

(2) Beams and girders extending below the ceiling of the space protected and any other obstructions do not detract from the effectiveness of the detector; and

(3) Damage to the detector is unlikely to occur if it is not protected.

(b) Each detector must be set to activate at not less than 57 °C (135 °F) and at not more than 73 °C (165 °F), except that if a space normally has a high ambient temperature each detector may be set to activate at not less than 80 °C (175 °F) and not more than 107 °C (225 °F).

**§ 108.409 Location and spacing of tubing in pneumatic fire detection system.**

(a) All tubing in a pneumatic fire detection system must be on the overhead or within 300 millimeters (12 inches) of the overhead on a bulkhead in a location where—

(1) No portion of the overhead is more than 3.6 meters (12 feet) from the nearest point of tubing;

(2) Beams or girders extending below the ceiling or other obstructions do not detract from the effectiveness of the tubing; and

(3) Damage to the tubing, is unlikely to occur if it is not protected.

(b) If tubing in a tubing circuit is installed in an enclosed space, at least 5% of the tubing in the circuit must be exposed in the space, except that at least 7.6 meters (25 feet) of tubing must always be exposed in the space.

(c) A pneumatic fire detection system must be set to activate after approximately a 22 °C. (40 °F.) per minute increase in temperature at the center of the circuit in the system.

**§ 108.411 Smoke detection system.**

Each smoke accumulator in a smoke detection system must be located on the overhead of the compartment protected by the system in a location—

(a) Where no portion of the overhead of the compartment is more than 12 meters (40 feet) from an accumulator;

(b) That is no closer to the opening of a ventilator than 3 times the diameter or equivalent size of the opening.

(c) Where damage to the accumulator is unlikely to occur if it is not protected.

**§ 108.413 Fusible element fire detection system.**

(a) A fusible element fire detection system may be installed.

(b) The arrangements for the system must be acceptable to the Commandant.

**FIRE MAIN SYSTEM**

**§ 108.415 Fire pump: General.**

A fire main system must have at least two independently driven fire pumps that can each deliver water at a continuous pitot tube pressure of at least 3.5 kilograms per square centimeter (approximately 50 pounds per square inch) at least two fire hose nozzles that are connected to the highest two fire hydrants on the unit. Alternative designs that meet the pressure requirement of this paragraph will be considered for column stabilized and self elevating units.

**§ 108.417 Fire pump components and associated equipment.**

(a) Each fire pump in a fire main system must have a relief valve on its discharge side that is set to relieve at 1.75 kilograms per square centimeter (approximately 25 pounds per square inch) in excess of the pump discharge pressure necessary to meet the pressure required in § 108.415 for the pump or 8.6 kilograms per square centimeters (approximately 125 pounds per square inch), whichever is greater. A relief valve may be omitted if the pump operating under shut off condition is not capable of developing the pressure described in § 108.415 plus 1.75 kilograms per square centimeter (25 pounds per square inch).

(b) Each fire pump in a fire main system must have a pressure gauge on its discharge side.

(c) Fire pumps may be used for other purposes. One of the required pumps must be kept available for use on the fire system at all times. If a fire pump is used in a system other than the fire main system, except for branch lines connected to the fire main for deck washing, each pipe connecting the other system must be connected to the pump discharge through a shut off valve at a manifold near the pump. If the fire pump exceeds the pressure in