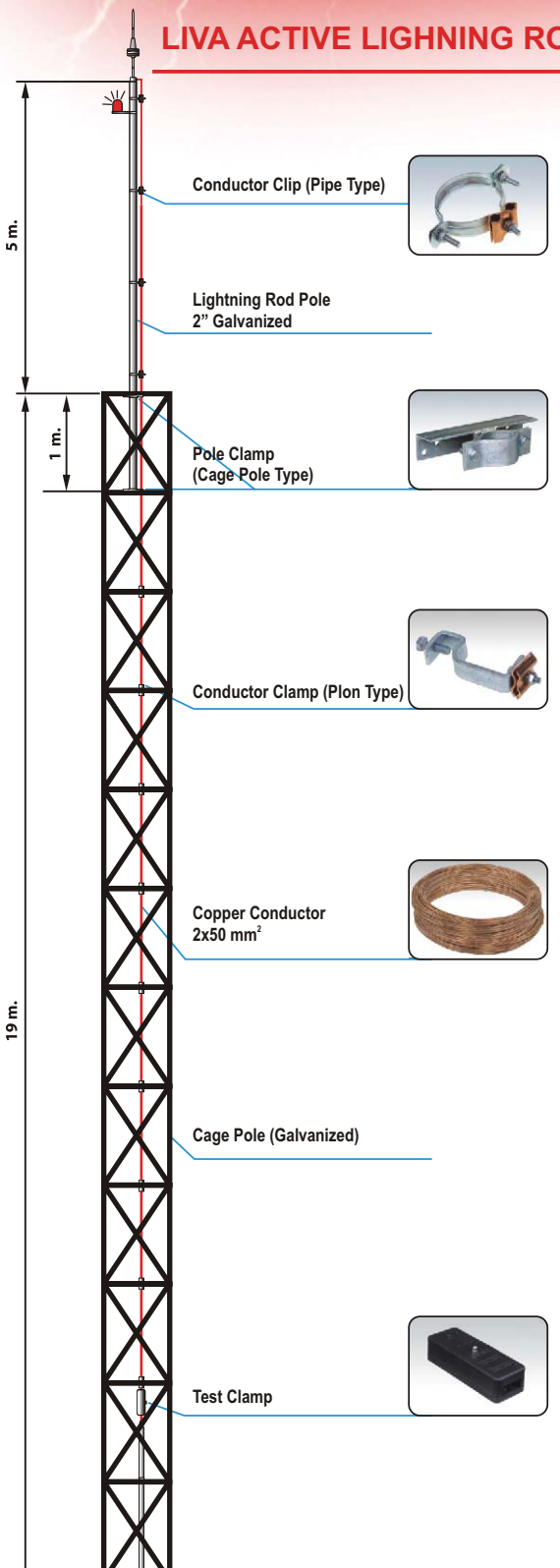
Test Clamp

Protection Pipe (1”-1$^{1/4}$)

Pipe Clip With
Rubber Insulation

Ap

LIVA ACTIVE LIGHNING ROD



Conductor Clip (Pipe Type)

Lightning Rod Pole
2” Galvanized

Pole Clamp
(Cage Pole Type)

Conductor Clamp (Plon Type)

Copper Conductor
2x50 mm^2

Cage Pole (Galvanized)

Test Clamp