

Lightning Risk Assessment Checklist

For facility managers and property owners. Work through it before you ask for a risk assessment, an inspection or a quote. The first three sections gather the inputs of the simplified risk assessment in NFPA 780 Annex L; the last three cover a system you already have.

The structure

- ☐ **Length, width and height**, including the tallest roof feature (stacks, towers, rooftop units). Height moves the result most: the collection area is $A_e = LW + 6H(L + W) + 9\pi H^2$ in meters, so doubling the height adds far more than doubling the length.
- ☐ **Frame and roof construction**: metal, nonmetallic or combustible.
- ☐ **Taller than 75 ft?** NFPA 780 uses Class I materials up to 75 ft and heavier Class II materials above it.
- ☐ **What has been added on the roof** since any system went in: HVAC units, solar panels, antennas, satellite dishes, new rooftop structures.

Location and strike density

- ☐ **Local flash density (Ng)**: cloud-to-ground flashes per km² per year, from lightning detection network data. Colorado's statewide average is 4.8 (NWS Pueblo, 2009–2018); the Oklahoma Mesonet publishes a 1996–2016 density map. Density varies within a state, so use values for your site.

- ☐ **What stands within three building heights (3H)**, and whether the site is on a rise. This sets the location factor C1:

Surrounded by taller structures or trees within 3H	0.25	Isolated, nothing within 3H	1
Surrounded by structures of equal or lesser height within 3H	0.5	Isolated on a hilltop	2

Contents, occupancy and consequences

- ☐ **What is inside and its value**, including anything flammable or critical electronics.
- ☐ **Normal occupancy**, and whether evacuation would be difficult.
- ☐ **What an outage would cost**, and any environmental exposure (fuel, chemicals).
- ☐ **Any requirement already on paper** from an insurer, lender, owner's design standard or corporate policy. It may require protection whatever the calculation says.

Coefficient	Range of values
C2, structure and roof	0.5 metal/metal to 3.0 combustible/combustible
C3, contents	0.5 low value, noncombustible to 4.0 irreplaceable cultural items; flammable liquids, computers or electronics 3.0
C4, occupancy	0.5 unoccupied, 1.0 normally occupied, 3.0 difficult to evacuate or risk of panic
C5, consequence	1.0 services can stop, 5.0 continuity of service required, 10.0 consequences to the environment

How the simplified method decides

Expected strikes per year: $N_d = N_g \times A_e \times C_1 \times 10^{-6}$

Tolerable strikes per year: $N_c = 1.5 \times 10^{-3} \div (C_2 \times C_3 \times C_4 \times C_5)$

If $N_d > N_c$, a lightning protection system is recommended. If $N_d \leq N_c$, it is optional.

Annex L is guidance, not a mandatory requirement. The coefficients come from the simplified method in earlier editions; NFPA 780 is now in its 2026 edition, so use the edition your project references. This checklist is not a design or a formal assessment: have a qualified designer confirm the inputs.

Existing protection to look at

A complete system has five parts (Lightning Protection Institute). Look for each one, and for the faults inspections commonly find.

- ☐ **Air terminals** on ridges, roof edges, chimneys and rooftop equipment. Look for bent, missing or loose terminals, and for new rooftop equipment that never got one. **NFPA 780** (2023) puts tips at least **10 in** above what they protect and no more than **20 ft** apart along ridges and flat-roof perimeters.
- ☐ **Roof and down conductors:** continuous and secured, with no broken sections, cut cables, loose connections or sharp bends. Copper must not touch aluminum roofing or siding, and aluminum must not sit on copper or in its runoff.
- ☐ **Bonding** to the electrical service ground, telecom grounds, water and gas piping, metal roofing, gutters and HVAC equipment. New piping, antennas or equipment that was never bonded can let a strike side-flash through a wall or attic.
- ☐ **Grounding electrodes** at the base of each down conductor: corroded clamps, rods disturbed by excavation or trenching, connections buried or paved over. A test well over the rod lets an inspector reach the clamp without digging.
- ☐ **Surge protection** at every service entrance: power, phone and data lines, and solar circuits. Look for missing devices and spent devices that were never replaced.
- ☐ **Corrosion** on connectors, fasteners, ground rods, bonding clamps and air terminal bases.

Inspection and maintenance records

- ☐ **The installer's maintenance guidelines.** **NFPA 780** requires the installer to give them to the owner when the job is done (1.6). Ask for them in writing.
- ☐ **Your inspection interval.** The 2023 edition leaves it to the authority having jurisdiction (1.7). The first revision for the 2026 cycle proposed annual inspections or intervals set by that authority; check the final wording before you set a schedule.
- ☐ **Ground resistance readings,** each with its date and recent weather: a baseline at installation, then readings at a similar time of year. Test against the target in your specification or from your insurer or engineer; if nobody has set one, compare with the system's own earlier readings.
- ☐ **Drawings and the inspection document** from the installation (a third-party certificate, where there is one), plus any repair records.
- ☐ **A fresh inspection** after re-roofing or roof repairs, building additions or new rooftop equipment, excavation, trenching or paving near the building, or a known strike.

Questions to ask a contractor

- ☐ Which edition of **NFPA 780** are you designing to, and does it match what our jurisdiction or specification requires?
- ☐ Will you provide drawings showing air terminal locations, conductor routing and grounding?
- ☐ Are all components listed to **UL 96**?
- ☐ How will you bond to our electrical, water, gas and communications grounds?
- ☐ Who will do the third-party inspection, and what document will we receive at the end?
- ☐ What maintenance guidance will you hand over?
- ☐ Will you test the grounding at installation, so we have a baseline for later readings?

Sources

1. NFPA 780, Standard for the Installation of Lightning Protection Systems, 2023 edition (NFPA document page). [nfpa.org](https://www.nfpa.org)
2. NFPA 780 (A2025 cycle) First Revision report. [docinfofiles.nfpa.org](https://www.docinfofiles.nfpa.org)
3. Lightning Protection Institute: Lightning Protection Overview. lightning.org
4. Lightning Protection Institute: Measuring the Tolerable Risk. lightning.org
5. Calculations of Risk Assessment Study as per NFPA 780. electrical-knowhow.com
6. NWS Pueblo: Colorado Lightning Statistics as Compared to Other States. weather.gov
7. Oklahoma Mesonet: Yearly Lightning Density 1996–2016. mesonet.org
8. Fluke: Fall-of-Potential Measurement. fluke.com

Written from these articles at www.sitesafelp.com: Lightning risk assessment · NFPA 780 explained · Lightning protection system components · Fall of potential test · Common problems found during inspections · When to re-inspect your system.