External LPS Design

Basis of calculation: IEC 62305-3:2024 (Ed. 3.0)

Report	VB-LPS-SAMPLE-0001
Revision	1
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Project	Commercial block — 5 storeys (sample)	Client	(the client you name on the project)
Site address	(the site address you enter)		
Prepared by	(your name), (your company) · Reg. no. (your registration no.)		
Checked by	(the checker you name)	Approved by	(the approver you name)
Dimensions	(where you say the dimensions came from: measured, drawings or approximate) — (the drawings or survey you name)		

Rev.	Date	Description	Prepared	Checked	Approved
1	2026-07-01	First issue	(your name)	(the checker you name)	(the approver you name)

Air termination

LPS class	II
Method	Rolling sphere
Sphere radius	30 m
Rod height above the reference plane	2 m
Protected radius at the reference plane	10.8 m
Perimeter air-termination conductor	128.0 m on the roof edge
Conductor minimum cross-section (Table 7)	50 mm² tape / 50 mm² round
Rod height that best protects the roof edge	10.0 m
Rod spacing at the roof edge (d_edge)	12.0 m
Proposed air-termination rods	12
Candidate positions considered	12
Candidate lattice pitch	13.3 m
Roof within a rod's protected radius	100%
Rod coverage proof	exact — every point of the roof shown to lie within a rod's protected radius (no grid; see note)
Lateral protection angle α (D. 5.2.3.3)	15°
Lateral protected width w = r/10	3 m

§5.2.1: for all types of air terminals only the real physical dimensions of the metal air-termination systems shall be used for the determination of the volume protected. Every protected volume in this design is computed from the entered physical height alone — no enhanced or extended radius is claimed for any device. §5.2.1 also states that radioactive air terminals are not allowed.

§5.2.1: the individual air-termination rods should be connected together at roof level to ensure current division.

An air-termination conductor runs around the roof edge, following the outline: 128.0 m. §5.2.2.1 requires air-termination components to be located at roof level on corners, exposed points and edges, and §5.2.1 requires the individual rods to be connected together at roof level to ensure current division — the roof edge is where both are satisfied at once, and where practice routes the connection. This is not additional material: it specifies a conductor the design already implied.

The rolling sphere always touches the roof edge. That is geometry — it holds for every building and nothing placed mid-roof changes it. D.5.2.2.2 makes a positioning adequate when the sphere touches only the ground and the air-termination system, so a conductor on the edge is what makes the contact there a contact with the air termination rather than with the structure.

It protects the **edge line only**. A conductor lying flush in the roof plane obstructs nothing above it: a sphere coming straight down touches it at one tangent point, and the roof inward of the edge is still the rods' job. Nor is it protected space — an air termination is where the strike is meant to land, not volume that is safe — so the protected volume drawn for this design is the same with the conductor as without it.

Minimum cross-sectional area, Table 7 (§5.6.2) for Copper / tin-plated copper: 50 mm² solid tape or 50 mm² solid round. The Materials section resolves the same table for every LPS conductor, including the stranded option where the table gives one.

The length is the perimeter of the roof outline this design was given, and nothing more: no allowance for laps, joints, fixings, down-conductor connections, upstands or roof plant, and no route around anything on the roof, because no design here knows what is on the roof. It is the geometry to take off from, not a cut length to order.

The roof edge is governed by a different figure from the interior. A sphere resting on the ground beside the building reaches the roof edge from 28.3 m away in plan; a rod tip at 22.0 m above ground is reached from 28.9 m. Rods on the edge keep that sphere off it while they are no more than $d_{edge} = 2\cdot\sqrt{(a_1^2 - a_o^2)} = 12.0$ m apart — against the 10.8 m that governs the interior. The two are not the same number and neither substitutes for the other.

d_{edge} is largest at a rod height of exactly $R - H = 10.0$ m for this class and building, and falls away on both sides of it. Taller is not better at the roof edge: past 20.0 m a rod of that height protects the edge at no spacing at all, because the sphere that clears its tip clears the roof with it.

These rods carry the roof's interior and nothing else. §5.2.2.1 requires air-termination components on corners, exposed points and edges, and the perimeter conductor above passes through every corner and along every edge — so that requirement is met by the conductor, and the rods answer the one question left: bring every roof point within 10.8 m of a rod. Without the conductor the rods would have to hold the edge as well, and there would be 12 of them here instead of 12.

12 of the 12 lattice positions were kept. The selection is computed the same way for the same inputs, so re-running this design gives this layout again — but it is one covering layout, not the only one, and a rod moved to suit the roof is the engineer's call to make against the same criterion.

The layout is **proved** to cover rather than sampled for coverage. Any uncovered piece of roof would be an open region whose border is made of walls and of arcs of the rods' reach, and such a border can only change from one to the other at a corner of the outline, where a rod's reach crosses a wall, or where two

rods' reaches cross. A piece with none of those would have to be ringed by a single unbroken circle, which cannot happen inside a closed outline. So that finite set of places decides the whole roof, and every one of them was tested — no grid is involved and nothing between the tested places is assumed. Two limits, stated because the claim is only worth what they leave: a point exactly at a rod's reach counts as **outside** it throughout, so a point on the boundary of the protected volume is treated as unprotected rather than protected; and where a tested place is a knife-edge contact rather than a gap, its surroundings are probed at a finite number of points to decide whether real area opens there, so a gap narrower than roughly a quarter-turn at that contact would not be reported. Both are properties of the layout as drawn: move or shorten any rod and neither this proof nor the coverage percentage applies until the design is recomputed. That percentage — the "Roof within a rod's protected radius" row above — is not a second proof. It answers the same question on a grid, by code that shares none with this argument, so where this proof closes it can only agree — read it as a check on the tool, not as further evidence about this roof. It is reported with its spacing because it is the number that says how far short a layout falls in the case this proof does not close.

The rod positions above are a **proposed** layout, computed from the LPS class, the plan outline and the rod height by the positioning rule of §5.2.2.1 — rods on corners, then edges, then the field, on a square grid no coarser than the spacing one rod's protected radius supports. They are not a survey and not an instruction: the engineer may move them, and the coverage figure is what any alternative should be judged against — but the coverage figure and the covering proof are both about the layout as drawn, and a rod moved, shortened or removed voids them until the design is recomputed against the positions actually adopted.

Natural air terminations are not counted. Metal parapets, copings, handrails, ladders and existing masts commonly protect a roof already, and §5.2.5 allows them; none of them is an input here, so the layout may put a rod where something on the roof already does the job. Check the layout against what is actually up there before pricing it.

The coverage figure is measured and not assumed: 960 roof points on a 1.00 m grid, each tested against the rolling-sphere criterion of §5.2.2 — a point is protected when the sphere resting on it cannot avoid touching the air termination, and every one of them is protected — so it reads 100% with no "at least" in front of it. Elsewhere the figure is a lower bound, because the only obstacles counted are the rods above and anything else on the roof can add protection but never remove it; here there is nothing left above it for a bound to allow for. What it remains is the grid's answer rather than the roof's: whether every point of the roof is covered is a different question, and the "Rod coverage proof" row above is what answers it.

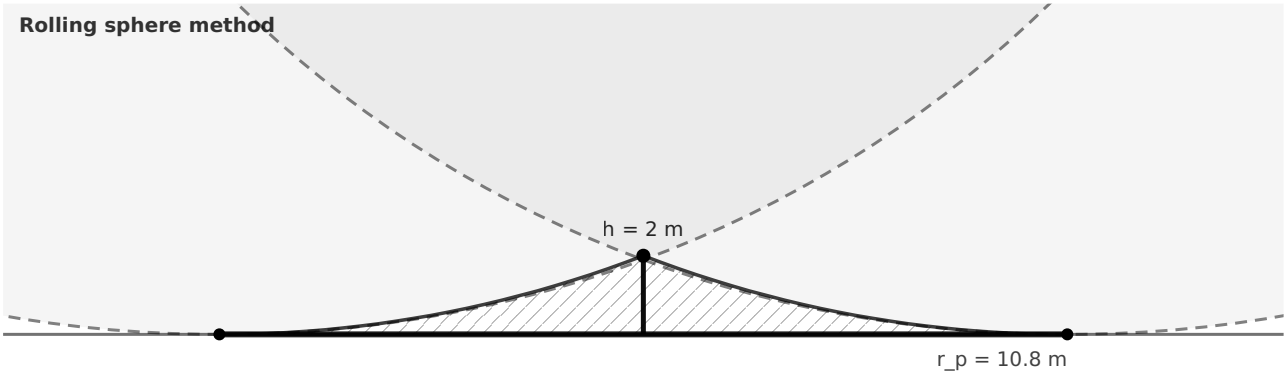
§5.2.3: lateral impacts of flashes to the side are considered negligible for structures up to 60 m measured from ground level, and this structure is 20 m. However, the same clause states that elements significantly protruding the facade can be endangered (e.g. balconies, cameras, antennas), and NOTE 2 adds that such elements on structures up to 60 m are rarely endangered. No air termination is required on the vertical surfaces at this height — the requirement in §5.2.3 is scoped to structures taller than 60 m — so this is a judgement for the designer, about protruding elements this design does not know about.

D.5.2.3.3 proposes a simple approach for those elements: the positioning is adequate if all parts of the element to be protected are below a surface generated by a straight line at α = 15° to vertical (Figure D. 6), with the horizontal width of the protected area limited to w = r/10 = 3 m at class II. α is independent of the class of LPS; only w moves with it. This design states those two quantities and positions nothing on the facade. w is a width limit rather than a facade solution — D.5.2.3.3 offers the method as a supplementary part of protected area, "especially useful just below the roof".

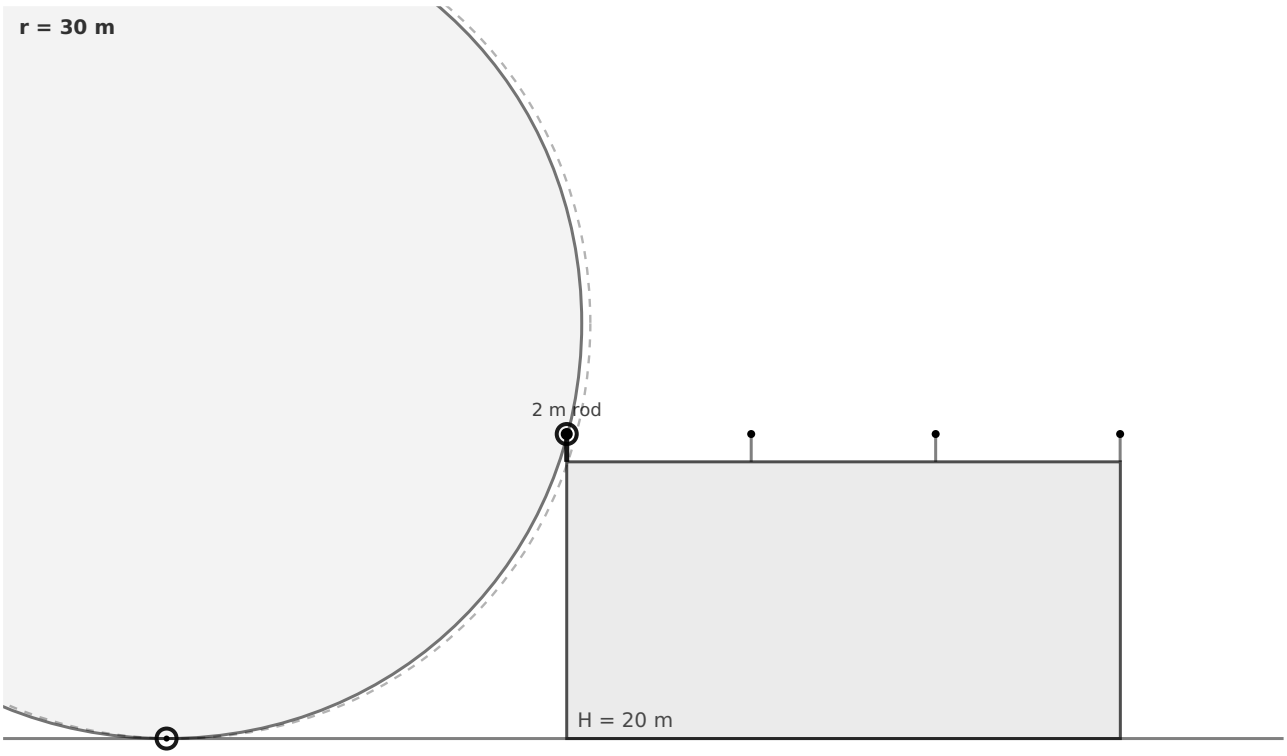
This design does not lay out the lateral air termination. It carries no facade elevation, no balcony, camera or antenna position, and no facade conductor route — the quantities above size that work, they do not specify it.

Rod	x (m)	y (m)	h (m)	r_p (m)
1	0.00	0.00	2.00	10.77
2	0.00	24.00	2.00	10.77
3	40.00	0.00	2.00	10.77
4	40.00	24.00	2.00	10.77
5	0.00	12.00	2.00	10.77
6	13.33	0.00	2.00	10.77
7	13.33	24.00	2.00	10.77
8	26.67	0.00	2.00	10.77
9	26.67	24.00	2.00	10.77
10	40.00	12.00	2.00	10.77
11	13.33	12.00	2.00	10.77
12	26.67	12.00	2.00	10.77

The 12 rods this layout proposes, with x and y measured from the 0, 0 marked on the roof plan, as the model in the workspace gives them, with the height each one stands at and the protected radius that height buys it. The covering proof and the coverage figure are about these positions: a rod moved, shortened or removed voids them until the design is recomputed.

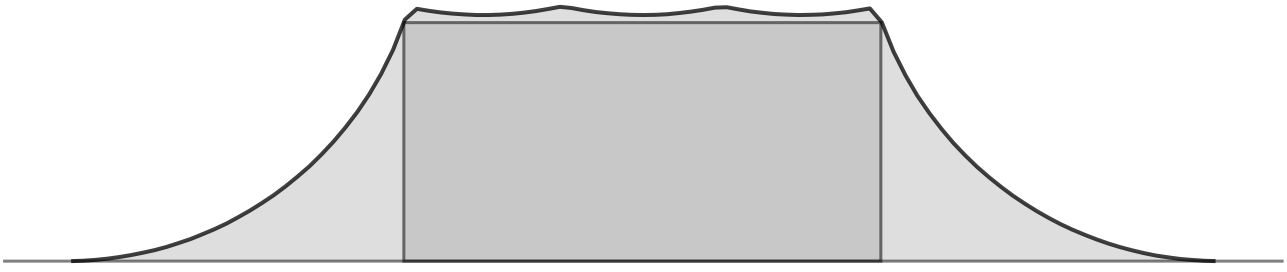


The space the tallest of this design's rods — 2 m — protects at the reference plane. Rolling-sphere construction: each sphere of r = 30 m rests on the reference plane 10.8 m from the rod and touches its tip. The shaded region is their underside — what a sphere of that radius cannot reach. Drawn to scale on both axes. The plane is drawn rather than a roof because this figure is about the geometry one rod makes, not about where it stands — the layout is the roof plan below.



- Rolling sphere, r = 30 m — resting on this design
- Structure, 40 m × 20 m
- Where the sphere touches — a strike point
- The same sphere on the bare structure
- The design's air-termination rods, 2 m

Rolling sphere r = 30 m over a 40 m × 20 m elevation. Ground contact 28.9 m from the wall, where this design's own rods hold the sphere off. On the bare structure it would reach 28.3 m (a = √(H(2r − H))) — the difference is what the air termination buys. Marked points are where the sphere touches, which is where lightning can strike — they are what an air termination has to answer. No protected zone is shaded here: this figure shows where the sphere rests and what holds it off, not what that leaves protected — which is computed, and is the protected-volume figure below. Drawn to scale on both axes; the sphere is clipped to the frame.



- Structure, 40 m x 20 m in section
- Protected volume — one surface

Protected volume in section at y = 5.086 m, to scale on both axes. **One surface**, not one per rod: a rolling sphere of r = 30 m cannot reach anywhere inside it. It climbs the flank beside the structure — where the building's own bulk does the shielding, and a rod on the roof edge deepens it — crosses the roof sagging between the rods, and falls away beyond. The cut is taken

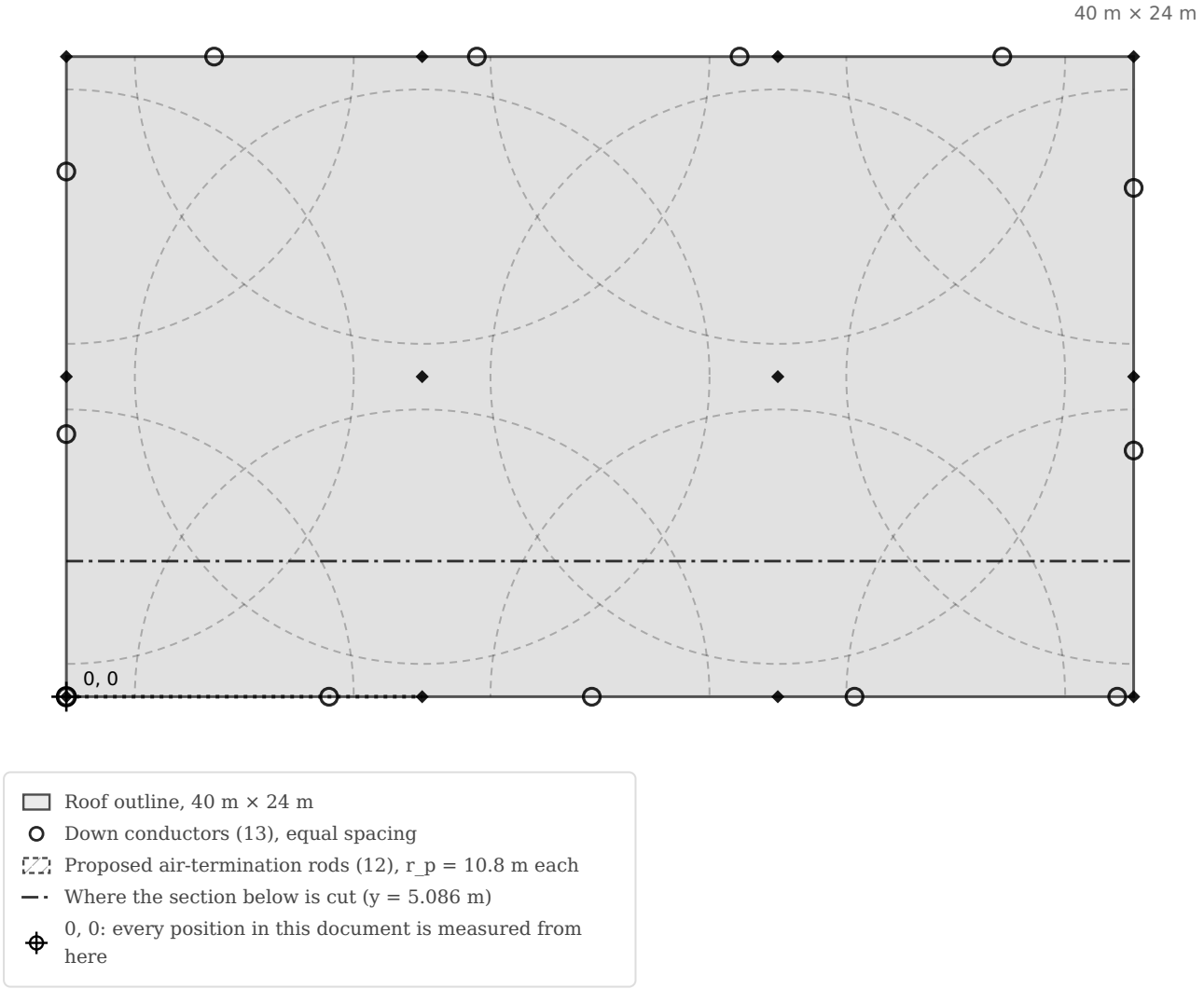
through the roof's **deepest point** — where a rolling sphere lowered over the roof comes to rest lowest — so no rod stands on this line. Sampled at 1 m: the sag between rods is a closed form and exact at any sampling; the flank is measured on that grid and errs low. The roof edge it climbs over is where this design runs its edge conductor (§5.2.2.1), so the sphere touches air termination there. Natural air terminations are not counted, so the real surface is at least this high.

Down conductors

Perimeter	128 m
Preferred distance between down conductors	10 m
Down conductors	13
Largest gap between adjacent conductors	9.85 m (of the even spacing this design proposes)

IEC 62305-3:2024 §5.3.3 requires only that an attached LPS have not fewer than two down conductors. Distributing them around the perimeter is stated as a recommendation, explicitly subject to architectural and practical constraints, and both equal spacing and the Table 5 distances are preferred values rather than limits. The count above is derived from the preferred distance for this class, which is the conservative reading; a layout that departs from it is a departure from a preference, and the design records it as one.

Fit a test joint on each of the 13 down conductors at its connection to the earth termination, openable for measurement and closed in normal use (§5.3.6).



Roof plan, to scale. Positions are measured from 0, 0, marked on the plan. Rings mark the 13 down conductors at the equal spacing §5.3.3 requires — indicative positions, not a layout: on site they follow corners and downpipes. Diamonds are the 12 **proposed** rods, on corners and edges first and then the field, on a square grid no coarser than one rod's reach supports. The faint circles are that reach, r_p = 10.8 m each, clipped to the roof — a rod on the edge reaches past the wall, and that is not roof to cover. The dotted line joins the two rods the rolling sphere rests on at the roof's deepest point. The protected ceiling's lowest point anywhere on this roof is 1.75 m below the rod tips, on the section line marked below. Measured: 100% of the roof lies within a rod's protected radius, at the positions drawn. The engineer may move any of them; this figure is what an alternative should be judged against, and an alternative has to be recomputed — moving a rod voids the figure rather than carrying it along.

Separation distance

k_i (class)	0.06
k_c (current division)	0.44 — 13 down conductor(s)
k_m (material)	1 — Air
Length l	20 m
Required separation s at the air-termination tip	0.648 m
Point considered	20 m above ground
Down-conductor spacing c	9.85 m (assumed equally spaced)
Per-level k_c	level 1: 0.337, level 2: 0.177
Required separation s (general)	0.309 m
Simplified comparison	0.528 m (general saves 42 %)

s is a distance at a point, and this design has two worth quoting. §6.3.1 measures l from the point where the separation distance is to be considered, along the air termination and the down conductor. The figure above is for the down-conductor run; at the tip of the rod the path is longer and the current has not yet divided among the down conductors, so k_c = 1 over the rod (Annex B, Figure B.4 a) — the values of k_c are considered from the point of strike). Separate any metal installation by the figure for its own elevation; this design carries no position for any metal installation, so it cannot say which applies where — a proposed rod layout locates the air termination and nothing else. The governing figure below is the larger of the two, because a single distance applied everywhere has to be the worst case.

General approach assumes all down conductors interconnected by ring conductors at the stated spacing (§5.3.4, Figure B.3).

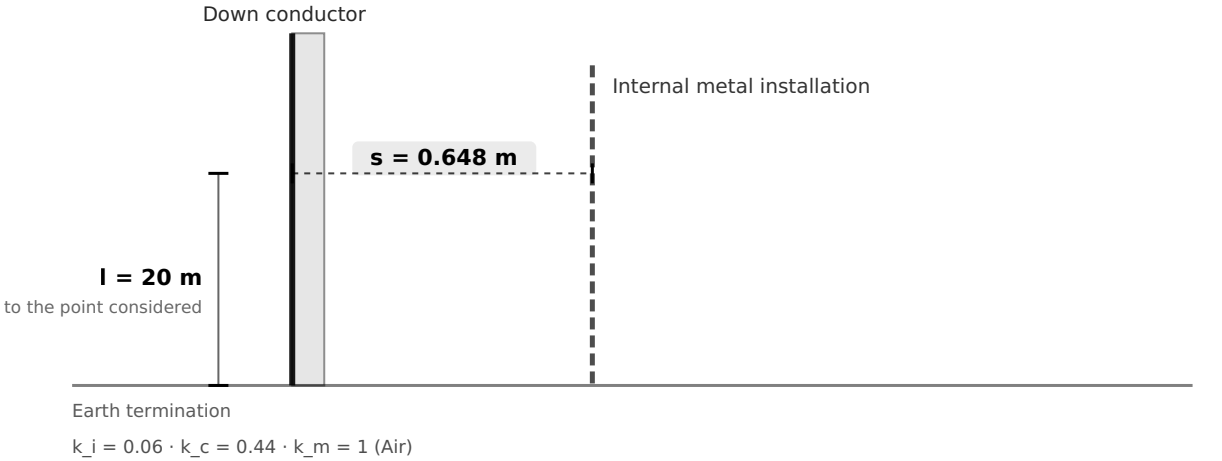
The segment sum runs to the earth termination (bonding at ground level only — conservative). Where the internal installation is bonded at a ring level, only the segments above that level apply (Figure B.3, cases a–e).

Every internal metal installation closer than s to a down conductor must be bonded or the distance increased.

This separation distance is **not altitude-corrected**. §6.3.2 requires a correction for an LPS installed at high elevations, following IEC 60071-2. Site elevation is not an input to this tool and no correction has been applied, so where the site is at elevation, read §6.3.2 against it and adjust s accordingly.

s is the one figure in this design that the finished drawing can correct. Everything else above is fixed by the class and the building; s is computed from the conductor run length and, on the general approach, from the down-conductor and ring spacings — and the values used here for those are stated defaults, not measurements of a layout. Two of them can move s the wrong way: k_c1 grows with the down-

conductor spacing c, and rings further apart than assumed make the computed s non-conservative. Once the layout is drawn, re-run this design with the measured figures.



Separation distance by the general approach (§6.3.1, eq. 5), with 13 down conductors. **Schematic — s and l are not to a common scale**; at typical values s would render as a hairline beside l. The figures on it are the computed ones. Any internal metal installation closer than s must be bonded instead, or the distance increased.

Earth termination

Arrangement	`Type B (ring or foundation earth electrode)`
Soil resistivity ρ	`1500 Ω·m`
Minimum length l_1	`19.0 m`
Ring requirement	`effective radius of the enclosed area r_e ≥ 19.0 m`
Effective ring radius r_e	`18.6 m (from footprint, ring ≈ 1 m out)`
Ring criterion	`not met — additional electrodes required`
Additional electrodes	`13 × horizontal ≥ 0.4 m, or vertical ≥ 0.7 m`

The minimum lengths may be disregarded where an earthing resistance of the Type A arrangement below 10 Ω is achieved — measured at a frequency different from the power frequency and its multiples, to avoid interference (§5.4.2.2).

Ring in contact with the soil for at least 80 % of its length, buried ≥ 0,5 m deep, about 1 m from the external walls (§5.4.3).

Vertical electrode lengths above include the 0,5 m that §5.4.3 adds to every vertical electrode on top of the l_1-derived figure; horizontal lengths carry no such addition.

Connect the additional electrodes to the ring where the down conductors connect, as equidistantly as possible.

Materials & minimum dimensions

LPS conductor material	`Copper / tin-plated copper`
Solid tape, minimum	`50 mm²`
Solid round, minimum	`50 mm²`
Stranded, minimum	`50 mm²`

Air-termination rods	176 mm² solid round
Earth-electrode material	Copper / tin-plated copper
Earth rod (solid round)	Ø 15 mm
Earth rod (tubular)	Ø 20 mm
Buried earth conductor	50 mm²
Earth plate	500 × 500 mm

All LPS components (conductors, rods, electrodes, clamps) shall meet IEC 62561-2 mechanical/electrical/corrosion requirements (Table 7/8 note a).

Air-termination rods where mechanical stress such as wind loading is not critical may be reduced to 9,5 mm diameter, 1 m long (Table 7 note c).

Copper solid round 50 mm² (8 mm Ø) may be reduced to 28 mm² (6 mm Ø) where mechanical strength is not essential; reduce fastener spacing accordingly (Table 7 note b).

A buried copper earth electrode shall not be used in contact with the structure's steel members, pipes or piles — corrosion (Table 8 note g).

Equipotential bonding (internal LPS)

Bonding conductor material	Copper
Bars ↔ bars / bar ↔ earth termination	16 mm² (Table 9)
Internal installations ↔ bonding bar	6 mm² (Table 10)

Install the main bonding bar in the basement or at ground level, accessible for inspection, and connect it to the earth-termination system (§6.2.2 a).

Structure length 40 m exceeds 20 m — use a ring bonding bar or several interconnected bonding bars (§6.2.2 a).

Bond additionally at every point where the separation distance s of the section above cannot be kept (§6.2.2 b). Keep bonding connections as direct and straight as possible.

Live conductors of internal systems are bonded via SPDs — coordinate per IEC 62305-4.

Touch & step voltages

People within 3 m of down conductors	yes (assumed)
Assessment	Protection measures required
Touch-voltage measures	Insulate exposed down conductors to 100 kV, 1,2/50 µs impulse withstand (e.g. ≥ 3 mm cross-linked polyethylene), or apply physical restrictions / warning notices
Step-voltage measures	Equipotentialize with a meshed earth-termination system, or apply physical restrictions / warning notices within 3 m of the down conductors

The insulation withstand voltage should be considered in wet conditions (§8.1). Signage shall conform to ISO 3864-1.

Alternative exemption: a measured contact resistance within 3 m of the down conductors of at least 100 kΩ also brings the hazard to a tolerable level. §8.1 c) sets that over the area of a typical footprint (0,02 m²) for touch voltage; §8.2 c) states the 100 kΩ for the soil surface layer without giving an area. A 5 cm layer of insulating material, e.g. asphalt, generally achieves it (§8.1 NOTE 2 / §8.2 NOTE 1).

Inspection & maintenance

Site environment	`Sensitive internal systems / high occupancy`
Visual inspection	`every year`
Complete inspection (incl. electrical testing)	`every year`

Also inspect: during construction (components that become concealed), after LPS installation, after alterations or repairs, and after a known or suspected lightning strike to the structure (§7.4).

Periodic checks: deterioration and corrosion of air-termination elements, conductors and connections; earthing resistance of the earth-termination system; condition of connections, equipotential bonding and fixings (§7.4).

Testing on a 14–15-month cycle is acceptable where earth-resistance readings across different seasons are wanted (D.7.2.2). Consider improving the earthing system when measured resistance rises over successive inspections.

Record all inspection and test results and keep them with the LPS design documentation for the property manager (§7.4).

Assumptions for missing inputs

- Separation length l not entered — the structure height (20 m) is used per §6.3.2 NOTE 1 (valid while the smaller plan dimension ≤ 3·H), i.e. bonding at ground level only. Enter the length to the nearest bonding point to refine.
- Down-conductor spacing c not entered — 9.85 m used, the 128 m perimeter divided by the 13 down conductors. That is the spacing of an equally spaced layout; §5.3.3 prefers equal spacing but does not require it, so where the layout is known, enter the largest actual distance between adjacent down conductors — k_c1 grows with c.
- Ring-conductor spacing not entered — 10 m assumed. Table 5 itself gives a horizontal distance between down conductors; it is the informative Annex D (D.5.2.4, the Figure D.10 text) that directs ring spacing to §5.3.1 and so to that same table. In Figure B.2 h is the vertical spacing between rings and feeds k_c1 directly — rings further apart than this make the computed separation distance non-conservative, so enter the actual spacing for a design figure.
- Point considered not entered — the top of the structure (20 m) is used (worst case).
- Bonding-conductor material taken as copper to match the LPS conductor material family (Tables 9/10).
- People are assumed present near the down conductors under normal conditions (Clause 8) — mark the site as non-accessible in the Materials & site step if that is not the case.

Calculation trace

Step	Formula	Values	Result	Reference
Rolling-sphere radius	`r = r(class)`	class II	`30 m`	IEC 62305-3:2024 §5.2.2, Table 2

Step	Formula	Values	Result	Reference
Rod protected radius (rolling sphere geometry)	d = √(h·(2r − h))	h = 2 m, r = 30 m	10.8 m	Rolling-sphere geometry, IEC 62305-3:2024 §5.2.2
Perimeter air-termination conductor	l = perimeter of the roof outline	4-sided outline	128.0 m	IEC 62305-3:2024 §5.2.1, §5.2.2.1
Rod spacing that protects the roof edge	d_edge = 2·√(h(2R − 2H − h)); best at h = R − H	R = 30 m, H = 20 m, h = 2 m	12.0 m (best height 10.0 m)	Rolling-sphere geometry at the roof edge, IEC 62305-3:2024 §5.2.2
Proposed rod layout	s ≤ s_max = √2 · r_p; rods on corners, edges, then the field	r_p = 10.77 m, s_max = 15.23 m	12 rods selected from 12 lattice positions at 13.3 m	IEC 62305-3:2024 §5.2.2.1; rolling-sphere geometry
Measured coverage of the rod layout	protected ⟺ dist((x, y, H + r), air termination) < r	960 roof points at 1.00 m spacing	100% protected	Rolling-sphere criterion, IEC 62305-3:2024 §5.2.2
Rod height needed to match the class mesh on a square grid	h = r − √(r² − (w_m/√2)²)	w_m = 10 m, r = 30 m	0.85 m	Rolling-sphere geometry, IEC 62305-3:2024 §5.2.2
Lateral protected width	w = r / 10	class II, r = 30 m	3 m	IEC 62305-3:2024 D.5.2.3.3, Figure D.6
Down-conductor count	n = max(2, ⌈perimeter / spacing⌉)	perimeter = 128 m, spacing = 10 m (class II)	n = 13	IEC 62305-3:2024 §5.3.3, Table 5
Separation distance (simplified)	s = k_i · k_c · l / k_m	k_i = 0.06, k_c = 0.44, l = 20 m, k_m = 1	s = 0.528 m	IEC 62305-3:2024 §6.3.2, eq. (6), Table 13
Separation distance at the air-termination tip	s = k_i / k_m · (1 · h_rod + k_c · l)	k_i = 0.06, k_m = 1; k_c = 1 over the 2 m rod (the current has not divided at the point of strike), then k_c = 0.44 over l = 20 m	s = 0.648 m	IEC 62305-3:2024 §6.3.1, eq. (5); Annex B, Figure B.4 a)
k_c per level (ring-interconnected down conductors)	k_c1 = 1/(2n) + 0.1 + 0.2·∛(c/h₁); k_c2 = 1/n + 0.1; k_c3 = 1/n + 0.01; k_c4… = 1/n	n = 13, c = 9.8 m	k_c1 = 0.337, k_c2 = 0.177	IEC 62305-3:2024 Annex B, Figure B.3
Separation distance (general approach)	s = k_i/k_m · Σ (k_cn · l_n)	k_i = 0.06, k_m = 1; Σ = 0.337·10 + 0.177·10	s = 0.309 m	IEC 62305-3:2024 §6.3.1, eq. (5); Annex B

Step	Formula	Values	Result	Reference
Minimum electrode length	`l_1 = l_1(class, ρ)`	class II, ρ = 1500 Ω·m	`l_1 = 19.0 m`	IEC 62305-3:2024 §5.4.2, Figure 5
Type B ring criterion	`r_e ≥ l_1`	l_1 = 19.0 m	`r_e ≥ 19.0 m`	IEC 62305-3:2024 §5.4.2.3, eq. (1)
Effective ring radius	`r_e = √(A/π), A = (L+2)·(W+2)`	L = 40 m, W = 24 m	`r_e = 18.6 m`	IEC 62305-3:2024 §5.4.2.3 (r_e of the enclosed area)
Type B additional electrodes	`l_r = l_1 − r_e ; l_v = (l_1 − r_e) / 2 + 0.5 m`	l_1 = 19.0 m, r_e = 18.6 m; + 0,5 m per vertical electrode (§5.4.3)	`l_r ≥ 0.4 m or l_v ≥ 0.7 m, × 13`	IEC 62305-3:2024 §5.4.2.3, eq. (2)/(3), §5.4.3

Installation notes

- Bond every internal metal installation that cannot keep the separation distance s from LPS conductors.
- Connect the earth termination to the equipotential bonding bar; coordinate SPDs per IEC 62305-4.

What this report does not cover. Stated for every design, whether or not it applies to yours:

- Hazardous-area classification, and vessels, tanks or piping inside or on a structure that is not itself the container. The zones are the engineer's input, from IEC 60079-10-1 / -10-2, and such vessels are not modelled. Otherwise IEC 62305-3:2024 Annex C, normative for a structure with a risk of explosion, is applied: for a structure that is itself a closed metal container or tank the tool checks the wall against Table 3, Table 4, C.3 and C.4.5.1 and sizes the earth connections and a floating roof's contacts, and on every such design it prints the engineer's statement on each other requirement that applies to the declared zones — stated, not checked. In Austria Annex C is informative, replaced by ÖVE/ÖNORM EN 62305-3 Beiblatt 1.
- Isolated LPS built on masts or catenary wires — the geometry of Annex D. The tool sizes a non-isolated external LPS on the structure itself; the separation distance s it computes is the criterion an isolated design is judged against, not a design of one.
- Green roofs, facades and other construction specials covered by Annex D prose.
- SPD selection and sizing, which belongs to IEC 62305-4 — use the SPM tool for the coordinated SPD system.
- Rooftop plant, parapets and penetrations. A rolling-sphere or protection-angle design with a rod height carries a proposed rod layout and the coverage it measures; a mesh design carries the conductor network — routes and length, roof edge included. On those methods the layout is the design's rather than the drawing's; everything else in a figure is still chosen by the drawing, and says so. Nothing on the roof is an input, so no design here knows about a chiller, a parapet or a vent, and no route is taken around one.
- A bill of materials, and the layout of the lateral air termination. The protected volume is solved and drawn around the whole structure — over the roof and down the flanks to the ground — but not to one standard throughout: over the roof its underside is a closed form evaluated point by point, so the drawing's resolution costs it nothing, while down the flanks it is read off a grid at the pitch published with the section and carries that grid's bias. It is a depth over the plan rather than a full three-dimensional boundary, so nothing is represented beneath an overhang. The section figure is one cut through that solved field, not the extent of what was solved. The published coverage percentage is the roof, measured exactly. §5.2.3 is now sized rather than described: the facade band the requirement covers, the Table 2 cell size for it, and D. 5.2.3.3's α and w. What is not designed is where any of that goes — no facade elevation, no protrusion positions, no facade conductor routes. Natural components are still not counted as obstacles, so the real protected volume is at least the one drawn, and no quantity, length or fixing schedule is produced.

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Method per IEC 62305-3 Ed. 3.0 (2024). Separation distance per the approach stated in its section — simplified (§6.3.2, Table 13) or general (§6.3.1 eq. (5) with Annex B per-level current division). **The simplified result is not a conservative envelope for this design.** That holds where the whole path is down conductor, and this design specifies an air-termination rod: the current is undivided over the rod (k_c = 1 from the point of strike, Annex B Figure B.4 a)) where Table 13's value assumes it has already divided among the down conductors. eq. (5) therefore gives a larger separation distance at high level

than eq. (6) does, not a smaller one. See the separation section for the figure at the rod tip. · Voltbench is a calculation aid intended for use by, or under the supervision of, a qualified engineer; results support and do not replace professional judgement.