



LIGHTNING

**RISK EVALUATION
GUIDE FOR . . .**

**BUILDING OWNERS
ARCHITECTS
ENGINEERS
CONTRACTORS**



THOMPSON LIGHTNING PROTECTION INC.

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GENERAL

This lightning risk assessment guide is prepared to assist in the analysis of various criteria to determine the risk of loss due to lightning. As a guide, it is not possible to cover each special design element that may render a structure more or less susceptible to lightning damage. In special cases personal and economic factors may be very important and should be considered in addition to the assessment obtained by use of this guide.

If the structure is in a high risk situation, a risk index (R) should be computed for a wide range of structures in the environment concerned. The structure's index is then compared to the index of these other structures so that a judgment of local risk weighting can be made.

DETERMINING THE RISK *

The assessment of risk index (R) is given in Table I-2. The risk index (R) is obtained by dividing the sum of the values given in Tables I-2a through I-2e by the lightning frequency index value obtained from Table I-2f.

Table I-2
Assessment of Risk, R

R Value	Risk Value
0-2	Light
2-3	Light to Moderate
3-4	Moderate
4-7	Moderate to Severe
Over 7	Severe

The risk index (R) is:

$$R = \frac{A + B + C + D + E}{F}$$

RISK INDEX A *

TABLE I-2a - TYPE OF STRUCTURE



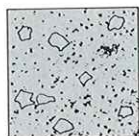
Index Structure	Value
Single family residence less than 5,000 sq. ft. (465 m ²)	1
Single family residence over 5,000 sq. ft. (465 m ²)	2
Residential, office or factory building less than 50 ft. (15 m) in height:	
Covering less than 25,000 sq. ft. (2323 m ²) of grounded area	3
Covering over 25,000 sq. ft. (2323 m ²) of ground area	5
Residential, office or factory building from 50 to 75 ft (15 to 23 m) high	4
Residential, office or factory building from 75 to 150 ft (23 to 46 m) high	5
Residential, office or factory building from 150 ft (46 m) or higher	8
Municipal services buildings, fire, police, water, sewer, etc.	7
Hangars	7
Power generating stations, central telephone exchanges	8
Water towers and cooling towers	8
Libraries, museums, historical structures	8
Farm buildings	9
Golf shelters and other recreational shelters	9
Places of public assembly such as schools, churches, theaters, stadiums	9
Slender structures such as smokestacks, church steeples and spires, control towers, lighthouses, etc.	10
Hospitals, nursing homes, housing for the elderly or handicapped	10
Buildings housing the manufacture, handling or storage of hazardous materials	10

RISK INDEX B *

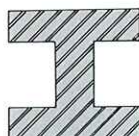
TABLE I-2b - TYPE OF CONSTRUCTION



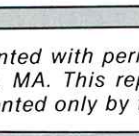
Structural Framework
Nonmetallic
(other than wood)



Wood



Reinforced Concrete



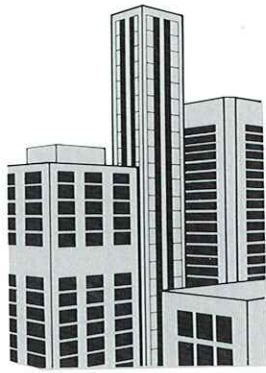
Structural Steel

Roof Type

Roof Type	Index Value
Wood	5
Composition	3
Metal — not continuous	4
Metal — electrically continuous	1
Wood	5
Composition	3
Metal — not continuous	4
Metal — electrically continuous	2
Wood	5
Composition	3
Metal — not continuous	4
Metal — electrically continuous	1
Wood	4
Composition	3
Metal — not continuous	3
Metal — electrically continuous	1

NOTE: Composition roofs include asphalt, tar, tile, slate, etc.

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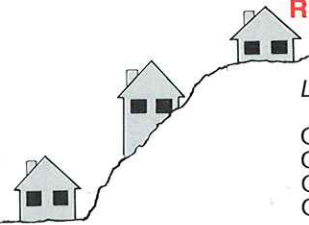
RISK INDEX C *

TABLE I-2c - RELATIVE LOCATION

Location

Index
Value

Structures in areas of higher structures:	
Small structures — covering ground area of less than 10,000 sq. ft. (929 m ²)	1
Large structures — covering ground area of more than 10,000 sq. ft. (929 m ²)	2
Structures in areas of lower structures:	
Small structures — covering ground area of less than 10,000 sq. ft. (929 m ²)	4
Large structures — covering ground area of more than 10,000 sq. ft. (929 m ²)	5
Structures extending up to 50 ft (15.2 m) above adjacent structures or terrain	7
Structures extending more than 50 ft. (15.2 m) above adjacent structures or terrain	10



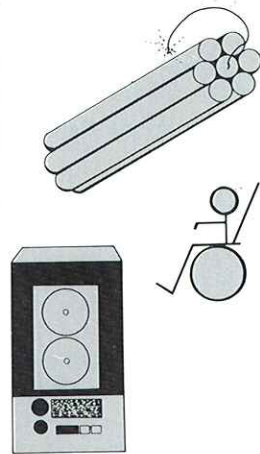
RISK INDEX D *

TABLE I-2d - TOPOGRAPHY

Location

Index
Value

On flat land	1
On hillside	2
On hill top	4
On mountain top	5

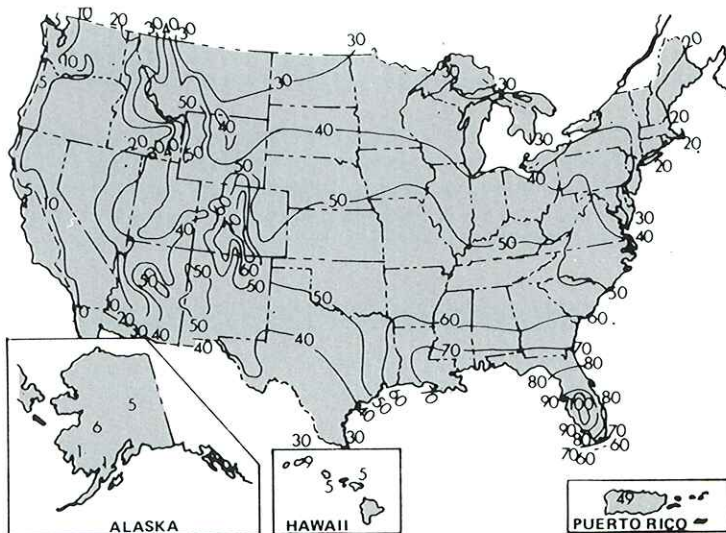


RISK INDEX E *

TABLE I-2e - OCCUPANCY AND CONTENTS

Index
Value

Noncombustible materials — unoccupied	1
Residential furnishings	2
Ordinary furnishings or equipment	2
Cattle and livestock	3
Small assembly of people — less than 50	4
Combustible materials	5
Large assembly of people — 50 or more	6
High value materials or equipment	7
Essential services — police, fire, etc.	8
Immobile or bedfast persons	8
Flammable liquids or gases — gasoline, hydrogen, etc.	8
Critical operating equipment	9
Historic contents	10
Explosives and explosive ingredients	10



RISK INDEX F *

TABLE I-2f LIGHTNING FREQUENCY ISOCERAUNIC LEVEL

Index
Value

0-5	9
6-10	8
11-20	7
21-30	6
31-40	5
41-50	4
51-60	3
61-70	2
Over 70	1

* The computed "R" values for the eastern United States should be multiplied by a factor varying from 1.5 in the Northeast to 0.5 in the Southeast. This factor is due to the differences in storm characteristics in these regions.

USING THE RISK ASSESSMENT GUIDE

To get the feel of lightning risk assessment, use the form below to chart the risk values of a few potential targets — your office building, your house, a nearby school or church, a structure on the drawing board. You'll sharpen your judgment and minimize chances for error or oversight when the time comes to use the guide in an actual assessment situation.

$$\text{Risk "R"} = \frac{A + B + C + D + E}{F}$$

DATE	PROJECT NAME	INDEX A	INDEX B	INDEX C	INDEX D	INDEX E	TOTAL	INDEX F	RISK VALUE

TO THE CONSTRUCTION PROFESSIONAL ...

This reprint of the NFPA's Risk Assessment Guide is in answer to innumerable requests from architects, engineers and others for guidance in what up until now has been an area void of any real criteria. We at Thompson Lightning Protection could only urge, "If there's any doubt, protect the structure; the costs of doing so are in most cases tiny in contrast to value of the building alone, not to mention its contents, and particularly the safety of its occupants."

We feel that's still sound advice. But we're glad that we can now furnish you with a guide prepared by a committee representing the divergent views of independent experts and lightning protection users as well as the views of the industry of which we are a part.

We still recommend that if based on use of this guide you specify lightning protection for a particular property and it is rejected, require that the rejection be put in writing for your files.

TO THE PROPERTY OWNER ...

Experts can evaluate, specify and recommend, but only owners can, in the end, decide.

May we recommend that whatever the risk value of your building you also consider three outside factors that affect the advisability of protecting the structure?

These are trends we have seen during the more than 70 years our company has been in business:

- 1) **Rising costs** - A proper system protects for a life-time at a cost amortized over decades of escalating prices.
- 2) **Increasingly vulnerable contents** - With fragile electronic equipment susceptible to tiny blips of current, a lightning protection system provides low-resistance paths to minimize the effects of direct strikes to the building.
- 3) **Changing views of liability** - If there's a liability question today, chances are it will grow. Views regarding owner liability are changing.

THOMPSON LIGHTNING PROTECTION SYSTEMS

Thompson Lightning Protection, Inc., came into being as George E. Thompson Company more than 70 years ago when protection of houses and barns constituted most of our business. Today, protection of commercial and industrial properties is the largest area of activity, with protection of hospitals, schools, churches and other institutional buildings second, homes third, and farms, last.

We were a full service company then and so we remain today, manufacturing top quality lightning protection components and offering installation services through what is now a nationwide network of representatives and dealers. Our design and drafting department is equipped to furnish system layouts on a one-day basis for most projects. We've designed and installed systems for everything from the most sophisticated space exploration and defense installations to the simplest of golf course rain shelters. All our components and installations meet or exceed requirements of the Lightning Protection Institute, the National Fire Protection Association, and the Underwriters Laboratories, Inc.

TECHNICAL DESIGN, PRODUCT CATALOGS, GENERAL INFORMATION ON LIGHTNING PROTECTION SYSTEMS ARE AVAILABLE FOR ALMOST ANY APPLICATION, INCLUDING:

- Schools
- Churches
- Hospitals
- Residences
- Golf Courses
- Commercial Buildings
- Farms
- Offices
- Factories
- Elevators
- High Rise Buildings
- Hazardous Facilities

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