

## Chapter E 170

## SCOPE, EXCEPTIONS, ETC.

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## PROTECTION OF STRUCTURES CONTAINING FLAMMABLE LIQUIDS AND GASES

## Introduction

*Note: Reduction of damage.* Certain types of structures used for the storage of flammable liquids and gases are essentially self-protecting against damage due to lightning strokes. Protection of a greater or less degree may be secured in the case of others through the installation of various types of protective equipment, such as rods, masts, overhead ground wires, and by other means.

Sections E 160.01 through E 168.03 relate to the protection of buildings and miscellaneous property against lightning damage. Because of the nature of contents of the structures considered in the following, extra precautions must be taken. In these structures a small spark that would ordinarily cause little if any damage might cause the complete destruction of the structure due to explosion of its contents.

*Fundamental principles of protection.* Protection of structures and their contents from lightning involves the following principles:

- (1) The storage of flammable liquids and gases in all-metal structures, essentially gastight.
- (2) The closure or protection of vapor or gas openings against entrance of flame.
- (3) The maintenance of containers in good condition, so far as potential hazards are concerned.
- (4) The avoidance, so far as possible, of the accumulation of flammable air-vapor mixtures about such structures.
- (5) The avoidance of spark gaps between metallic conductors at points where there may be an escape or accumulation of flammable vapors or gases.
- (6) The location of structures not inherently self-protecting in positions of lesser exposure with regard to lightning. Elevated positions should be avoided.
- (7) In connection with structures not inherently self-protecting, the establishment of zones of protection through use of grounded rods, masts, or the equivalent.

**E 170.01 Scope and purpose.** (1) This code applies to the protection of structures containing flammable liquids and gases from lightning or electric discharges. It applies particularly to structures containing alcohol, benzol, petroleum, petroleum products, turpentine, and other liquids which produce flammable air-vapor mixtures at atmospheric temperatures.

(2) This code is primarily intended to give fundamental information as to the kind of structures most suitable for the protection of their contents from lightning or electric discharges and to indicate ways of protecting such structures as are not inherently self-protecting.

(3) This code is concerned only with the prevention of fires or explosions from electric discharges and is not concerned with means of extinguishing fires when once started.

**History:** Cr. Register, November, 1961, No. 71, eff. 12-1-61.

**E 170.02 Interpretation and exceptions.** This code shall be liberally construed. Exceptions from its literal requirements may be made if

equivalent protection is otherwise secured. It is not intended that this code be interpreted as recommending the protection of the class of property to which it applies, but it shall constitute the standard where economic or other considerations make it appear that protection is necessary or desirable.

**History:** Cr. Register, November, 1961, No. 71, eff. 12-1-61.

**E 170.03 Mandatory and advisory requirements.** The word "shall" where used is to be understood as mandatory and the word "should" as advisory. The word "may" is used in the permissive sense.

**History:** Cr. Register, November, 1961, No. 71, eff. 12-1-61.

**E 170.04 Terms and definitions.** The following terms and definitions apply specifically to the structures, materials, and contents involved in sections E 170.01 through E 171.07:

(1) **VAPOR OPENINGS.** These are openings through a tank shell or roof above the surface of the stored liquid. Such openings may be provided for tank breathing, tank gaging, fire fighting, or other operating purposes.

(2) **FLAME PROTECTION OF VAPOR OPENINGS.** Self-closing gage hatches, vapor seals, pressure-vacuum breather valves, flame arresters, or other reasonably effective means to minimize the possibility of flame entering the vapor space of a tank. Where such a device is used, the tank is said to be "flameproofed".

(3) **CAGE.** A system of wires or cables forming an essentially continuous mesh or network over a structure and roof, including the necessary conductors that are connected to the structure and to an adequate ground.

(4) **CONE OF PROTECTION.** The cone of protection provided by a grounded lightning rod or mast is that space adjacent to the rod or mast that is substantially immune to direct strokes of lightning. When overhead ground wires are used, the space protected is called a zone of protection or protected zone.

(5) **FLASH POINT.** Flash point is the minimum temperature at which a liquid will give off vapor in sufficient amount to form a flammable air-vapor mixture that can be ignited under specified conditions.

(6) **GASTIGHT.** Structures so constructed that gas or air can neither enter nor leave the structure except through vents or piping provided for the purpose.

(7) **SPARK GAP.** As used in this code, the term "spark gap" means any short air space between 2 conductors electrically insulated from or remotely electrically connected to each other.

(8) **FLAMMABLE VAPORS.** The vapors given off from a flammable liquid at and above its flash point.

(9) **FLAMMABLE AIR-VAPOR MIXTURES.** When flammable vapors are mixed with air in certain proportions, the mixture will burn rapidly when ignited. The combustion range for ordinary petroleum products, such as gasoline, is from 1½ to 6% of vapor by volume, the remainder being air.

**History:** Cr. Register, November, 1961, No. 71, eff. 12-1-61.