ELECTROWELD ®

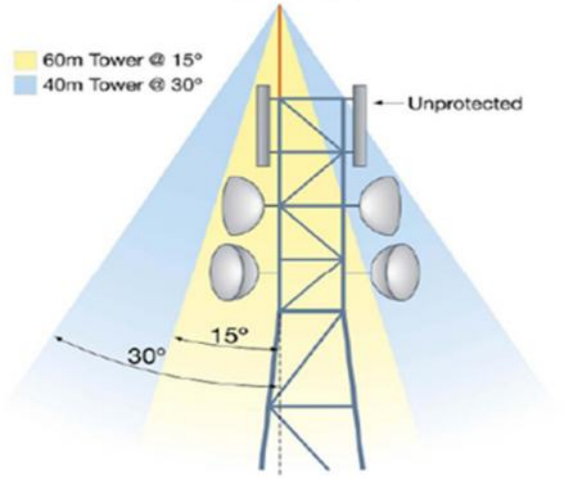
PARARRAYOS FRANKLIN

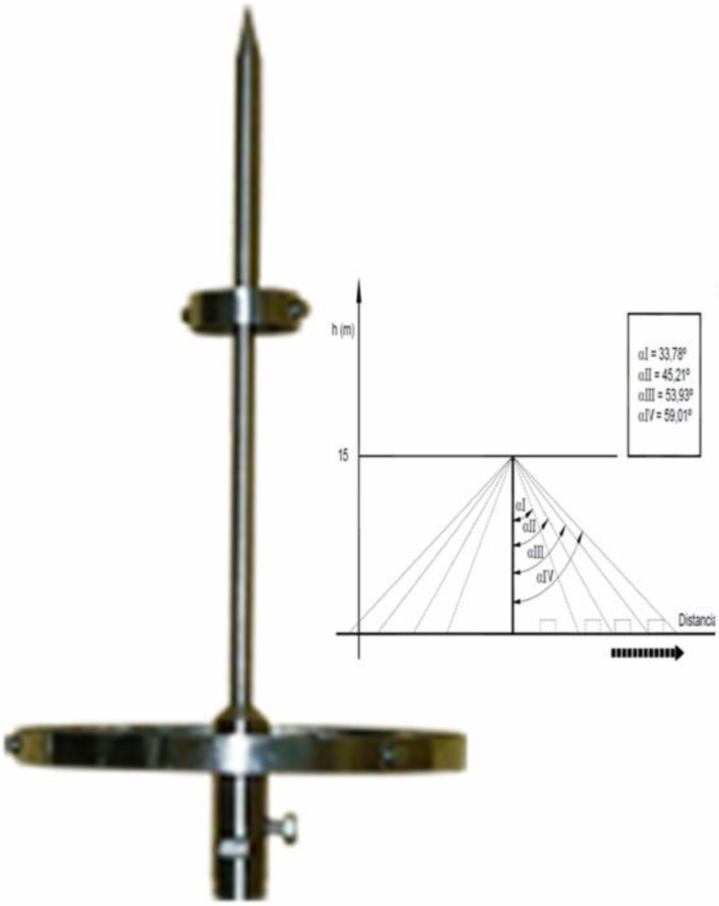
PROME

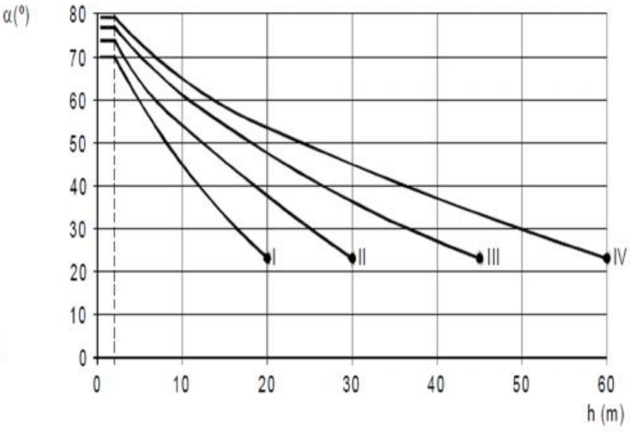
MATERIAL:	SS
CORRIENTE CONTINUA:	30 Ka
ACABADO:	NATURAL
DIAM. PUNTA CENTRAL:	1 X 5/8”
ALTURA PUNTA CENTRAL:	20”
MASTIL GALVANIZADO:	1” X 46”
ALTURA TOTAL:	72” (1,80 MTS)
ACOPLE:	BASE ROSCADA - SS

COBERTURA:

ACORDE CON LO ESTABLECIDO EN LA NORMA IEC 62305


60m Tower @ 15°
40m Tower @ 30°
Unprotected
15°
30°


h (m)
15
αI = 33,78°
αII = 45,21°
αIII = 53,93°
αIV = 59,01°
αI
αII
αIII
αIV
Distancia



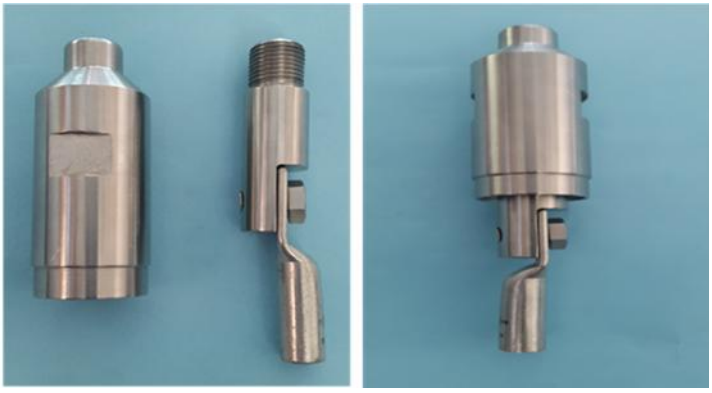
h: ALTURA DEL DISPOSITIVO DE CAPTURA ENCIMA DEL VOLUMEN A PROTEGER(altura Mínima 2,00 mts)

α:ANGULO DE PASO DEL VERTICE DEL CONO DE PROTECCION DEFINIENDO EL NIVEL DE PROTECCION.

I, II, III, IV
NIVELES DE PROTECCION DEFINIDOS SEGÚN NORMA NF C 17-100.

BASE DEL PARARRAYOS

ROSCA 1” NPT PARA ACOPLAR BASE A MASTIL RIGIDO 1”

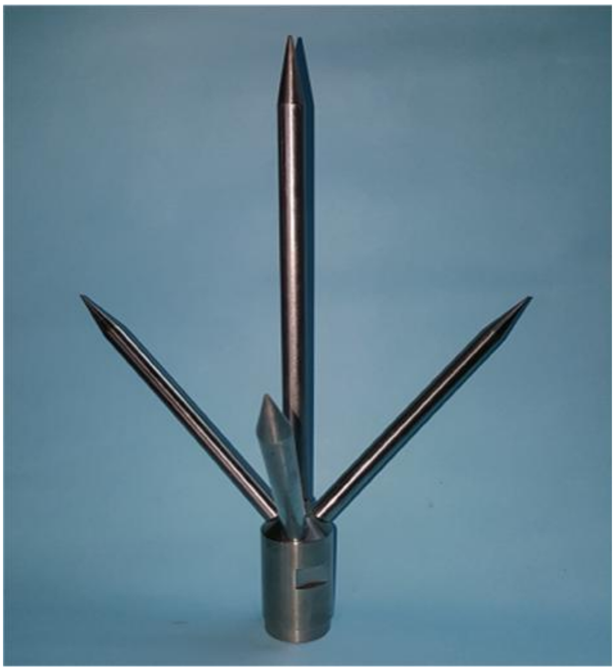


BASE, ACOPLE Y TERMINAL DE OJO PARA CONEXIÓN DE CABLE BAJANTE DE ENERGIA A TIERRA

HECHO EN ECUADOR

ELECTROWELD ®

PARARRAYOS TIPO FRANKLIN - 4 PUNTAS



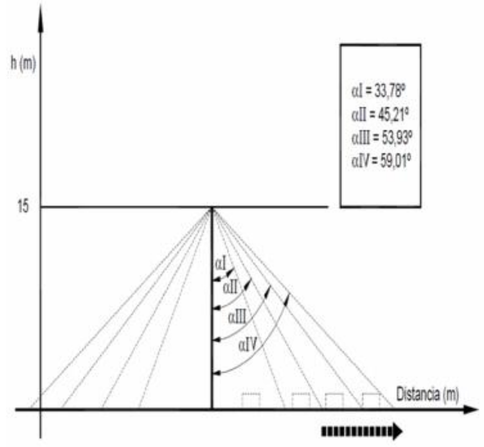
PARARRAYOS 4 PUNTAS – SS

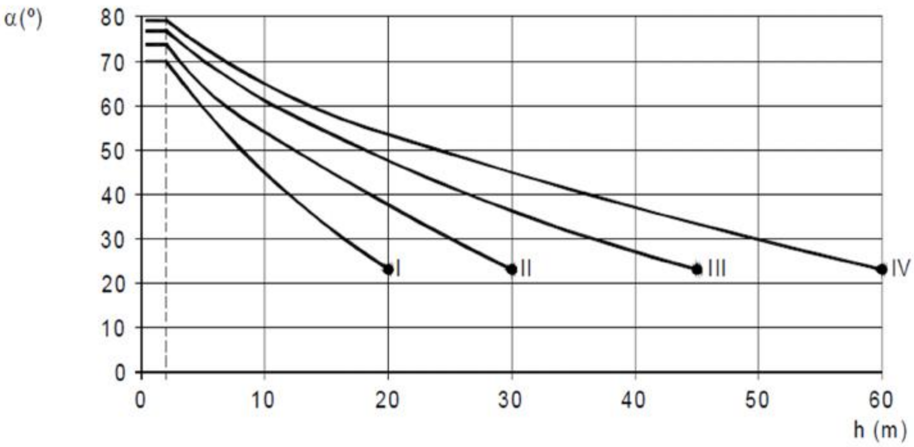
BASE ROSCA 1” NPT

ESPECIFICACIONES:

PUNTAS:	4
MATERIAL:	ACERO INOXIDABLE
ACABADO:	NATURAL
ALTURA TOTAL:	14-1/4”
DIAM. PUNTA CENTRAL:	1 X 1/2”
ALTURA PUNTA CENTRAL:	11”
DIAM. PUNTAS LATERALES:	3 X 1/2”
ALTURA PUNTAS LATERALES:	7.5”

COBERTURA: ACORDE CON LO ESTABLECIDO EN LA NORMA IEC 62305


h (m)
αI = 33,78º
αII = 45,21º
αIII = 53,93º
αIV = 59,01º
15
αI
αII
αIII
αIV
Distancia (m)



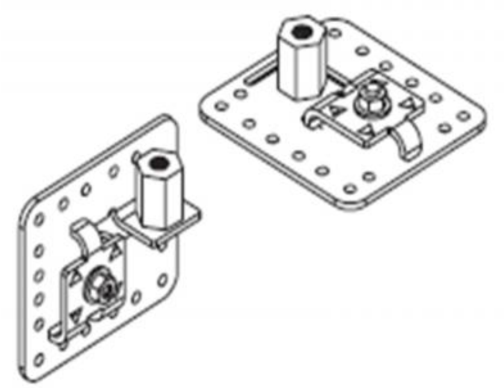
h: ALTURA DEL DISPOSITIVO DE CAPTURA ENCIMA DEL VOLUMEN A PROTEGER(altura Mínima 2,00 mts)

α: ANGULO DE PASO DEL VERTICE DEL CONO DE PROTECCION DEFINIENDO EL NIVEL DE PROTECCION.

I, II, III, IV: NIVELES DE PROTECCION DEFINIDOS SEGÚN NORMA NF C 17-100.

HECHO EN ECUADOR

BASE UNIVERSAL PARA PUNTAS FRANKLIN



- PARA SER USADA SOBRE SUPERFICIES PLANAS, VERTICALES O INCLINADAS
- DIMENSIONES 4” X 4” X ¼”
- MATERIAL BRONCE, COBRE Y ACERO INOXIDABLE CLASE 304
- PERFORACIONES DE ¼” PERIMETRALES PARA FACILIDAD DE INSTALACION CON PERNOS, REMACHES Y/O TORNILLOS
- SOPORTE EXAGONAL 1” CON ROSCA STANDARD SEGUN DIAMETRO DE LA PUNTA FRANKLIN A SER INSTALADA
- BASE DEL SOPORTE EXAGONAL TROQUELADA PARA AJUSTAR AL ANGULO (0 - 90°) REQUERIDO
- GRAPA PARA 2 CABLES A SUPERFICIE PLANA CON PERNO 1/4” SS
- PARA PUNTAS DIAMETRO ¾” USAR BASE PARA 5/8”

DIAMETRO PUNTA	BRONCE	COBRE	ACERO INOXIDABLE
3/8"	LPB 30238	LPC 30238	LPS 30238
1/2"	LPB 30212	LPC 30212	LPS 30212
5/8"	LPB 30258	LPC 30258	LPS 30258

PUNTAS FRANKLIN USO INDUSTRIAL

- PARA USO EN SISTEMAS DE PROTECCION ATMOSFERICA
- MATERIAL COBRE, COBRE NIQUELADO Y ACERO INOXIDABLE CLASE 304**
- LONGITUD Y DIAMETRO DE ACUERDO A REQUERIMIENTOS
- BASE ROSCADA SEGÚN DIAMETRO DE LA PUNTA*
- PUNTA CONICA

DIAMETRO PUNTA	LONGITUD	COBRE	COBRE NIQUELADO	ACERO INOXIDABLE
3/8"	10"	LPC201B	LPC201N	LPS201S
3/8"	12"	LPC202B	LPC202N	LPS202S
3/8"	15"	LPC203B	LPC203N	LPS203S
3/8"	18"	LPC204B	LPC204N	LPS204S
3/8"	24"	LPC205B	LPC205N	LPS205S
3/8"	30"	LPC206B	LPC206N	LPS206S
3/8"	36"	LPC207B	LPC207N	LPS207S
3/8"	48"	LPC208B	LPC208N	LPS208S

DIAMETRO PUNTA	LONGITUD	COBRE	COBRE NIQUELADO	ACERO INOXIDABLE
5/8"	18"	LPC244B	LPC244N	LPS244S
5/8"	24"	LPC245B	LPC245N	LPS245S
5/8"	36"	LPC246B	LPC246N	LPS246S
5/8"	48"	LPC247B	LPC247N	LPS247S
5/8"	60"	LPC248B	LPC248N	LPS248S
5/8"	72"	LPC249B	LPC249N	LPS249S

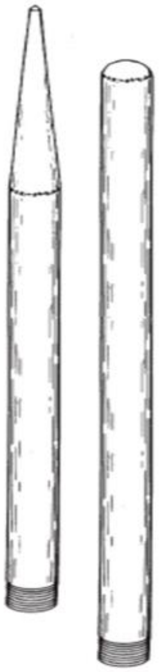
** **TODAS LAS PUNTAS SON CONSTRUIDAS BAJO REQUERIMIENTOS DE “*Underwrites Laboratories*”**

PARARRAYOS ERICO

PARARRAYOS & ACCESORIOS SYSTEM 2000 SERIES

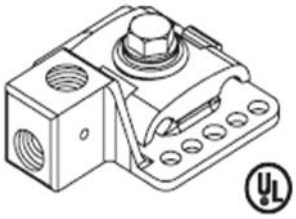
PARARRAYOS Ø 3/8" - 5/8" - 3/4"

No PARTE	Ø	LARGO (")	DESCRIPCION
LPC 201	3/8"	10	CLASE I
LPC 202	3/8"	12	CLASE I
LPC 203	3/8"	15	CLASE I
LPC 204	3/8"	18	CLASE I
LPC 205	3/8"	24	CLASE I
LPC 241	5/8"	10	CLASE I I
LPC 242	5/8"	12	CLASE I I
LPC 243	5/8"	15	CLASE I I
LPC 244	5/8"	18	CLASE I I
LPC 245	5/8"	24	CLASE I I
LPC 421	3/4"	18	CLASE INDUSTRIAL
LPC 422	3/4"	24	CLASE INDUSTRIAL
LPC 423	3/4"	36	CLASE INDUSTRIAL



BASES PARARRAYOS HORIZONTALES / VERTICALES

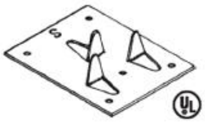
No PARTE	Ø	DESCRIPCION
30538	3/8"	BASE PERFORADA PARARRAYOS 3/8" CON ACOPLE CONDUCTOR BAJADA
30512	1/2"	BASE PERFORADA PARARRAYOS 1/2" CON ACOPLE CONDUCTOR BAJADA
30558V	5/8"	BASE VERTICAL PARARRAYOS 5/8" CON ACOPLE CONDUCTOR BAJADA
30558H	5/8"	BASE HORIZONTAL PARARRAYOS 5/8" CON ACOPLE CONDUCTOR BAJADA



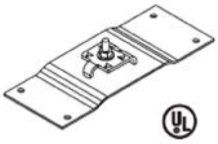
GRAPAS SUJECION CABLES BAJANTES DE ENERGIA

No, PARTE	DIMENSION	DESCRIPCION
LPC 533	8" CUADRADAS	GRAPA DE COMPRESION PARA INSTALACIONES CLASE I / * PARA CABLES
LPC 534	8" CUADRADAS	GRAPA MECANICA PARA INSTALACIONES CLASE I Y II / * PARA CABLES
LPC 535	4" CUADRADAS	GRAPA DE COMPRESION PARA INSTALACIONES CLASE I / * PARA CABLES
LPA 805	2" CUADRADAS	SUJETADOR DE COMPRESION PARA CABLES BAJANTES / DIAMETRO 5/8 1 OJO ½" – CU Y/O SS

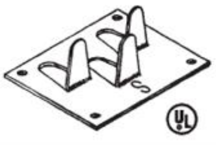
533



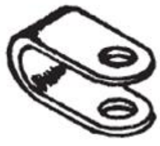
534



535



805



DESCRIPCION GENERAL:

LIGHTNING PROTECTION INTERNATIONAL Pty. Ltd. (LPI) es fabricante y proveedor ubicado en Australia de equipos de protección directa contra rayos, subidas de tensión y transitorios y soluciones para sistemas de puesta a tierra a una amplia gama de industrias en todo el mundo.

Nuestro personal y asesores vinculados a LPI han combinado la experiencia de muchos anos sirviendo a clientes de todo el mundo en diversos tipos de proyectos y especialmente en zonas propensas a descargas eléctricas.

Nuestra amplia experiencia en el suministro de protecciones tomando en consideración la gestión de riesgos, diseño de sistemas, capacitación, calificación, instalación y puesta en marcha de proyectos nos permite atender sectores de la industria como:

- TELECOMUNICACIONES
- PETROQUIMICA, REFINERIAS, GAS
- EDIFICIOS
- TODO TIPO DE ESTRUCTURAS
- CENTROS DEPORTIVOS
- CAMPOS DE GOLF, ESTADIOS E HIPODROMOS
- AVIACION CIVIL Y MILITAR
- MINERIA
- DEFENSA Y ALMACENAMIENTO DE ARMAS

NCS INTERNATIONAL
CERTIFIED QUALITY MANAGEMENT SYSTEM
ISO9001

ITE
INSTITUTO TECNOLÓGICO DE LA ENERGÍA

COMPLIES
NF C 17-102 (2011)
STANDARD

Pararrayos Stormaster ESE 15, 30, 50, 60

La gama de Pararrayos LPI modelos Stormaster ESE / PDC ofrecen un sistema seguro y eficaz para la protección de sus instalaciones contra la descarga directa de rayos.

Los Pararrayos LPI Stormaster ESE / PDC capturan la energía del rayo en un punto preferido, La energía se transmite a tierra a través de un conductor de bajada de energía y cuando la energía entra en la tierra dedicada del pararrayos, se disipa de forma segura, sin riesgo para el personal y los equipos.

La gama de pararrayos Stormaster ESE / PDC están diseñados para su uso en grandes ambientes corrosivos.

La gama de pararrayos Stormaster ESE / PDC están disponibles en Aluminio Anodizado y Acero Inoxidable calidad 316.

¿Cómo funcionan los Pararrayos LPI Stormaster ESE / PDC?

El Stormaster es un Pararrayos de cebado y para su emisión utiliza el campo eléctrico natural del ambiente para formar y completar la emisión oportuna de un líder ascendente o trazador.

Este proceso establece un seguro y eficiente método de control de energía de los rayos peligrosos en un punto preferido.

Como una tormenta recoge parte del campo eléctrico que rodea el ambiente, el ESE/PDC Stormaster empieza a subir la tensión eléctrica.

En el enfoque de una descarga hacia el área protegida hay un rápido aumento en el campo eléctrico, inicia la activación de un líder ascendente desde arriba del Pararrayos Stormaster ESE/PDC.

El concepto de emisión temprana o de cebado permite un mayor o mejor ámbito para la protección a cargo del Stormaster ESE/PDC en comparación con una barra convencional.

La gama de Pararrayos LPI Stormaster ESE / PDC para determinar su zona de protección utiliza el modelo electro geométrico y su avance de cebado cumpliendo lo indicado en los ANEXOS y Apéndices incluidos en las normas NFC 17102 - V2011 (CODIGO FRANCES), UNE 21186 – V2011 (NORMA ESPANOLA), AS 1768 - V2010 (CODIGO AUSTRALIANO).

Certificado de Cumplimiento:

Como una de las compañías líderes en el campo de la protección contra rayos, LPI ha invertido mucho en pruebas campo y de laboratorio como parte de su continuo compromiso con la investigación y el desarrollo.

A lo largo del desarrollo de productos como los Pararrayos Stormaster el prototipo de los modelos se han sometido a pruebas intensas en condiciones de alta tensión.

Los Pararrayos Stormaster ESE / PDC fueron sometidos a pruebas finales por un laboratorio de ensayo acreditado de forma independiente que completó las pruebas de cumplimiento de las normas NF C 17-102 – V2011 y UNE 21186 – V2011.

Las pruebas finales de los Pararrayos Stormaster ESE / PDC mostraron un desempeño eficaz como se definen en el código nacional francés y en la norma española.

El objetivo de las pruebas de acuerdo con las normas NF C 17-102 y UNE 21186 es obtener un resultado estadístico entre un único punto de referencia y el pararrayos ESE / PDC, por el cual una diferencia de tiempo se obtiene entre los dos y por definición, un avance de tiempo de activación (ΔT) se calcula.

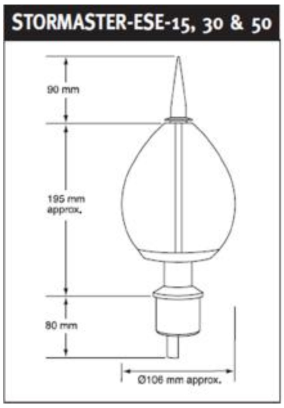
Márgenes de seguridad se aplican a los valores medidos con el fin de proporcionar un resultado medido conservador

Ventajas de los Pararrayos Stormaster ESE / PDC:

- Una instalación típica consiste en un Pararrayos Stormaster ESE / PDC con una mejorada área de protección, uno o más conductores de bajada conectados a sistema de puesta a tierra dedicado de baja impedancia.
- Los pararrayos Stormaster ESE / PDC son fáciles de instalar y no requieren ningún mantenimiento especial.
- Los pararrayos Stormaster ESE / PDC son una solución rentable para proporcionar una protección de seguridad superior.
- La gama de pararrayos Stormaster ESE / PDC se han probado completamente de acuerdo con lo especificado en las normas técnicas NF C 17-102 y UNE 21 186 en un laboratorio de alta tensión externo.

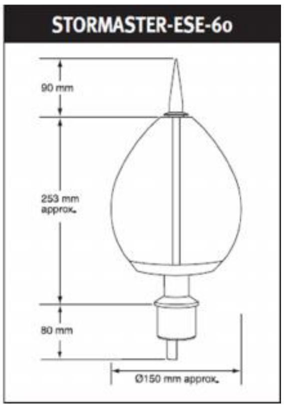
Códigos de Orden:
Stormaster-ESE-15
Stormaster-ESE-15-GI
Stormaster-ESE-30
Stormaster-ESE-30-GI
Stormaster-ESE-50
Stormaster-ESE-50-GI
Stormaster-ESE-60
Stormaster-ESE-60-GI
(Modelo GI para montaje directo a TUBERIA RIGIDA 2 ")

LPI ofrece 4 modelos en su gama de Pararrayos de emisión temprana (ESE) o dispositivo de cebado (PDC) construidos en Aluminio Anodizado y / o Acero Inoxidable calidad 316.



Datos Generales

Stormaster-ESE-15, 30 y 50
Punta Terminal: Acero Cromado
Terminal de color: Plata
Material del panel: AL y/o Acero Inoxidable, Grado 316
Peso: 1,8 kg (aproximado)
Material aislante: UV Evoprene
Conexión cable conductor: Acople / Terminal o GI (Rosca 2”)



Stormaster-ESE-60
Punta Terminal: Acero Inoxidable, Grado 316
Terminal de color: Natural
Material del panel: Acero Inoxidable, Grado 316
Peso: 2,8 kg (aproximado)
Material aislante: UV Evoprene
Conexión cable conductor: Acople / Terminal o GI (Rosca 2”)

RADIOS DE PROTECCION MODELOS ESE-15, 30, 50 & 60:

Los radios de protección (Rp) de un Pararrayos modelo Stormaster ESE / PDC están calculados usando la siguiente formula como lo define el Código Nacional Francés NFC – 17102 (2011).

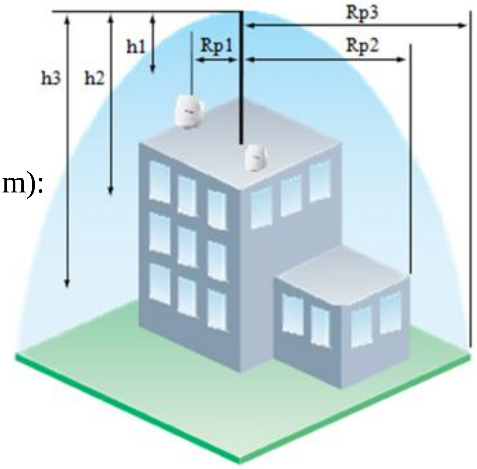
$$Rp\ (h) = \sqrt{2rh - h2 + \Delta(2r + \Delta)} \text{ for } h \geq 5\ m$$

y $Rp = h \times Rp_5 / 5$ *for* $2 \leq h < 5m$ *donde:*

h = altura actual del pararrayos sobre el área a ser protegida (m):

Rp_5 = *Valor del Rp de la ecuación (1) donde h = 5 m*

r = ***20m*** Nivel de protección 1 (Protección Muy Alta)
30m Nivel de protección II (Protección Alta)
45m Nivel de protección III (Protección Media)
60m Nivel de protección IV (Protección Estándar)



Δ establecidos en los test según el modelo a ser instalado:

Stormaster ESE – 15, ΔT (µs) = 15
Stormaster ESE – 30, ΔT (µs) = 30
Stormaster ESE – 50, ΔT (µs) = 50
Stormaster ESE – 60, ΔT (µs) = 60

El nuevo estándar NF C 17-102 está escrito específicamente para asegurar el cumplimiento con respecto a la prueba, la aplicación y la instalación de terminales de ESE. La nueva norma, emitida en 2011, se considera que es aplicable a estructuras de cualquier altura y para la protección de áreas abiertas. La versión anterior de la norma, publicada por primera vez en 1995, ha sido cancelado por los franceses UTE organización de estándares y conformidad con esa versión cesado en septiembre de 2012.

PROTECTION RADIUS, Rp (m)

h = height of Stormaster ESE terminal above the area to be protected (m)	2	4	5	6	10	15	20	45	60	80	100
Protection Level I (Very High)											
Stormaster ESE 15	13	25	32	32	34	35	35	35	35	35	35
Stormaster ESE 30	19	38	48	48	49	50	50	50	50	50	50
Stormaster ESE 50	27	55	68	69	69	70	70	70	70	70	70
Stormaster ESE 60	31	63	79	79	79	80	80	80	80	80	80
Protection Level II (High)											
Stormaster ESE 15	15	30	37	38	40	42	44	44	44	44	44
Stormaster ESE 30	22	44	55	55	57	58	59	59	59	59	59
Stormaster ESE 50	30	61	76	76	77	79	79	79	79	79	79
Stormaster ESE 60	35	69	86	87	88	89	89	89	89	89	89
Protection Level III (Medium)											
Stormaster ESE 15	18	36	45	46	49	52	55	60	60	60	60
Stormaster ESE 30	25	51	63	64	66	69	71	75	75	75	75
Stormaster ESE 50	35	69	86	87	88	90	92	95	95	95	95
Stormaster ESE 60	39	78	97	97	99	101	102	105	105	105	105
Protection Level IV (Standard)											
Stormaster ESE 15	20	41	51	52	56	60	63	73	75	75	75
Stormaster ESE 30	29	57	71	72	75	78	81	89	90	90	90
Stormaster ESE 50	38	76	95	96	98	100	102	109	110	110	110
Stormaster ESE 60	43	85	107	107	109	111	113	119	120	120	120

El estándar NF C 17-102 (2011) incluye requisitos mucho más estrictos en comparación con la versión 1995. Las principales diferencias son las siguientes:

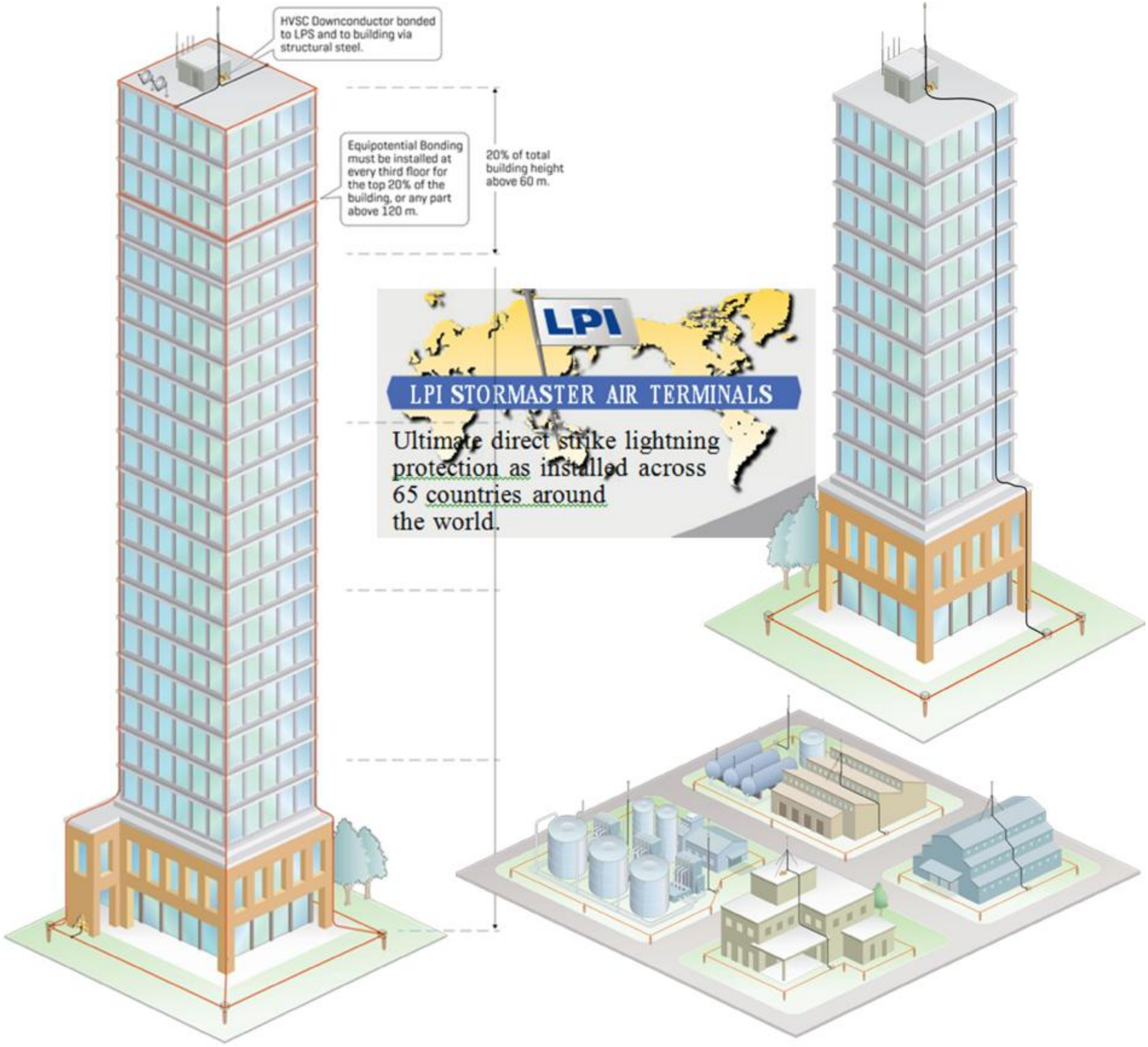
1. Ahora hay cuatro niveles de protección en lugar de los tres niveles anteriores.

2. Hay dos nuevos mejorados sub niveles para el nivel de protección I (niveles I + y ++).

3. Protección de las estructuras más altas de 60 metros está permitido y hay reglas especiales con respecto a intercepción del impacto y conductores de bajada. El 20% de la parte superior del edificio necesita ser protegido.

4. Algunas reglas simples con respecto a conductores de bajada, esencialmente, dos son necesarios, pero uno de ellos pueden ser los componentes naturales de la estructura.

5. La prohibición anterior sobre conductores de bajada aislados coaxiales, el uso de conductores aislados tiene que seguir la distancia de separación indicada en las normas IEC 62305.

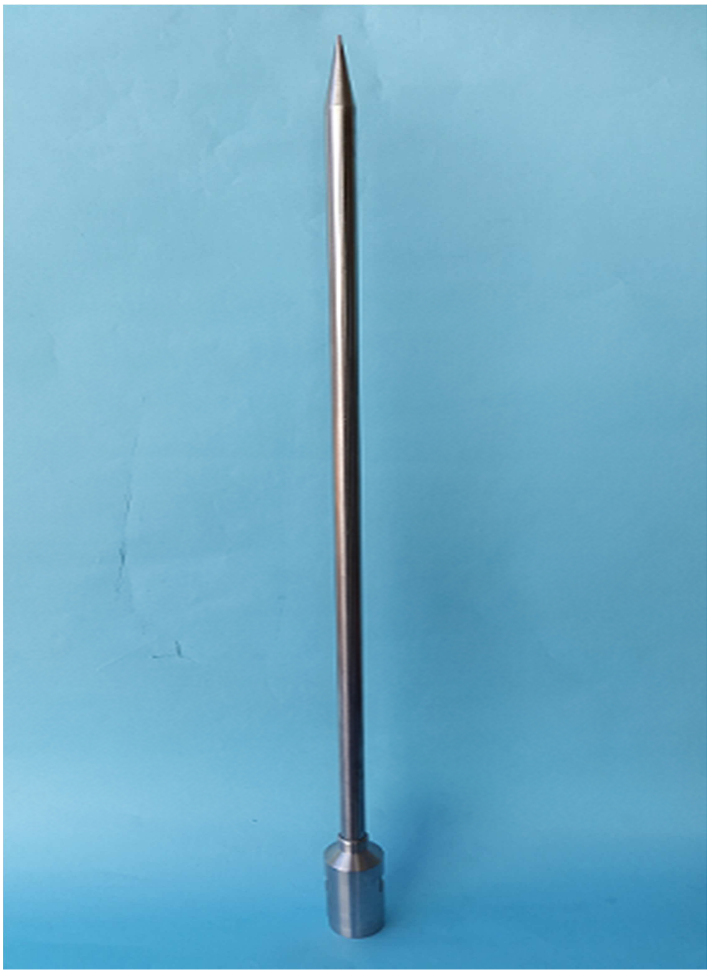

HVSC Downconductor bonded to LPS and to building via structural steel.
Equipotential Bonding must be installed at every third floor for the top 20% of the building, or any part above 120 m.
20% of total building height above 60 m.
LPI
LPI STORMASTER AIR TERMINALS
Ultimate direct strike lightning protection as installed across 65 countries around the world.

ELECTROWELD ®

PARARRAYOS TIPO FRANKLIN

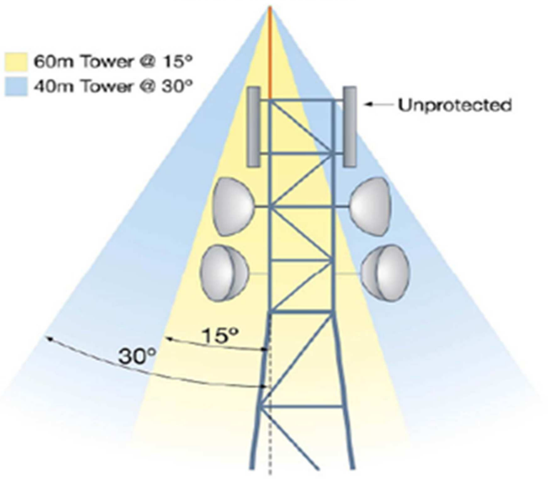
MONO PUNTUAL

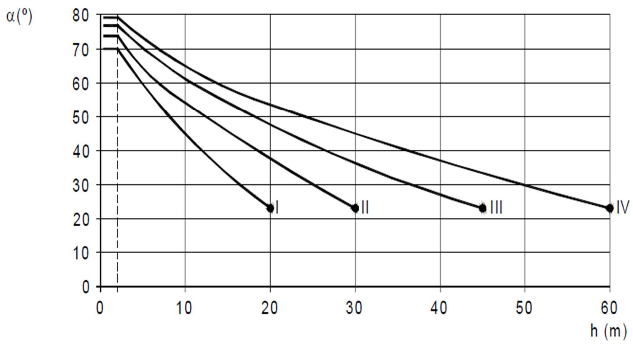
MATERIAL:	SS 304
ACABADO:	NATURAL
ALTURA PUNTA CENTRAL:	11”
DIAMETRO PUNTA CENTRAL:	1 X 5/8” (20MM)
ALTURA BASE:	4” (90MM)
DIAMETRO INFERIOR BASE:	1” (25MM)
ROSCA CONECTOR:	5/8”
ROSCA MASTIL:	1”



COBERTURA:

ACORDE CON LO ESTABLECIDO EN LA NORMA IEC 62305





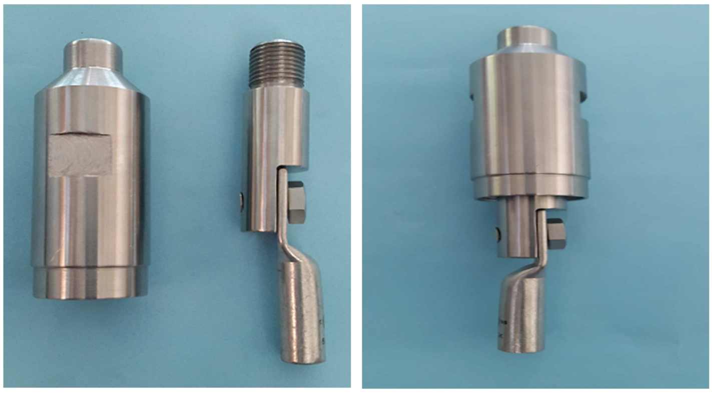
h: ALTURA DEL DISPOSITIVO DE CAPTURA ENCIMA DEL VOLUMEN A PROTEGER(altura Mínima 2,00 mts)

α:ANGULO DE PASO DEL VERTICE DEL CONO DE PROTECCION DEFINIENDO EL NIVEL DE PROTECCION.

I, II, III, IV
NIVELES DE PROTECCION DEFINIDOS SEGÚN NORMA NF C 17-100.

BASE DEL PARARRAYOS

ROSCA 1” NPT PARA ACOPLAR BASE A MASTIL RIGIDO 1”

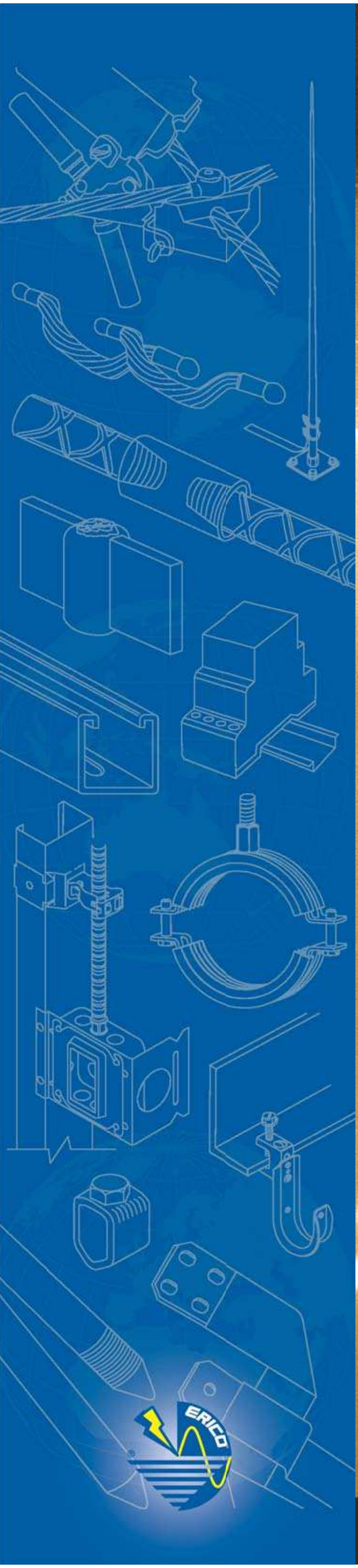


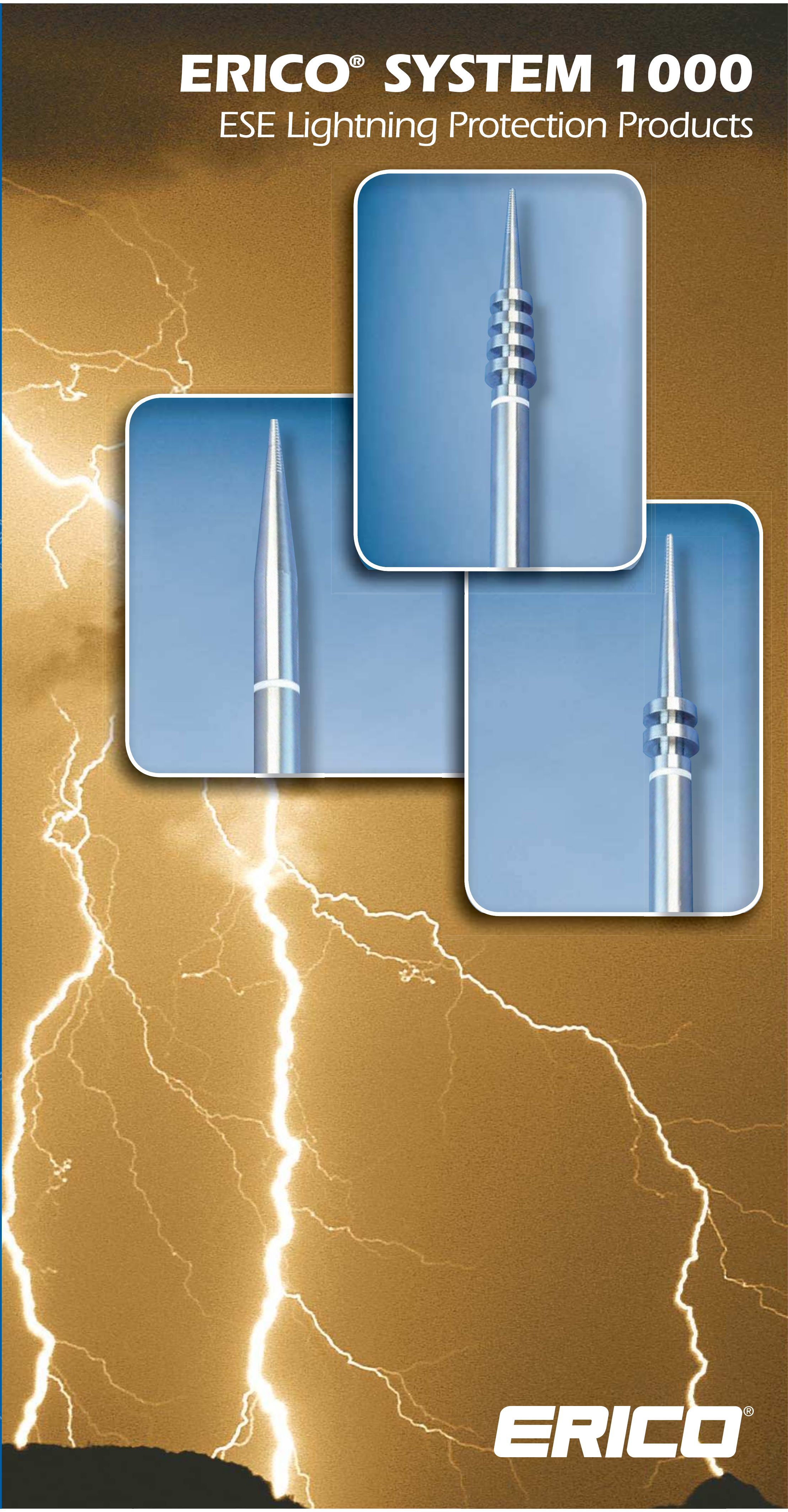
BASE, ACOPLE Y TERMINAL DE OJO PARA CONEXIÓN DE CABLE BAJANTE DE ENERGIA A TIERRA

HECHO EN ECUADOR

ERICO® SYSTEM 1000

ESE Lightning Protection Products





ERICO®

Active Protection

ERICO is a trusted world leader for providing high-quality grounding solutions, lightning protection and surge protection technologies. By recognizing the importance of an integrated lightning protection strategy, ERICO has incorporated several major concepts into a Six Point Plan of Protection:

1. Capture the lightning strike
2. Convey this energy to ground
3. Dissipate energy into the grounding system
4. Bond all ground points together
5. Protect incoming AC power feeders
6. Protect low voltage data/ telecommunications circuits

ERICO operates in every region of the world and supports the global market with an extensive distribution network, helping to ensure that ERICO products and expertise are available for any project, regardless of size or location. Dedicated consulting teams assess the requirements of any project and provide expertise for optimal lightning protection solutions.

An unparalleled level of engineering support and experience is involved in the development of grounding, lightning protection and surge protection products. ERICO has developed specialized design software to integrate all aspects affecting system performance, including local conditions, to help ensure that requirements of relevant standards are met or exceeded.

ERICO's products are manufactured to ISO® 9001:2008 and are subjected to rigorous field and laboratory testing and computer modeling during product development. The products are supported by test reports, technical papers, literature and installation instructions.

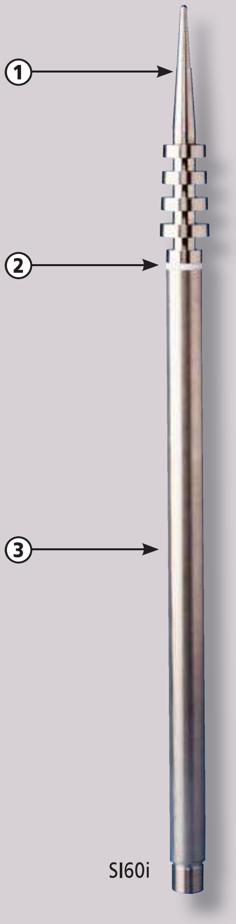
ERICO offers three versions of the ERICO® INTERCEPTOR ESE i-Series air terminals:

- SI25i with a triggering advance of 25 µs
- SI40i with a triggering advance of 40 µs
- SI60i with a triggering advance of 60 µs

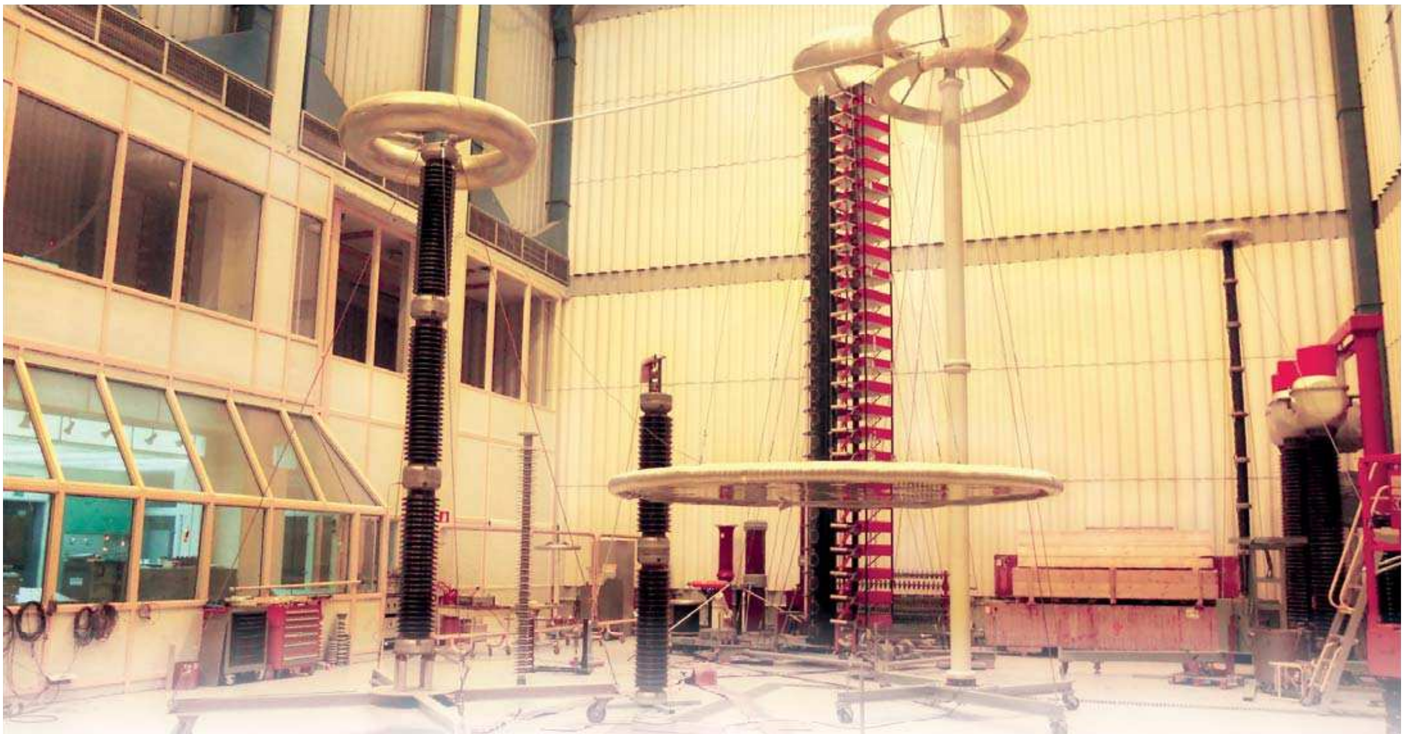
These early streamer emission air terminals (ESEAT) are in accordance with the 2011 edition of NF C 17-102. The design requirements, protection level calculations and protection radius are obtained from this standard.

Due to the internal control circuit, the ERICO INTERCEPTOR ESE i-Series enables the early launching of an upward leader compared to other passive components.

1. Strike tip
2. Insulator ring
3. High voltage control section



Testing and Working Principles



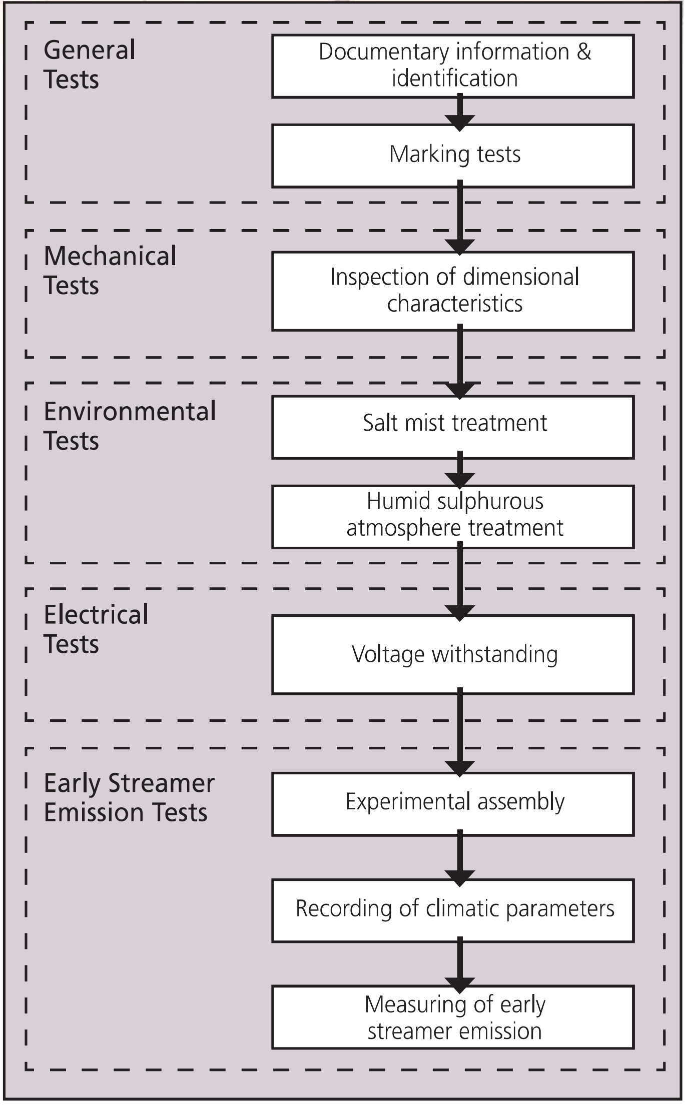
Testing

The ERICO® INTERCEPTOR ESE i-Series has been extensively tested at an independent high-voltage laboratory* in accordance with the revised 2011 requirements of French NF C 17-102 or equivalent standards. The testing, as defined in the standard, was designed to simulate naturally occurring conditions and allow comparison of the performance between differing types of lightning protection systems.

The test simulates natural field conditions where a field impulse (from the downward leader approaching ground, simulated by a Marx Generator with a long front time) is superimposed onto a permanent field (from the charge between cloud and ground, simulated in the laboratory by a DC generator).

The corona at the tip of the rod is measured by a photo-multiplier that enables the determination of the triggering time of both the simple rod air terminal (SRAT) and the ESEAT. The average value is then determined for both a simple rod and the ESEAT. The time difference is then T(SRAT) subtracted from T(ESEAT) to achieve the ΔT advantage for the ERICO INTERCEPTOR ESE i-Series.

The 2011 revision of the standard has defined more rigorous environmental and performance criteria during terminal testing and has created a higher standard for early streamer emission terminals. The requirements became effective September 2012.


General Tests
Documentary information & identification
Marking tests
Mechanical Tests
Inspection of dimensional characteristics
Environmental Tests
Salt mist treatment
Humid sulphurous atmosphere treatment
Electrical Tests
Voltage withstanding
Early Streamer Emission Tests
Experimental assembly
Recording of climatic parameters
Measuring of early streamer emission

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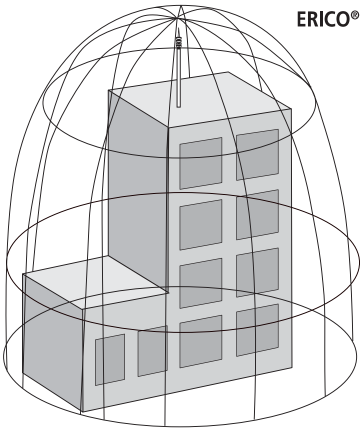
* Test reports available upon request.

Testing and Working Principles

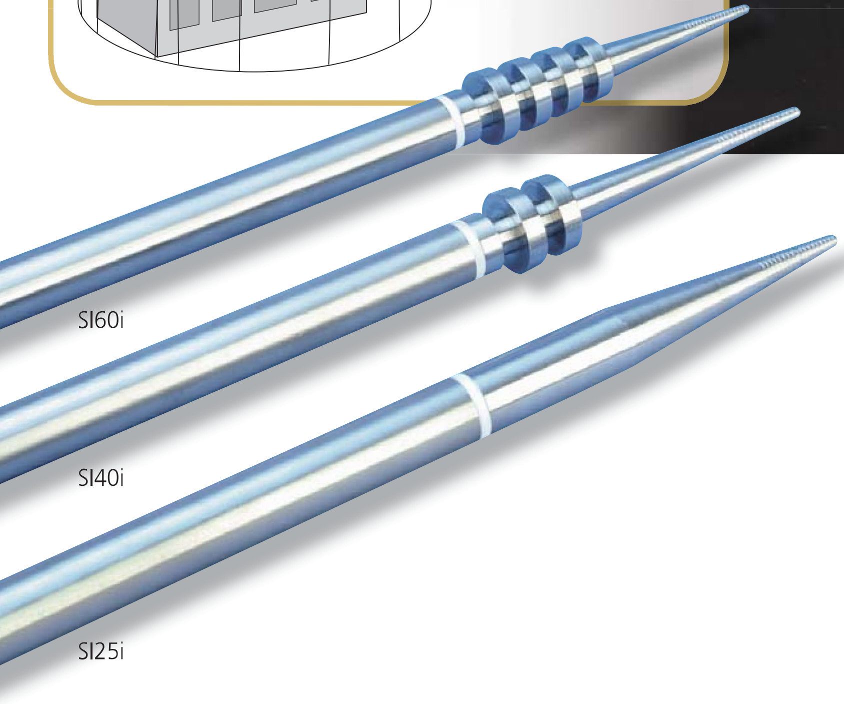
Working Principles

During thunderstorm conditions when the lightning down leader is approaching ground level, an upward leader may be created by any surface. In the case of a passive lightning rod, the upward leader propagates only after a long period of charge reorganization. In the case of the ERICO® INTERCEPTOR ESE i-Series, the initiation time of an upward leader is greatly reduced. The ERICO INTERCEPTOR ESE i-Series generates controlled magnitude and frequency pulses at the tip of the terminal during high static fields prior to a lightning discharge. This enables the creation of an upward leader from the terminal that propagates toward the downward leader coming from the thundercloud.



ERICO® INTERCEPTOR i-series ESE
Early Streamer Emission
Lightning Terminal

According to
the NF C 17-102
and similar
ESE standards

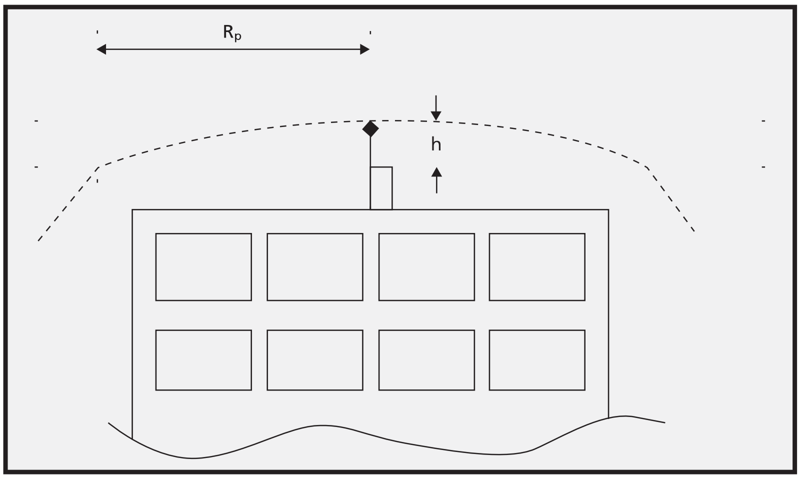


Features

- Designed and tested to NF C 17-102 and similar standards
- 304 stainless steel design suitable for most environments
- Available in three models to suit specific site requirements
- Suitable for use with a variety of downconductor systems, including tape, cable, smooth-weave, Isolated Downconductor (ISODC) and ERICO® ERICORE conductor

Protecting Areas

According to NF C 17-102:2011, the standard protection radius (Rp) of the ERICO® INTERCEPTOR ESE i-Series is linked to ΔT (below), the protection levels I, II, III or IV (as calculated in EN 62305-2) and the height of the ERICO INTERCEPTOR ESE i-Series above the structure or feature to be protected (H, defined by NF C 17-102 as a minimum 2 m).



Protection Level	Protection Level I (99%, D = 20 m)			Protection Level II (97%, D = 30 m)			Protection Level III (91%, D = 45 m)			Protection Level IV (84%, D = 60 m)		
Model	SI25i	SI40i	SI60i	SI25i	SI40i	SI60i	SI25i	SI40i	SI60i	SI25i	SI40i	SI60i
ΔT (µs)	25	40	60	25	40	60	25	40	60	25	40	60
Rp (m) Protection Radius												
h (m)												
2	17	23	32	19	26	34	23	30	40	26	34	44
3	25	35	48	26	39	52	34	45	59	39	50	65
4	34	46	64	39	52	68	46	60	78	52	67	87
5	42	58	79	49	65	86	57	75	97	65	83	107
6	43	59	79	49	66	86	58	76	97	66	84	107
7	44	59	79	50	66	87	59	76	98	67	85	108
8	44	59	79	51	67	87	60	77	99	68	86	108

Where h>5 m, then Rp can be calculated from

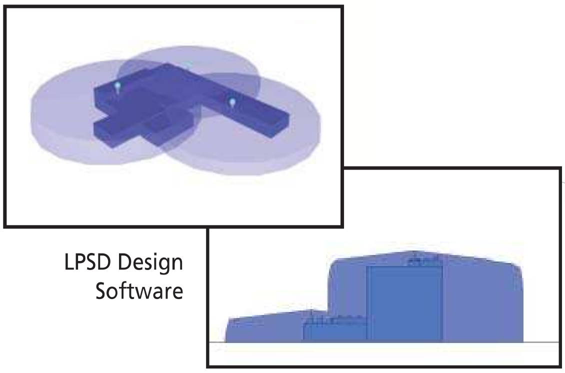
$$Rp = \sqrt{h(2D-h) + \Delta L(2D+\Delta L)}$$

ΔL = v(m/µs) x ΔT(µs), where v is assumed to be 1m/µs
D = Protection Level, where D = 20, 30, 45 or 60 m

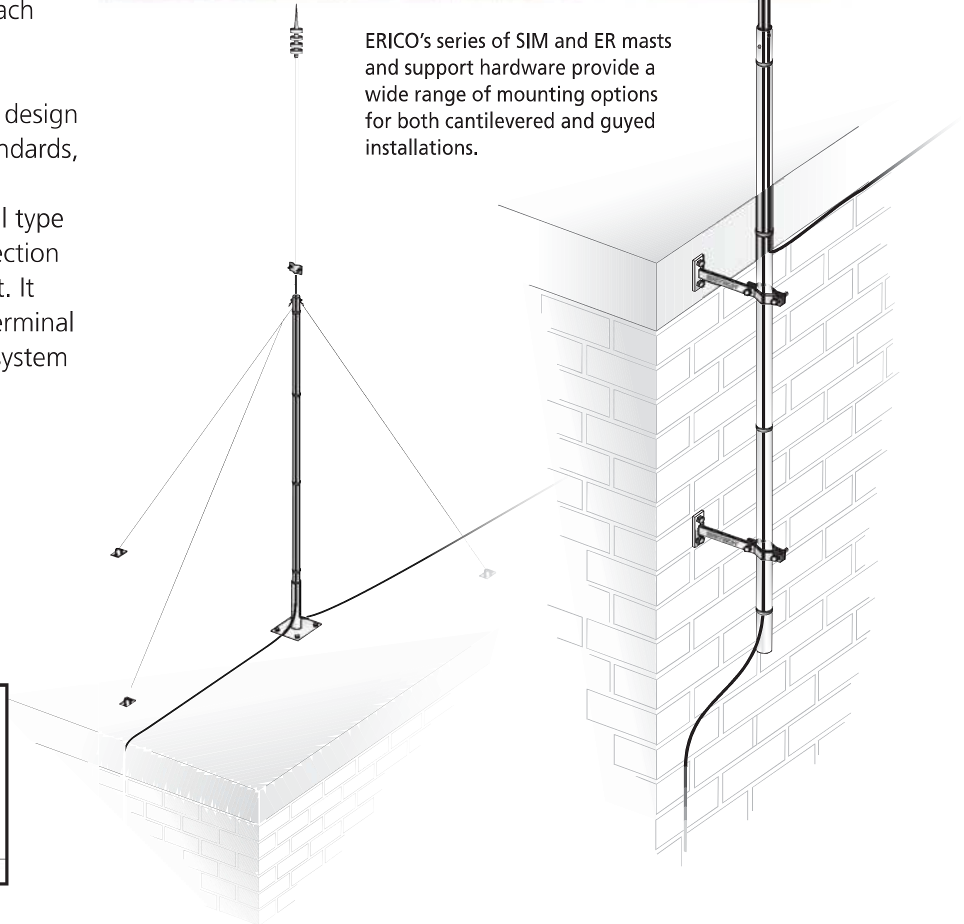
Design

The aim of lightning protection design is to mitigate all the factors that can impact the lightning risk. The requirements of EN62305-2 provide guidance on calculation and selection of protection levels for each specific application.

ERICO's unique computer-aided program provides design support for a variety of design techniques and standards, including NF C 17-102. Based on individual site parameters, such as structure dimensions, terminal type and protection requirements, each Lightning Protection System Design (LPSD) is customized for the project. It provides elevation, 3-D and plan views enabling terminal location, downconductor routing and grounding system requirements to be optimized for your facility.



LPSD Design Software



ERICO's series of SIM and ER masts and support hardware provide a wide range of mounting options for both cantilevered and guyed installations.

System Requirements:

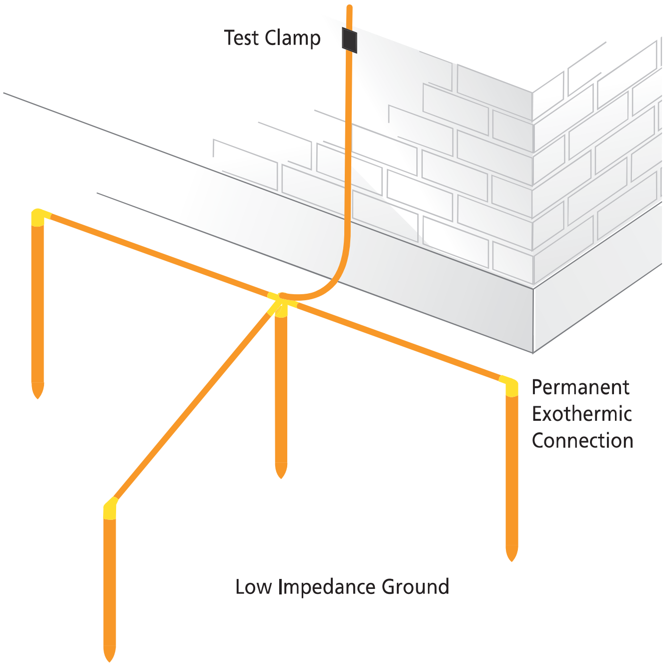
The design and installation of the terminals should be completed in compliance with the requirements of the French Standard NF C 17-102. In addition to terminal placement requirements, the standard requires a minimum of two paths to ground per terminal for non-isolated conductor systems. A downconductor cross-sectional area of ≥50 mm2 is specified. The downconductors are to be secured at three points per meter with equipotential bonding made to nearby metallic items.

Each downconductor requires a test clamp and dedicated earth system of 10 ohms or less. The lightning protection ground should be connected to the main building ground and any nearby buried metallic items. The NF C 17-102 and similar ESE standards requirements for inspection and testing range from each year to every four years dependent upon location and protection level selected. Refer to your ERICO representative or the ERICO® SYSTEM 1000 installation manual for additional information.

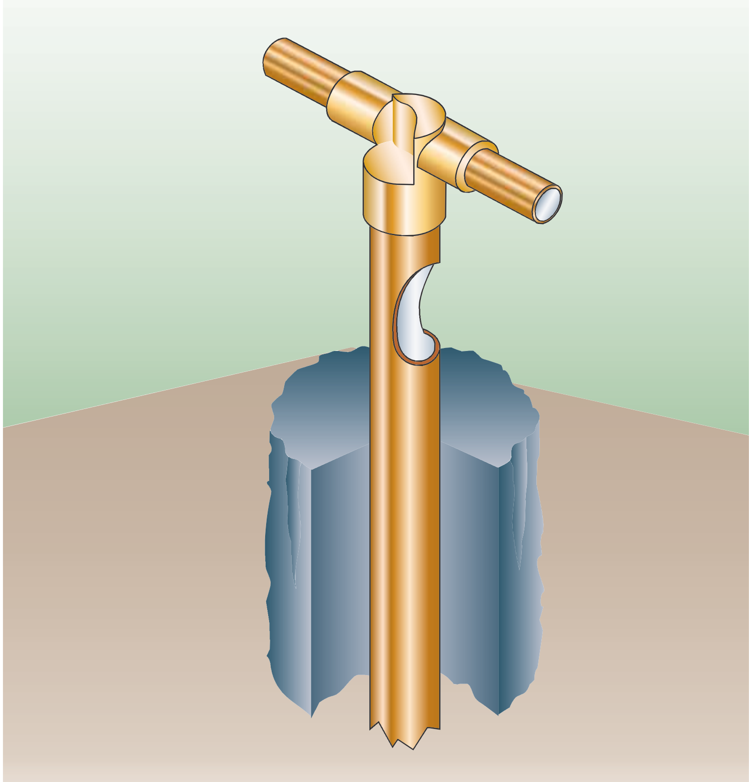
Importance of Grounding

The transient nature of lightning with its associated fast rise times and large magnitude currents mean that special consideration needs to be given to grounding for lightning protection to be effective. A poorly grounded system increases the likelihood of the strike flashing over to the structure and/or finding a non-preferred path within the structure. Many factors, such as soil resistivity variations, installation accessibility, layout and existing physical features are all site-specific and tend to affect decisions on grounding methods employed. The primary requirements of a direct strike grounding system are to:

- Efficiently dissipate lightning energy into the ground
- Help protect equipment and personnel
- Provide good corrosion resistance/long life



The ground electrode system should be corrosion resistant and bonded to the structural ground system. Copper and copper-bonded steel are the most common materials used for grounding conductors. Mechanical coupling can be used to join ground conductors, but suffers from corrosion effects when dissimilar metals are involved. In addition to mechanical strength, ERICO® CADWELD® connections provide excellent, low-impedance and long-life electrical connections with excellent corrosion resistance.



ERICO also recommends the use of Ground Enhancement Material (GEM) to ensure an optimal ground. GEM is a low-resistance, non-corrosive, carbon dust-based material that helps improve grounding effectiveness, especially in areas of poor conductivity. GEM contains cement, which hardens when set to provide a permanent, maintenance-free, low-resistant grounding system that never leaches or washes away. GEM does not adversely affect soil and will not leach ions or contaminate ground water. GEM conforms to IEC 62561-7 Standard, and is identified in NF C 17-102 as an option for reducing soil resistivity.

GEM
Ground Enhancement Material

ERICO recommends an annual inspection and maintenance program to verify the long-term effectiveness of the lightning protection and grounding system.

Ordering Information

Air Terminals

ERICO® INTERCEPTOR SI

SI25i	25 µs	1.53 kg
SI40i	40 µs	1.53 kg
SI60i	60 µs	1.53 kg

Masts Accessories

Guy Kit

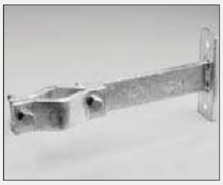
GUYKIT4MGRIP	(701305)	4 m	0.4 kg
GUYKIT7MGRIP	(701315)	7 m	0.7 kg

Guy kits for 4 m and 7 m vertical guy heights.

Cable Tie

CABTIESS	(701420)	0.05 kg

520 mm stainless steel cable tie for strapping downconductor to lower mast sections.



Mast Bracket

ALOF1GS	(702175)	1.5 kg

280 mm galvanized steel bracket for masts 28 to 68 mm diameter.

Accessories

ERITECH
ERICO

Lightning Event Counter

LECIV	(702050)	2.0 kg

Installed on downconductor to record number of lightning strikes.

Ordering Information for Europe and Asia

Masts and Bases

Masts and Bases

SIM28A2	Upper section, 2 m	2.3 kg
SIM33B2	Mid section, 2 m	3.5 kg
SIM33B3	Mid section, 3 m	5.3 kg
SIM40C2	Lower section, 2 m	4.0 kg
SIMBASE2840	Base	1.2 kg
SIM28XX	Mast diameter	28 mm
SIM33XX	Mast diameter	33 mm
SIM40XX	Mast diameter	40 mm

Adapters

Mast Adapter

INTCPTMI16AT 0.1 kg

SIM28 to 16 mm air terminal.

Mast Adapter

INTCPTSIIERICOR 0.1 kg

ERICO® ERICORE to SIi terminal.

Mast Butt Adapter

INTCPTADBUTTSIi 0.05 kg

Required to mount the ERICO® INTERCEPTOR Air Terminal into the FRP mast. For use with INTCPTSIIERICORE.

Accessories

Mast Clamp

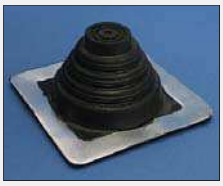
TMC-SS (702165) 0.2 kg

Clamp for connecting 25x3, 30x2 or 8 mm diameter conductor to SIM masts.

Mast Bracket

ACF-2-GS (103100) 2.1 kg

Parallel pipe clamp for masts 30 to 50 mm diameter. Supplied as set of two brackets.



Waterproof Cone

WPC (702230) 0.07 kg

Aerial Spark Gap

SG-AERIAL-302 (702285) 0.5 kg

For the connection of TV and communication masts to the lightning protection systems.

Guyed Masts:					
Mast height (m)	2	4	5	6	7
SIM28A2	X	X	X	X	X
SIM33B2		X		X	
SIM33B3			X		X
SIM40C2				X	X
SIMBASE2840	X	X	X	X	X
GUYKIT4M/GRIP	X	X	X	X	
GUYKIT7M/GRIP					X
CABTIESS	4	8	10	12	14
BASEADAPTER40		X	X		

Cantilevered Masts:			
Material Mast height (m)	4	5	7
height above roof plane (m)	3	4	5
SIM28A2	X	X	X
SIM33B2	X		
SIM33B3		X	X
SIM40C2			X
CABTIESS	8	10	14
ALOF1GS	2	2	3

Ordering Information for North America and South America

Masts and Bases

Masts and Bases

ER1-1000-SS	(702255)	Upper section, 1 m	3.5 kg
ER1-2000-SS	(702260)	Upper section, 2 m	6.2 kg
ER2-2000-SS	(702265)	Mid section, 2 m	4.9 kg
ER2-3000-SS	(702270)	Mid section, 3 m	7.3 kg
ER3-2000-SS	(702275)	Lower section, 2 m	5.3 kg
ER3-3000-SS	(702280)	Lower section, 3 m	7.9 kg
ER2-BASE-SS	(702290)	Base for ER2 mast	5.2 kg
ER3-BASE-SS	(702295)	Base for ER3 mast	5.6 kg
ER1-xxxx-SS	mast diameter 25 mm		
ER2-xxxx-SS	mast diameter 32 mm		
ER3-xxxx-SS	mast diameter 38 mm		

Adapters

Adapter

INTCPTSIIER1 0.1 kg

Sli terminal to ER1 mast.

Adapter

INTCPTSIIER2 0.1 kg

Sli terminal to ER2 mast.

Accessories

Mast Clamp

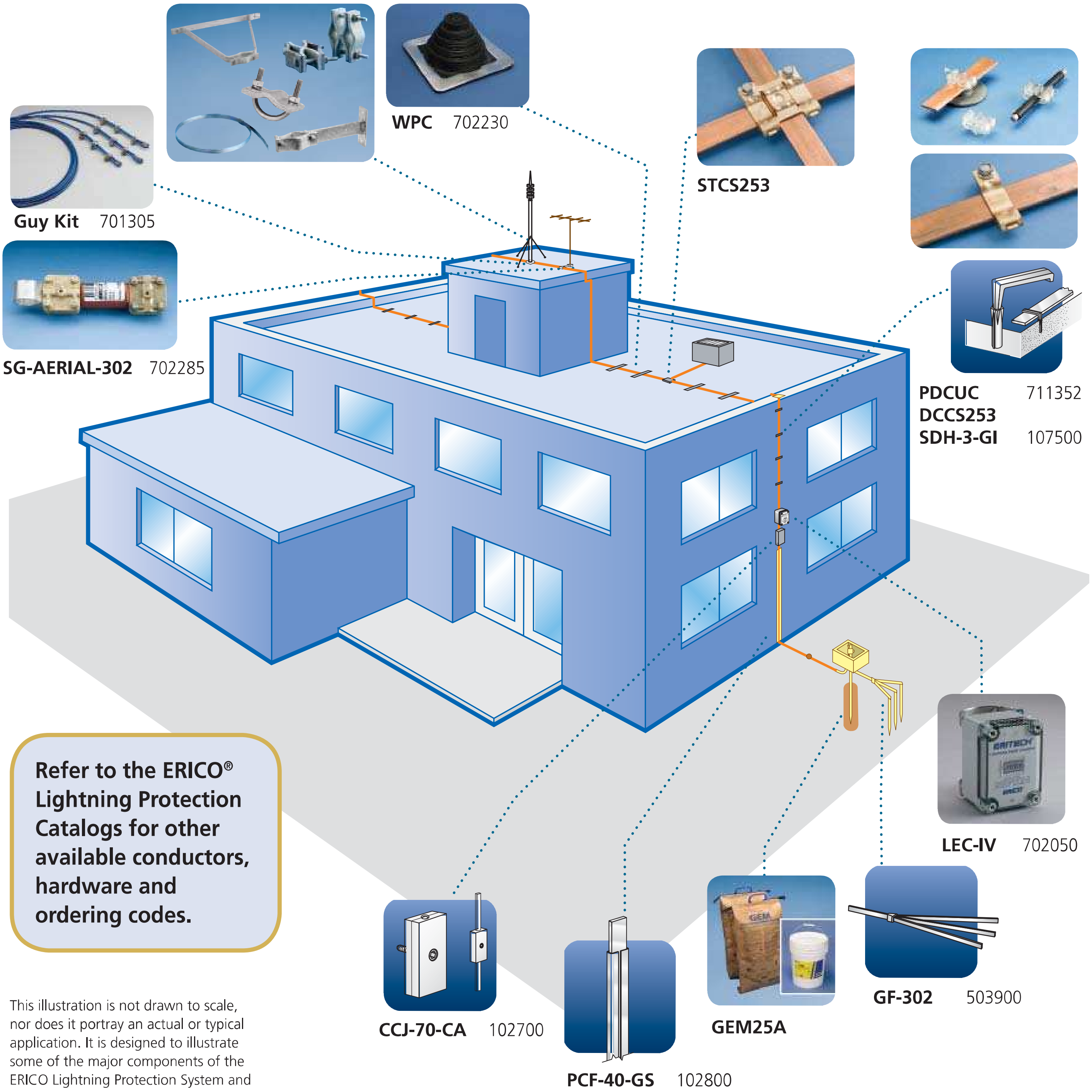
LPC570 0.2 kg

Clamp for connecting stranded conductor to ER mast.

Standing Masts							
Mast Height (m)	2	3	4	5	6	7	8
ER11000SS						X	
ER12000SS							X
ER22000SS	X		X	X			
ER23000SS		X			X	X	X
ER32000SS			X				
ER33000SS				X	X	X	X
ER2BASESS	X	X					
ER3BASESS			X	X	X	X	X
GUYKIT4M/GRIP			X			X	X
GUYKIT7M/GRIP				X	X	X	X
CABTIESS	4	6	8	10	12	14	16

Cantilevered Masts:				
Mast Height (m)	3	4	5	7
Height above roof plane (m)	2	3	4	5
ER11000SS				X
ER22000SS		X	X	
ER23000SS	X			X
ER32000SS		X		
ER33000SS			X	X
CABTIESS	6	8	10	14

Other Lightning Protection and Grounding Accessories



Refer to the ERICO® Lightning Protection Catalogs for other available conductors, hardware and ordering codes.

This illustration is not drawn to scale, nor does it portray an actual or typical application. It is designed to illustrate some of the major components of the ERICO Lightning Protection System and their relationship with one another.

WARNING
ERICO products shall be installed and used only as indicated in ERICO's product instruction sheets and training materials. Instruction sheets are available at www.erico.com and from your ERICO customer service representative. Improper installation, misuse, misapplication or other failure to completely follow ERICO's instructions and warnings may cause product malfunction, property damage, serious bodily injury and death.

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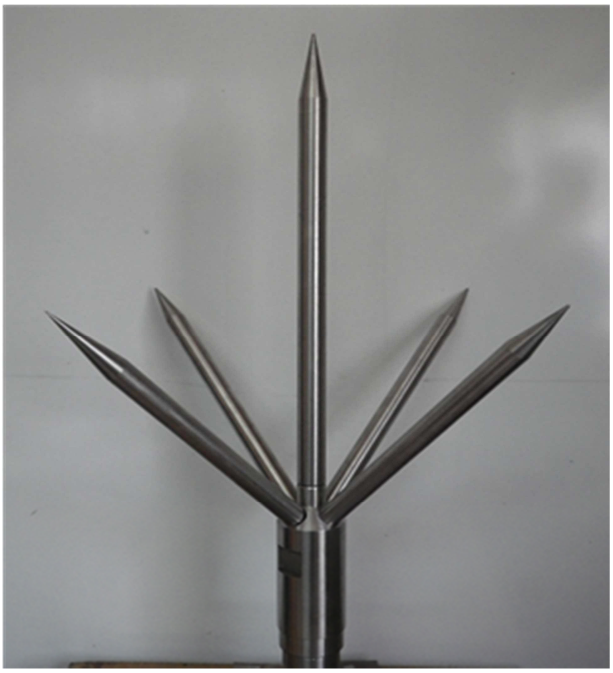
ELECTROWELD ®

PARARRAYOS TIPO FRANKLIN - 5 PUNTAS



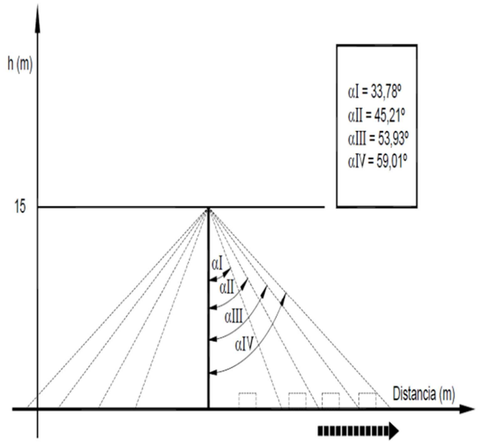
PARARRAYOS 5 PUNTAS – SS

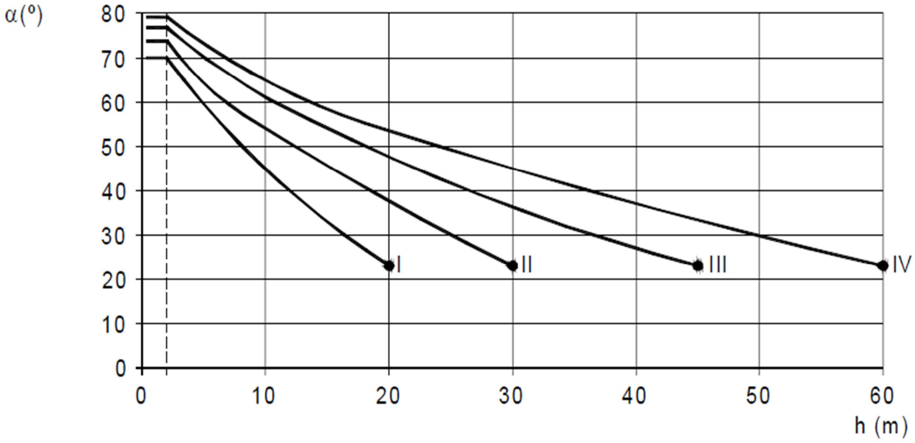
BASE ROSCA 1” NPT

ESPECIFICACIONES:

PUNTUAS:	5
MATERIAL:	ACERO INOXIDABLE
ACABADO:	NATURAL
ALTURA TOTAL:	14-1/4”
DIAM. PUNTA CENTRAL:	1 X 1/2”
ALTURA PUNTA CENTRAL:	11”
DIAM. PUNTAS LATERALES:	4 X 1/2”
ALTURA PUNTAS LATERALES:	7.5”

COBERTURA: ACORDE CON LO ESTABLECIDO EN LA NORMA IEC 62305





h: ALTURA DEL DISPOSITIVO DE CAPTURA ENCIMA DEL VOLUMEN A PROTEGER(altura Mínima 2,00 mts)

α: ANGULO DE PASO DEL VERTICE DEL CONO DE PROTECCION DEFINIENDO EL NIVEL DE PROTECCION.

I, II, III, IV: NIVELES DE PROTECCION DEFINIDOS SEGÚN NORMA NF C 17-100.

HECHO EN ECUADOR