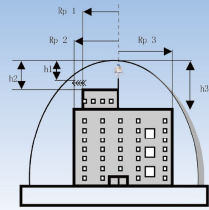
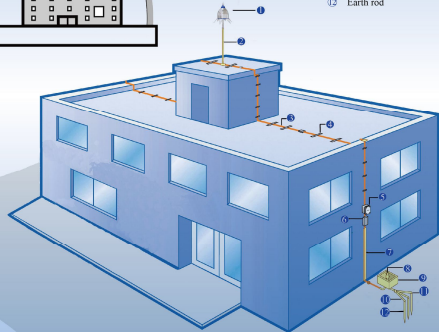


Installation procedure for TSTLP® ESE Lightning Rod is governed by latest French standard NF C 17-102 and follows a series of simple rules catering for all types of structure; (Referring to installation stated in French standard NF C 17-102_2011)

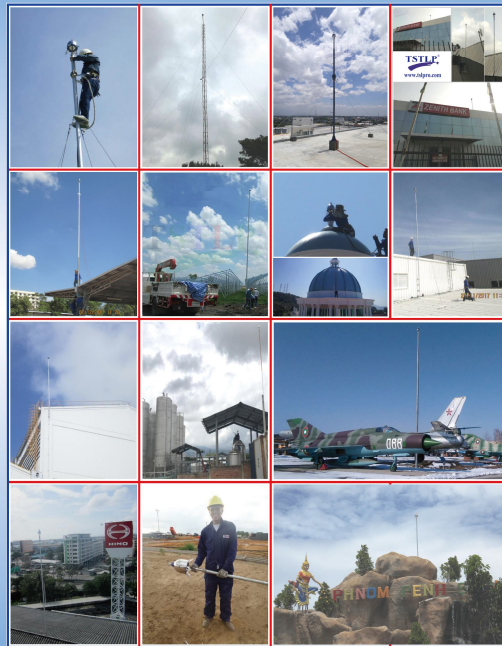


- ① TSTLP® FSF lightning rod
- ② Elevation pole
- ③ Copper conductor
- ④ Copper clamp
- ⑤ Lightning counter
- ⑥ Test clamp
- ⑦ Protection sheath
- ⑧ Earth clamp
- ⑨ Inspection housing
- ⑩ Copper earthing
- ⑪ Rod to conductor clamp
- ⑫ Earth rod



Additional protection against direct lightning strike for the highest 20% of the structure height for buildings greater than 60 m or any point above 120 m, using TSTLP® ESE Lightning Rod or any other means must be implemented at each façade wall according to a valid standard. Furthermore a minimum of 4 down conductors, interconnected by a ring conductor when applicable, shall be used, distributed along the perimeter and if possible at each angle of the building.

NOTE : in general the risk due to the lateral flashes is low because only a few percent of all flashes to tall structures will be to the side and moreover their parameters are a lot lower than those of flashes to the top of structures.



Lightning Protection System Products

✓ TSTLP® Direct Lightning Protection (ESE LIGHTNING ROD, TESTER, COUNTER, EARTHING MATERIAL)



✓ TSTLP® Power Line Surge Protection (TYPE I+2, T1, T2, T3 SPD)



✓ TSTLP® Signal Line Surge Protection (DATA, NETWORK, CCTV, CAMERA, PHONE, ANTENNA, SPD)



TSTLP® ESE LIGHTNING ROD

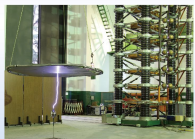
NF C 17-102:2011 & UNE 21.186:2011 Compliant
CE & Patented



TSTLP® (having its own factory) is one of the TOP brands specializing in lightning & surge protection field around the world, especially UPDATED TSTLP® Early Streamer Emission Lightning Rod according to international most popular standards for structural lightning protection.

Key Benefits:

- ✓ Series **PATENTED** models offering customized solutions for each project.
- ✓ Successfully TESTED according to NF C 17-102:2011 Annexe C & UNE 21.186:2011 Paragraph Cat ACCREDITED High-Voltage Laboratories in Europe (SPAIN & Romania) & Shanghai (Authorized Test Reports with **ilac-MRA, ENAC, Romania-RENAR, CAL & CMA** marks) as well as **CE certificate** to ensure your full satisfaction
- ✓ TSTLP® ESE Lightning Rod only becomes active when electrical field intensity rises (lightning discharge likely), TSTLP® ESE Lightning Rod presents no danger to the site.
- ✓ Fully reliability, even in extreme climatic conditions.
- ✓ Robust to withstand multiple lightning strikes.
- ✓ Standardized Manufacturing Process.



TSTLP® ESE TESTER



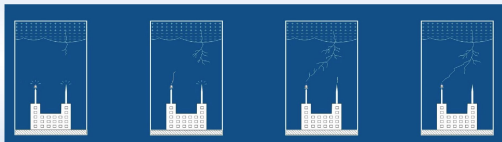
PORTABLE TSTLP® ESE TESTER



TSTLP® SMT-ESE30
Patent No. ZL 2013 3 0019136.3

- The IONIZATION SYSTEM IS CHARGED** - via the lower electrodes using the ambient electrical field (several thousand volts/meter when storms are approaching), which means TSTLP® Lightning Rod is a fully autonomous system requiring no external power supply.
- ACTIVATING THE NEW TSTLP® TECHNOLOGY** - Whilst dynamically assessing the development of the surrounding electrical field, the TSTLP® detects the appearance of downward leaders. This innovative and patented TSTLP® system is then activated to neutralize the space charges, which naturally occur around the Lightning Rod. The TSTLP® Lightning Rod is ready to operate in an optimal environment
- CONTROLLING THE IONIZATION PROCESS** - The ambient electrical field increases rapidly when a discharge is imminent and a downward leader descends from cloud to ground. This triggers the ionization process, using a spark ionization system between the upper electrodes and the central tip. The TSTLP® Lightning Rod reacts at the precise moment, when the risk of lightning discharge is imminent.
- EARLY TRIGGERING OF THE UPWARD LEADER** - The controlled ionization process and the new TSTLP® technology guarantee the triggering of an upward leader ahead of any other protruding point within the area to be protected making the TSTLP® Lightning Rod be the preferential point of impact for the lightning discharge and provides the structure with maximum protection.

Comparing TSTLP® E.S.E lightning rod with ordinal lightning rod.



A-1

A-2

A-3

A-4



TSTLP® SMT-ESE40
Patent No. ZL 2013 3 0032034.5

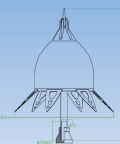


TSTLP® SMT-ESE50
Patent No. ZL 2013 3 0019139.7



TSTLP® SMT-ESE60
Patent No. ZL 2013 3 0019138.2

TSTLP® Model	SMT-ESE60	SMT-ESE50	SMT-ESE40	SMT-ESE30
Patent N°	2013300191382	2013300191397	2013300320345	2013300191363
Efficiency (µs)	60µs	50µs	40µs	30µs
Standard Deviation ESE / Single Rod	$\sigma_{tip} < 0.4 \text{ mV}$	$\sigma_{tip} < 0.5 \text{ mV}$	$\sigma_{tip} < 0.55 \text{ mV}$	$\sigma_{tip} < 0.6 \text{ mV}$
Lightning current withstanding test Imp	100kA (normative test at 10/350µs waveform as standard requires)			
Lightning current withstanding Imp	$\geq 200kA (10/350 \mu s)$			
Capacity against wind speed	$> 40 \text{ m/s}$			
Dimension/Length	408mm		418 mm	
Approx net weight	4.0 kg	3.8 kg	3.5 kg	3.0 kg
Enclosure material	Stainless Steel (Superior Quality)			
Test standards	NF C 17-102:2011 Annexe C IEC 60060-1:2010 Part 1 GB/T T 16927.1-2011 Part 1		UNE 21.186:2011 Paragraph C EN 60060-1:2010	



Size(mm)

Protection Radius.

The protection radius of TSTLP® ESE Lightning Rod is related to its height (h) relative to the surface to be protected, to its efficiency and to the selected protection level

$$R_p(h) = \sqrt{(2r-h)h + \Delta(2r + \Delta)} \quad \text{for } h \geq 5 \text{ m; and } R_p = h \times Rp(5)/5 \quad \text{for } 2 \text{ m} \leq h \leq 5 \text{ m}$$

Rp (h) (m): is the protection radius at a given height h

h (m) : is the height of the ESE Lightning Rod tip over the horizontal plane through the farthest point of the object to be protected

r (m) : 20m for protection level I

30m for protection level II

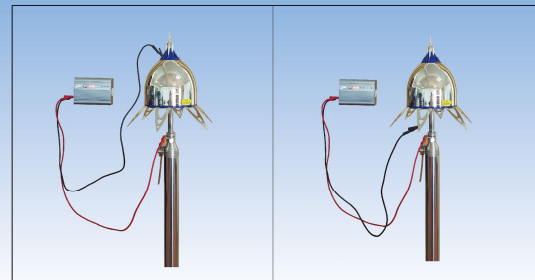
45m for protection level III

60m for protection level IV

$$\Delta (m) = \Delta T \times 10^6$$

Field experience has proved that Δ is equal to the efficiency obtained during the ESE Lightning Rod evaluation tests

Protection Level	Level I (99% D=20M)				Level II (97% D=30M)				Level III (91% D=45M)				Level IV (84% D=60M)			
	SMT-ESE				SMT-ESE				SMT-ESE				SMT-ESE			
TSTLP® Model	30	40	50	60	30	40	50	60	30	40	50	60	30	40	50	60
(ΔT)	30µs	40µs	50µs	60µs	30µs	40µs	50µs	60µs	30µs	40µs	50µs	60µs	30µs	40µs	50µs	60µs
h (m)	Radius Protection (m)															
2	19	23	27	32	22	26	30	34	25	30	34	39	28	34	38	43
3	29	35	41	47	33	39	46	52	38	45	52	58	43	50	57	64
4	38	46	54	63	44	52	61	69	50	60	69	78	57	67	76	86
5	48	58	68	79	55	65	76	86	63	75	86	97	71	84	95	107
6	48	58	69	79	55	66	76	87	64	76	87	97	72	84	96	107
8	49	59	69	79	56	66	77	87	65	77	87	98	73	86	97	108
10	49	59	69	79	57	67	77	88	66	77	88	99	75	87	98	109
12	49	59	70	80	57	68	78	88	67	78	89	100	76	88	99	110
20	50	60	70	80	59	69	79	89	71	81	92	102	81	92	102	113
30	/	/	/	/	60	70	80	90	73	84	94	104	85	95	106	116
45	/	/	/	/	/	/	/	/	75	85	95	105	89	99	109	119
60	/	/	/	/	/	/	/	/	/	/	/	/	90	100	110	120



UPPER Electrode(s) Test Status - OK

LOWER Electrode(s) Test Status - OK



TSTLP® ESE lightning rod with waterproof cable-box

ADVANTAGES:

- ✓ NO internal or external power are needed
- ✓ NO need to climb up to the pole for regular inspection
- ✓ Test at 2m from the ground, or on the roof - Suitable for most installation sites
- ✓ MORE competitive price for marketing & sale, Distributor/Installer can test all with one TSTLP® ESE Tester
- ✓ Convenient, Safe, Reliable & Durable