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Federal Aviation Agency

ADVISORY CIRCULAR

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SUBJECT: GUIDE SPECIFICATION FOR FIRE EXTINGUISHING SYSTEM (FOAM) FOR HELIPORTS

1. PURPOSE. This advisory circular contains guidance material which may be used by airport management in the development of local procurement specifications. It is not addressed to any regulatory requirements of FAA but is promulgated for general use. The words "shall" and "will" are not to be construed as mandatory requirements of FAA. They are specifically included so that portions of this guide specification may be copied verbatim by procurement specification writers.

2. REFERENCE. AC 150/5390-1, "Heliport Design Guide," dated November 3, 1964.

3. SCOPE. The guidance material describes an installed fire extinguishing system, hereinafter referred to as the system, possessing the minimum performance capabilities recommended for heliports used by helicopters grossing 10,000 pounds and over, see paragraphs 43b(2)(c) and 43b(3) of the referenced advisory circular. It also calls attention to additional items which must be taken into consideration when the installation of such a system is contemplated.

4. DESIGN CONSIDERATIONS. Careful consideration must be given to the following items prior to developing procurement specifications:

   a. Adequacy of available water supply to support the system.

   b. Adequacy of an elevated heliport drainage system to accommodate the quantities of water-foam solution, specified in paragraph 5a, and fuel which may drain from a helicopter in case of an accident.

   c. The need for larger quantities of a water-foam solution at elevated heliports to provide a reasonable degree of protection for the structure.

   d. When the local water supply will provide the required flow characteristics as specified in paragraphs 5a and 5b, the pump and motor requirements outlined in paragraphs 6c(1)(a) and 6c(1)(b) will be deleted as shown in Figure 3.

e. When the local water supply will provide 200 GPM for the periods established in paragraph 5a, the tank requirements outlined in paragraph 6c(1)(c) will be deleted as shown in Figure 2.

5. SYSTEM DESCRIPTION. This guide specification describes an installed balanced pressure-type foam system consisting essentially of storage lines, nozzles, a pumping unit, and all necessary valves and controls for the efficient operation of the system. The system shall be capable of:

a. Discharging a water-foam solution through two extended hose lines at the rate of 200 GPM in sufficient pressure to produce the characteristics of expansion, drainage time, and stream reach, specified in paragraphs 6c(3)(c)2 and 6c(3)(c)3.

b. Maintaining this discharge rate for a minimum period of 15 minutes at elevated heliports and 8 minutes at ground level heliports.

6. REQUIREMENTS.

a. Materials. Materials shall be as specified herein. Those not definitely specified shall be of the best quality used for the purpose in commercial practice. They shall be free from all defects and imperfections that might adversely effect the serviceability of the finished product.

b. Design and Installation. Design and installation of the system shall be in accordance with the best engineering practices and provide the accessibility required for ease in maintenance and operation. Provisions shall be provided to protect all portions of the system containing either water or foam concentrate from freezing.

c. Details of Components.

(1) Water Supply Equipment.

(a) Pump. The pump shall be of centrifugal type designed to provide for discharging a minimum of 200 GPM of water at the pressure required to overcome friction in piping and hose lines and produce the nozzle discharge requirements outlined in paragraph 6c(3)(c)2.

(b) Pump Motor. The pump shall be driven with an alternating or direct current type electric motor having sufficient power to permit the pump to meet the performance requirements as listed in paragraph 6c(3)(c)2 without the motor being overloaded.

(c) Water Storage Tank. The water storage tank shall be of sufficient size to contain the water needed to meet the performance requirements outlined in paragraph 5. Water level in the storage tank shall be controlled by a float valve.

(d) Controls, Valves, and Piping. A valve to control the flow of water to the delivery system shall be installed as shown in Figures 1, 2, or 3 of the attached piping diagrams. This valve shall be of the quick operating type remotely controlled from the delivery hardware cabinets. The remote control shall also actuate the pump motor and an alarm system. All other necessary valves and controls required to regulate the water flow and pressure, provide for drainage, and permit flushing the system shall be included. Piping shall possess a rating commensurate with the system pressures.

(2) Foam Supply Equipment.

(a) Proportioner. A venturi-like device constructed of corrosive resistant materials shall be installed in the water supply line. It shall be designed to introduce a metered pressure drop in this line for accurate control of the foam liquid injection rate. This device should be located for ease in flushing.

(b) Orifice Plate. A stainless steel orifice plate shall be installed in the foam concentrate supply piping, designed to accurately calibrate a foam concentrate flow of either 3 or 6 percent (as selected by the purchaser).

(c) Foam Concentrate Storage Tank. A foam concentrate storage tank shall be of sufficient size to contain the quantity of foam concentrate (3 or 6 percent) needed to provide for the discharge requirement established in paragraph 5 as a minimum. The tank shall be constructed of an anti-corrosive material or treated to prevent corrosion.

(d) Controls, Valves, and Piping. All controls, valves, and piping required to permit pressurizing, draining, and flushing the system; controlling flow of foam concentrate; and filling and draining the foam concentrate storage tank shall be installed. The piping shall be of a material which will minimize corrosion.

(e) Filler. A suitable device for filling the foam concentrate storage tank shall be permanently installed in a readily accessible position.

(3) Delivery Hardware.

(a) Hose Cabinets. Two weather resistant cabinets shall be located outside but within 5 feet of the boundary line defining the landing and takeoff area. They shall not protrude into the approach-departure path clearance planes as defined in paragraph 24 of the "Heliport Design Guide," AC 150/5390-1. The cabinets shall be located as remotely as possible from each other, but within the area described above. Each cabinet shall be of sufficient size to house hose reel, hose, nozzle system actuating and control mechanism, alarm box, and two hand type dry chemical fire extinguishers.

(b) Reels and Hose. The manual rewind reel installed in each cabinet shall be equipped with sufficient hose to reach all parts of the landing and takeoff area. The hose shall be 400 pounds test, booster hose, 1½-inch diameter. Reels shall be equipped with a friction brake to provide a positive control for unreeling of the hose.

(c) Nozzles. Each nozzle shall be equipped with a shutoff type nozzle designed:

1 For use with a foam concentrate approved by a recognized testing agency for fire extinguishing agent.

2 To discharge water-foam concentrate solution or water fog at a rate of 100 GPM at a pressure which will provide a foam discharge pattern from a flat 15-foot width and a 20-foot range to a solid stream of foam with a minimum 50-foot range.

3 To produce foam having a minimum expansion of 8 with a 25 percent drainage time of at least 5 minutes.

(d) Controls and Valves. All the necessary controls and valves to actuate the system and permit the selection of water-foam or water discharge shall be located in each cabinet.

(4) Name and Instruction Plates. All name and instruction plates shall be of metal or plastic with the information engraved, stamped, or etched thereon. If metal, they shall be made of a noncorrosive material. All plates shall be mounted in a conspicuous place.

(a) Plastic Plates. Plastic plates should not be used in an exposed position where they are subject to weathering.

(b) Name Plates. Name plates shall show make, model, serial number, and such other data as to positively identify the item.

(c) Identification or Instruction Plates. Identification or instruction plates should be attached to any handle, valve, or component part which necessitates identification or important instructions to be followed in operating or servicing of the system. Instruction plates shall include warnings or cautions and be of sufficient size to be effective for the intended purpose.

d. Technical Publications. The contractor shall furnish the following set of publications in accordance with standard commercial practice applicable to the system furnished under the contract. A set shall be composed of two copies each of the following publications:

(1) Operations Manual.

(2) Parts Manual.

(3) Maintenance and Service Manual.

(4) Detailed Plans of the System as Installed.

7. QUALITY ASSURANCE PROVISIONS. The contractor shall be responsible for the design and installation of a complete system conforming to the requirements outlined in paragraph 6b.

8. ACCEPTANCE TESTS. These tests, which should be witnessed by a representative of the local fire department, shall be conducted to determine:

a. Discharge Rate. The discharge rate of the system is in accordance with paragraph 5a.

b. Ratio. The ratio of water to foam concentrate is in accordance with paragraph 6c(2)(c).

c. Foam Characteristics. The foam expansion, drainage time, discharge and discharge rates are in accordance with paragraphs 6c(3)(c)2 and 6c(3)(c)3.

9. INFORMATION FOR BIDDERS. Bidders will provide with their bids a sketch of the proposed installation together with descriptive literature of all major system components to be used.

10. WARRANTY. The contractor shall warrant and guarantee the foam system and all equipment against defects due to design, material, or workmanship for a period of one year from date of acceptance. This guarantee shall require the immediate replacement of any defective equipment without cost to the purchaser.

11. HOW TO OBTAIN THIS PUBLICATION. Obtain additional copies of this circular, AC 150/5230-2, "Guide Specification for Fire Extinguishing System (Foam) for Heliports," and the referenced advisory circular from Federal Aviation Agency, Distribution Section, HQ-438, Washington, D. C. 20553.

Sole Morrow, Director
Airports Service

Attachment

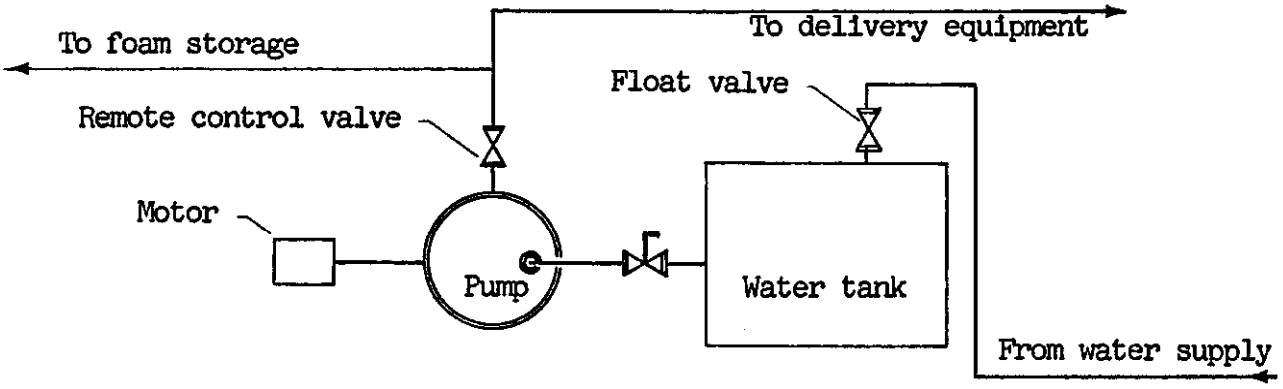

FIGURE 1

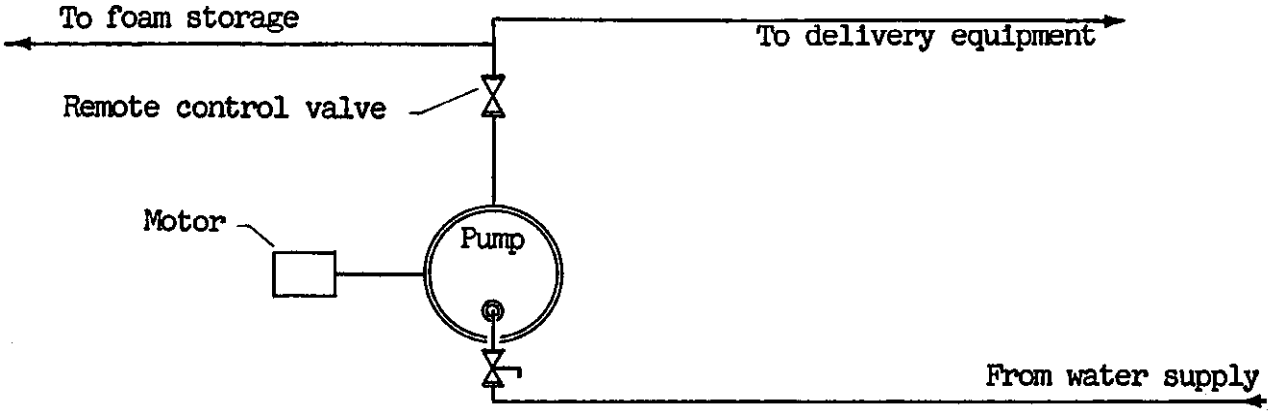

FIGURE 2

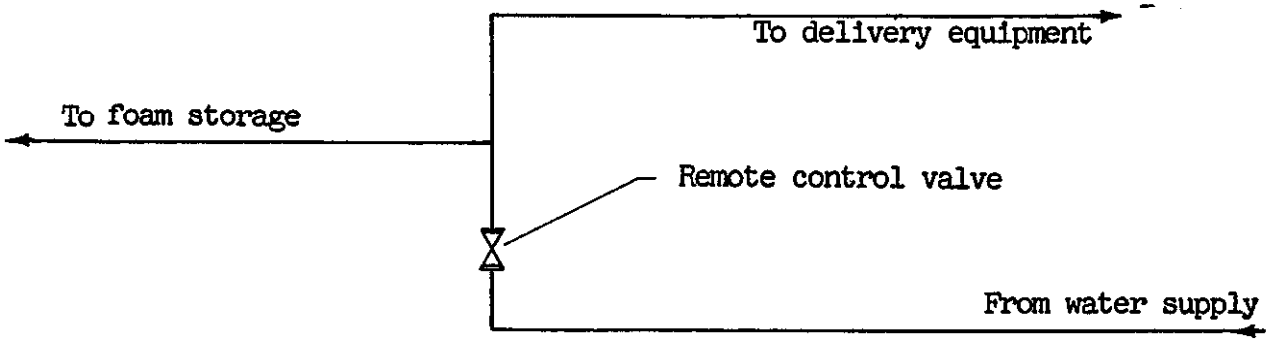

FIGURE 3

WATER FLOW DIAGRAMS