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ADVISORY CIRCULAR

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

SUBJECT: FIRE AND RESCUE SERVICE FOR CERTIFICATED AIRPORTS

1. PURPOSE. This circular furnishes guidance and explains to Federal Aviation Administration (FAA) airport inspectors and airport management the minimum criteria to be applied when evaluating the aircraft fire and rescue service required at an airport for its compliance with the requirements of Federal Aviation Regulation (FAR) Part 139.

2. REFERENCES. Obtain additional copies of this publication and the publications referenced below from the Department of Transportation, Distribution Unit, TAD-484.3, Washington, D.C. 20590. Federal Aviation Regulations Parts 139 and 152, Volume X, may be obtained from the U. S. Government Printing Office, Washington, D.C. 20402. Make check or money order for $4.50 payable to the Superintendent of Documents. No C.O.D. orders are accepted.

   a. AC 150/5200-15, Availability of the International Fire Service Training Association's (IFSTA) Aircraft Fire Protection and Rescue Procedure's Manual.

   b. AC 150/5210-7, Aircraft Fire and Rescue Communications.

   c. AC 150/5210-8, Aircraft Fire Fighting and Rescue Personnel and Personnel Clothing.

   d. AC 150/5210-10, Airport Fire and Rescue Equipment Building Guide.

   e. AC 150/5220-1, Guide Specification for a Light-Weight Airport Fire and Rescue Truck.

   f. AC 150/5220-2, Guide Specification for 1,800 Gallon Aircraft Fire and Rescue Truck.

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g. AC 150/5220-3, Guide Specification for 1000 Gallon Aircraft Fire and Rescue Truck.

h. AC 150/5220-4, Water Supply Systems for Aircraft Fire and Rescue Protection.

i. AC 150/5520-5, Guide Specification for a Combination Foam and Dry Chemical Aircraft Fire and Rescue Truck.

j. AC 150/5220-7, Guide Specification for 2500 Gallon Aircraft Fire and Rescue Truck.

k. AC 150/5325-5A, Aircraft Data.

l. Order 5220.2A, A Modern, Well-Designed Fire and Rescue Truck.

3. GENERAL.

a. The Federal Aviation Regulation Part 139.49 establishes a system of indexing airports that are regularly served by scheduled air carriers operating aircraft and holding certificates of public convenience and necessity issued by the Civil Aeronautics Board.

b. The airport index is determined by the length of the aircraft serving the airport and the frequency of such operation.

c. The Airport and Airway Development Act of 1970, which amends the Federal Aviation Act of 1958 to require airport operating certificates, specifies that fire fighting and rescue equipment must be capable of rapid access to any portion of the airport used for landing, takeoff, and surface maneuvering of aircraft.

d. The minimum amount of fire extinguishing agent(s) required for each index is specified in FAR 139.49 together with the minimum number of vehicles required to transport the agent(s). There are a number of combinations of vehicles and agents which will comply with these requirements. A number of other methods for transporting the fire extinguishing agent(s) are suggested herein as acceptable means of complying with the requirements of FAR 139.49. In addition to the combinations specified, other combinations of vehicles may also be capable of performing the required service. These alternate combinations will be given full consideration when evaluating the airport's fire service.

e. Applications for Federal participation in the purchase of safety equipment required by FAR Part 139 will be made in accordance with the procedures contained in FAR Part 152.

4. EQUIPMENT. Full descriptions and specifications for fire and rescue trucks found in the referenced publications provide guidance material only for evaluating these units.

5. FIRE EXTINGUISHING AGENTS AND EQUIPMENT. Table 1, Appendix 1, charts the minimum allowable fire extinguishing agents and equipment to meet certification requirements. Several alternate systems are outlined in the Notes to Table 1 which will also meet certification requirements. Minimal manning will be achieved by using the recommended equipment as shown in column 7, Table 1, Appendix 1.

6. INSPECTION PROCEDURES.

   a. A fair measure of the efficiency of a fire department is its ability to respond to an alarm and begin fire suppression activities. A test alarm will show alertness of personnel, proficiency in donning clothing, driving and operating apparatus, effectiveness of training programs, mechanical condition of apparatus, and ability to meet response time.

   b. During the response test, a record will be made of the time:

      (1) Of alarm.

      (2) Of the initial application of agent by appropriately clothed fire fighters.

   c. The airport manager shall present evidence showing the capacity and capability for each required aircraft fire and rescue vehicle. This evidence may be:

      (1) Procurement specifications used in the purchase of the vehicle(s).

      (2) Original inspection reports covering acceptance of the vehicle(s).

      (3) Manufacturer's or inspection service labels showing capacity and rate of discharge.

   d. In lieu of any of the above methods, the airport manager may demonstrate water/foam vehicle capacities and capabilities. In such cases, the following procedure is suggested:

      (1) The water tank capacity of a water/foam truck may be determined by weighing the truck with the water tank full, then weighing the truck with the water tank empty and dividing the difference in weight by 8.33 which will give the capacity in gallons of water.

(2) The pumping capacity of the truck may be determined at the same time by:

(a) Bringing the pump up to full operating pressure, opening all discharge orifices (i.e., turrets, ground sweep, handlines, and under-truck nozzles), and recording the time required to empty the water tank.

(b) Dividing the number of gallons in the tank by the time required to empty the tank.

(3) The normal complement of fire fighters shall be able to operate sufficient number of the truck discharge outlets so that the water tank on the truck can be emptied at the discharge rate specified in column 6 of Table 1, Appendix 1, multiplied by .85.

7. COMMUNICATIONS.

a. Prompt notification of the aircraft fire and rescue service contributes materially to the fast, efficient response. Advisory Circular 150/5210-7 suggests a number of efficient methods for providing the needed communication capabilities.

b. There are a number of means of alerting the fire fighters. These include: telephone, radio, sirens, horns, gongs, buzzers, etc.

c. For an airport with an air traffic control tower, all airport emergency vehicles will have two-way radio communications with the tower on suitable radio control frequencies when operating on usable runways or taxiways. For an airport without a control tower, adequate procedures must be shown for the control of emergency vehicles through pre-arranged signs or signals.

8. FIRE FIGHTING CLOTHING. Fire fighters must be provided with a complete set of protective clothing. A complete set includes:

a. Bunker suit should have heat insulative interlines for coats and trousers to afford full arm, body, and leg protection; the outer garments should be treated for water repellency and flame resistance.

b. Gloves should be of sufficient length to provide wrist protection. Soft, pliable leather shields to fit over these gloves should be supplied to provide additional protection to the wearer.

c. Boots should be standard fireman type with wool lining and steel innersole.

d. Hood should be standard aircraft fire and rescue type made of fire resistant material of sufficient length to protect the head and shoulders of the wearer. The hood assembly will include a full vision face shield and a helmet.

9. FIRE AND RESCUE EQUIPMENT BUILDING.

a. The location of the fire and rescue equipment building (fire station) plays a vital part in the fire service response time. Site selection is discussed in AC 150/5210-10.

b. The basic elements (building construction, utilities, and fixtures) which are eligible for financial participation under the Airport Development Aid Program are included in AC 150/5210-10.

10. MAINTENANCE OF EQUIPMENT.

a. Emergency equipment, such as aircraft fire and rescue trucks, communication and alarm equipment, clothing, etc., must be maintained at maximum operating efficiency to insure reliability and a constant state of readiness. Therefore, the maintenance program which the airport has for the repair and servicing of fire equipment should be carefully investigated to insure it accomplishes the desired purposes.

b. Each item of fire and rescue equipment will have its own service manual. Therefore, it is impossible to provide guidance other than very broad statements about the service and maintenance of equipment. Service manuals should be readily available and in usuable condition. Good indicators of proper maintenance procedures are:

(1) Cleanliness of equipment.

(2) Indication of use of manufacturer's maintenance manuals.

(3) General appearance of equipment noting paint, broken or cracked glass, leakage, torn upholstery, etc.

(4) General housekeeping condition in the fire station.

c. If the airport has its own maintenance facilities, the repair or servicing of aircraft fire and rescue equipment should get priority over nonemergency equipment.

d. Determine whether contracts for servicing and maintenance of emergency equipment contain a priority requirement.

11. TRAINING PROGRAM.

a. Consider the following in developing training programs:

(1) Aircraft identification illustrations of all large aircraft in scheduled service at the airport showing fuel tank location, emergency exits, batteries, oxygen systems, and other critical factors.

(2) The availability of an operations manual provided by the truck manufacturer.

(3) The capability for showing fire fighting operations (actual movies or slides).

(4) Familiarization program for new fire fighters.

b. The training curriculum will be examined to determine if it is capable of developing the degree of knowledge and expertise needed by the fire fighters to satisfactorily perform their duties.

c. The drill field should be examined to determine:

(1) The extent to which hot fire drills may be conducted and the number conducted per year.

(2) Whether the fire training ground is of sufficient size to permit training fires of an area at least equal to 50 percent of the critical fire area generated by the largest aircraft using the airport. The critical area is determined by multiplying the aircraft length by a 100-foot width.

12. WATER SUPPLY SYSTEMS.

a. Advisory Circular 150/5220-4 outlines, in general terms, water supply systems used to support the aircraft fire and rescue service.

b. Where fire hydrants are installed in aircraft operating areas, flow rates are an essential part of the fire service. Therefore, it is advisable to examine the water distribution system on the airport to determine:

(1) Suitability of hydrant location.

(2) Hydrant spacing.

(3) Flow rates for the hydrants.

(4) Dead end pipelines or complete loop system.

(5) Source and capacity of water supply and feed pipe size.

(6) Auxiliary or supplemental water sources which may be used.

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TABLE 1. FIRE EXTINGUISHING AGENTS AND EQUIPMENT

1 Index	2 Aircraft Length		3 Total Minimum Quantities of Extinguishing Agents		5 Water/Foam Trucks Capacity Total	6	7 Equipment Description
	More than (feet)	Not more than (feet)	Dry Chemical (pounds) (See Note 6)	Water (gallons)	Gallons	GPM	(See Notes 1 thru 4 for alternate vehicles)
A		90	500	0	0	0	One light weight dry chemical truck. (see Notes 1 and 2)
B	90	126	300	1500	One 500 One 1000	750	One combination water/foam and dry chemical truck. One 1000-gallon water/foam truck. (see Note 3)
C	126	160	500	3000	Two 1500	1500	One light weight dry chemical truck. Two 1500-gallon water/foam trucks. (see Note 4)
D	160	200	500	4000	One 1500 One 2500	1950	One light weight dry chemical truck. One 1500-gallon water/foam truck. One 2500-gallon water/foam truck. (see Note 4)
E	200		500	6000	Two 3000	2400	One light weight dry chemical truck. Two 3000-gallon water/foam trucks. (see Note 4)

NOTES TO TABLE 1

1. The airport index is determined by the length of the largest aircraft serving an airport with an average of five or more scheduled departures a day. Index A airports which are served by fewer than an average of five scheduled departures per day of Index B size turbojet aircraft must provide a combination water/foam dry chemical truck having 500 gallons of water for foam production and 300 pounds of dry chemical.

2. Index A airports may elect to provide a light weight dry chemical truck which has a fire extinguishing system consisting of 450 pounds dry chemical and 50 gallons of water/AFFF (Aqueous Film Forming Foam) solution. Either system may be contained on a skid-mounted unit and carried in a standard or common light weight (pick up) truck. The skid-mounted unit, available from a choice of manufacturers, weighs from 1,750 to 2,600 pounds and ranges in price from $1,500 to $5,900. The trucks (either two or four wheel-drive) range in price from $4,000 to $5,000. Usually such equipment will be eligible for matching grants under the Airport Development Aid Program; and, in addition, the truck may be used for other on-airport services provided this does not restrict the availability for fire fighting services.

3. Index B airports may substitute the Index A light weight dry chemical truck or light weight dry chemical/AFFF solution truck for the combination truck provided they include in the complement of equipment a 1500-gallon water/foam truck.

4. Index C, D, and E airports may substitute the combination water/foam dry chemical truck for the light weight dry chemical or dry chemical/AFFF truck.

5. Other combinations of dry chemical, AFFF, or water/foam trucks may be used when the total quantities of fire extinguishing agents required for each index airport are provided and are in accordance with the substitution permitted in the regulation.

6. The total quantities of dry chemical agent listed in Column 3 are based on a sodium bicarbonate base dry chemical. Potassium base dry chemicals may be substituted in quantities up to 10 percent less than that required in Table 1. This substitution is based on greater fire suppression capabilities of the potassium base dry chemical, and greater bulk per pound of potassium based dry chemical over sodium based dry chemical.

7. The total quantities of water listed in Column 4 are based on the use of a protein foam liquid concentrate. However, AFFF concentrate, having better fire suppression capabilities, permits the water requirement in column 4 to be reduced by 30 percent.

8. The discharge rates specified in Column 6 are based on a water/protein foam concentrate combination. If a water/AFFF concentrate combination is used, the discharge rate may be reduced by 30 percent.

TABLE 2. LENGTH AND DESIGN SEATING DATA FOR TYPICAL LARGE AIRCRAFT

Index	Make and Model	Overall Length
A	Douglas DC-3	64' 6"
Up to 90 feet	Grumman G-159	63' 9"
long	Handley Page 137	
	Jet Stream	47' 1"
	Hawker Siddeley DH-125	47' 5"
	Lockheed (Jet Star)	
	L-1329	60' 5"
	Nord 262	63' 3"
	Convair 240	74' 8"
	" " 440, 580, 640	81' 6"
	" " 340	79' 2"
	Fairchild F-27 Series	77' 2"
	" " FH-227 Series	83' 1"
	Grumman Gulfstream II	79' 11"
	Martin 404	74' 7"
	Nihon YS-11A	86' 3"
	Vickers (Viscount)	
	V745	81' 10"
	Vickers 800	85' 8"
B	BAC 1-11/500	92' 6"
90 to 126 feet	Boeing 737-100	94' 0"
long	" " 737-200	100' 0"
	Caravelle SE-210 VII	105' 0"
	" " SE-310 VIII	108' 3"
	Douglas DC-6A & 6B	105' 7"
	" " DC-7 & 7B	108' 11"
	" " DC-9-10 & 9-20	104' 5"
	" " DC-7C	112' 3"
	Lockheed	95' 2"
	" " 1049 Series	113' 7"
	" " 188 Series (Electra)	104' 7"
	DC-9-40	125' 7"
	DC-9-30	119' 4"

Index	Make and Model	Overall Length
C	Boeing 707-100, 200	144' 6"
126 to 160 feet	" " 707-300, 320	152' 11"
long	" " 720	136' 2"
	" " 727-100	134' 4"
	" " 727-200	153' 2"
	Convair L-880	129' 4"
	" " L-990	139' 5"
	Douglas DC-8/10-50 Series	150' 9"
	Douglas DC-8-62	157' 5"
	Tupolev TU-154	157' 2"
D	* BAC/SUD Concorde	193' 0"
160 to 200 feet	Douglas DC-8-61 & 63	187' 5"
long	* " " DC-10	180' 0"
	* Lockheed L-1011	177' 8"
	Vickers VC-10 Super	171' 0"
E	Boeing 747	231' 10"
200 feet and up	* Lockheed L-500 (C-5A)	247' 11"

* It is anticipated that these aircraft will be included in the air carrier fleet at some future date.