	<b>TANZANIA CIVIL AVIATION AUTHORITY</b> AERODROMES AND GROUND AIDS	<b>Revision: 1</b>
<b>Document No.</b> <b>TCAA/QSP/SR/AC/AGA-026</b>	<b>ADVISORY CIRCULAR ON RESCUE AND  FIRE FIGHTING AT AERODROMES</b>	<b>Page 1 of 16</b>

## 1. Introduction

This advisory circular has been prepared to provide guidance on the provision of rescue and firefighting services at aerodromes falling PART X (b) The Civil Aviation (Aerodrome Design and Operation) Regulations, 2024. The AC provides further guidance to operate requirements of provision of rescue and firefighting at aerodromes

The principal objective of a rescue and firefighting service (RFFS) is to save lives in the event of an aircraft accident or incident occurring at, or in the immediate vicinity of, an aerodrome. The RFFS is provided to create and maintain survivable conditions, to provide egress routes for occupants and to initiate the rescue of those occupants unable to make their escape without direct aid.

The rescue may require the use of equipment and personnel other than those assessed primarily for rescue and firefighting purposes. The most important factors bearing on effective rescue in a survivable aircraft accident are the:

- a) training received
- b) effectiveness of the equipment
- c) speed with which personnel and equipment designated for rescue and firefighting purposes can be deployed.

## 2. Applicability

### 2.1 Certified and Licensed Aerodromes


This AC is issued to enhanced compliance for aerodromes falling under certification, licensing and Registration categories pursuant the Civil Aviation (Certification, Licensing and Registration of Aerodromes)

### 2.2 Reference Documents

This AC has been prepared in line with the latest version of the following two primary documents:

- i. Civil Aviation (Certification, Licensing and Registration of Aerodromes) Regulations, 2024
- ii. Civil Aviation (Aerodrome Design and Operation) Regulations, 2024
- iii. ICAO Annex 14 Aerodromes
- iv. ICAO Doc 9137-AN/898 *Airport Services Manual Part1 Rescue and Fire Fighting*
- v. ICAO Doc 7192-AN/857 *Training Manual PartE-2 Aerodrome Fire Services Personnel*
- vi. ICAO Doc9683 *Human Factors Training Manual*

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### 3. Personnel


#### 3.1 Personnel Medical Fitness

Personnel selected for rescue and firefighting duties should be free from any physical or mental condition or disability which might limit their performance or which might be aggravated by a sudden level of exertion.

The medical fitness of a prospective rescue and firefighting personnel should be determined by a medical examination and assessment conducted by a registered medical practitioner to the following standards:

- (a) **Vision**-applicants should have:
  - (i) a distance visual acuity (without correction) of 6/12 in each eye separately. No standard is set for near visual acuity
  - (ii) normal fields of vision.
- (b) **Colour perception** –applicants should have normal colour perception as tested by pseudo-isochromatic plates. If this is failed by more than 2 errors with a 24-plate set, they should demonstrate an ability readily to identify coloured lights of signal red, signal green and white as tested by the normally accepted lantern tests.
- (c) **Hearing**-applicants should understand an average conversational voice in a quiet room, using both ears, at distance of 2.5 m (8 feet) from the examiner, and with the back turned to the examiner. In cases of doubt, an on-the-job hearing assessment should be used to determine whether there is adequate ability to understand radio instructions and verbal instructions under the conditions of background noise to be encountered in and around operating firefighting appliances.
- (d) **Medical fitness**- applicants should be free from any congenital or acquired disability and the effects of medication or of drugs causing such degree of functional incapacity as is likely to interfere with the efficient performance of their duties during the period before the next medical review.
- (e) Applicants should be free from any risk factor, disease, or disability which renders them likely to become suddenly unable to perform their assigned duties safely during the period before the next medical review.
- (f) There should be no history or current diagnosis of the following:
  - (i) psychosis, depression orthopsychiatry illness
    - (ii) alcohol or drug dependency
  - (iii) epilepsy
  - (iv) any disturbance of consciousness without an explanation

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- (v) coronary artery disease (whether successfully treated or not)
- (vi) other cardiac conditions treated by surgical means (for example, valve replacement or insertion of a pacemaker)
- (vii) any active disease (or functional disability) of the lungs
- (viii) diabetes mellitus controlled by insulin.

In determining the complete fitness of a person, consideration should be given to the arduous nature of rescue and firefighting duties. Particular care should be taken if personnel are selected to wear respiratory equipment, where psychological factors are significant, in addition to physical suitability. The nature of testing, and procedures for assessing, the suitability of prospective rescue and firefighting personnel should be established and included in the aerodrome certification exposition.

### 3.2 Continued medical fitness of personnel

Medical fitness assessments specific to RFFS should be developed. The medical fitness assessments should be conducted for pre-employment entry as rescue and firefighting personnel as well as ongoing medical fitness assessments for existing staff. The frequency of medical fitness assessments should be determined by local arrangement. The medical fitness framework assessments should be used to identify any underlying medical conditions, which may pose a risk to the individual rescue and firefighting personnel, during physically demanding activities.

The assessment should include a medical certificate:

- (i) from a registered medical practitioner
- (ii) with the periodicity of the checks set by the medical practitioner based on the rescue and firefighting personnel history, and results of examinations
- (iii) with a maximum check periodicity of four years.


### 3.3 Continued physical fitness of personnel

The physical fitness assessments should be conducted for pre-employment entry as a rescue and firefighting personnel as well as ongoing physical fitness assessments for existing staff to ensure that rescue and firefighting personnel are maintaining their level of physical fitness.

RFFS should develop various types of tests to ensure that the aerobic endurance fitness, an aerobic fitness and flexibility is tested to determine if the rescue and firefighting personnel has the required physical fitness level for the job. The physical fitness assessment should also be conducted at least once a year.

Aerobic endurance fitness is the ability to continue to exercise for prolonged periods of time at

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low to moderate or high intensity. This is typically what limits the ability to continue to run, cycle or swim for more than a few minutes and is dependent upon the body 's heart, lungs and blood to get the oxygen to the muscles (VO<sub>2</sub>) providing the sustained energy needed to maintain prolonged exercise. Typical aerobic activities include walking, jogging, cycling, rope skipping, stair climbing, swimming, and or any other various endurance activities.

Anaerobic fitness works differently to aerobic fitness. It is an activity that requires high levels of energy and is done for only a few seconds or minutes at a high level of intensity. The term an aerobic means-without oxygen. Participation in an aerobic activity leads to anaerobic fitness, which may be defined as higher levels of muscular strength, speed and power. Examples of anaerobic activities include heavy weight lifting, running up several flights of stairs, sprinting, power swimming, or any other rapid burst of hard exercises. Muscular strength is the ability to lift, pull, push and carry heavy objects over.

Flexibility refers to the ability to move the limbs and joints into specific positions at the end of their normal range of movement. Flexibility is important as it will allow the body to working cramped positions without unduly stressing the muscles, tendons and ligament sand may reduce the risk of injury. Flexibility is best developed usings low controlled stretching exercises.

### 3.4 Entry training standards

A recruitment and retention policy should ensure that all rescue and fire personnel go through a detailed and comprehensive assessment process to ensure that the right candidate is selected for the position.

Recruit rescue and fire personnel with no previous RFFS experience, should undertake an initial fire fighters' course and be deemed competent on acquisition. Competency assessments in both practical and technical aspects should be conducted within this course.


### 3.5 Continued rescue and firefighting personnel development

An environment conducive to learning and development should be provided, enabling personnel to have the opportunity to fulfil their potential.

All personnel in the aerodrome RFFS, regardless of RFFS experience on or off aerodromes, should participate in an ongoing structured learning program (SLP). Competency assessments in both practical and technical aspects should be conducted within this program. All RFFS watches, shifts or crews should participate in comprehensive recurrent training appropriate to their roles and tasks to maintain skills necessary to ensure all RFFS operations are carried out safely and effectively. This training should include:

- (a) realistic fire drills commensurate with the types of aircraft in use at the aerodrome
- (b) live fires associated with fuel discharge under very high pressure (requirement to be determined at local level)
- (c) drills to maintain operational performance with fire service equipment

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- (d) training to include human performance and team coordination
- (e) breathing apparatus training in heat and or smoke.

### 3.6 RFFS organizational structure

Aerodrome operators may use different titles in their organizational structure (such as firefighter, supervisor and manager) but they should equate to the following in terms of training, qualifications and accountability.

- a) **Rescue fire-fighter** -carries out day-to-day firefighting and other duties.
- b) **Rescue fire officer**-in charge of the watch at smaller fire stations or the crew of a fire appliance. Carries out day-to-day firefighting and other duties. Will attend incidents as officer in charge (OIC) of an appliance and will also take command of small-scale incidents. May undertake specialist duties such as training or fire safety.
- c) **Senior rescue fire officer**-responsible for management of a fire station or day-to-day work in a specific policy area. Will take charge of large-scale incidents or undertake specialist tasks such as support at an incident and any other duties.

Each RFFS unit should establish a training syllabus, competencies and experience requirements for each supervisory and management level.

Sole duty RFFS personnel should be able to display the competency requirements, knowledge and understanding of a rescue fire-officer.

The RFFS organizational structure should show clear lines of accountability so that it is apparent to all where safety responsibilities lie.


### 3.7 Protective clothing for personnel

It is essential that all personnel operating at an aircraft fire be provided with protective clothing designed to provide the firefighter with protection from radiated heat, occasional flame contact and injury from abrasive contact.

Consideration should be given on the extent to which it is necessary to wear continuously all or some elements of, the protective clothing so as to ensure immediate response when a call for attendance at an aircraft accident is received. Some form of protective clothing creates dressing problems which cannot easily be solved within the crew compartment of a moving vehicle.

On responding to a fire call, all RFFS personnel should don as a minimum, their firefighter boots and leggings prior to mounting the fire vehicle.

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Each rescue fire-fighter should be provided with at least the following items of protective clothing: (a) protective helmet complete with visor

- (b) bunker coat and leggings
- (c) firefighting gloves
- (d) firefighting boots
- (e) firefighter's flash hood.

Self-contained respiratory equipment should be provided for those personnel who are required to enter a smoke-filled cabin or operate in the presence of smoke or toxic gases.

Respiratory protection should be provided for those personnel who may be required to work in areas where breathing may be hazardous due to airborne particles (e.g. composite materials).

Each aerodrome should also assess the need for other items such as entry protective suits or chemical suits.


### 3.8 Personnel levels

The objective of providing an adequate level of competent personnel is to have available sufficient staff at all responsibility levels to ensure that:

- (a) the RFFS is capable of achieving the principal objective
- (b) all vehicles and equipment can be operated effectively and safely
- (c) continuous agent application at the appropriate rate(s) can be fully maintained
- (d) sufficient supervisory grades can implement a coordinated incident management system
- (e) the RFFS elements of the aerodrome emergency plan (AEP) can be effectively achieved. The rescue and firefighting vehicles should be staffed so as to ensure their ability to discharge at their maximum capability, extinguishing agents, principal and complimentary, both effectively and safely, at an aircraft accident/incident.

Any control room or communications facility operated by, and serving the RFFS can continue to provide this service until alternative arrangements to undertake this function are initiated by the AEP.

In determining the minimum number of rescue and firefighting personnel and supervisory levels required, a task and resource analysis (TRA) should be completed, and the level of staffing and supervisory control are documented or referenced in the aerodrome exposition.

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### 3.9 Task and resource analysis (TRA)

ATRA should be completed to establish justification as to the minimum number of competent personnel required to deliver an effective airport RFFS.

When carrying out a TRA, it is essential to fully understand the complexity of the various roles an individual is required to do in terms of actions, in order to achieve the principal objective of the RFFS.

The task analysis should observe human factor principles to obtain optimum response by all existing agencies participating in emergency operations. The principles should include the effect of human performance due to workload, capabilities, functions, decision aids, environmental constraints, team versus individual performance and training effectiveness.


When assigning operational duties to RFFS personnel enroute to the incident attention should be given to the following.

- (a) There is a need to approach the scene with extreme caution and watch for evacuating occupants, wreckage debris, fuel ponding, and other hazards. Avoid driving through any smoke which obscures your vision and potential evacuee's. Avoid driving over any aircraft wreckage.
- (b) The monitor-operator is able to assume the operating position while the vehicle is in motion and operate the monitor through at least 60 degrees either side of the central axis of the vehicle.

The following items will assist in determining the basic contents of a TRA:

- (a) description of the aerodrome(s) including the number of runways
- (b) promulgated RFFS categories (Aeronautical Information Publication)
- (c) response time criteria (area, times and number of fire stations)
- (d) current and future types of aircraft movements
- (e) operational hours
- (f) current RFFS structure and establishment
- (g) current level of personnel
- (h) level of supervision for each operational crew
- (i) RFFS qualifications/competence (training programme and facilities)
- (j) extraneous duties (to include domestic and first aid response)
- (k) communications and RFFS alerting system including extraneous duties
- (l) appliances and extinguishing agents available;
- (m) specialist equipment: fast rescue craft, hovercraft, watercarrier, hose layer, extending boom technology and high reach extendable turret technology;
- (n) initial emergency medical aid-role and responsibility;
- (o) medical facilities: role and responsibility;
- (p) pre-determined attendance-local council authority services, police, fire and ambulances, etc
- (p) incident task analysis-feasible worst-case scenarios, workload assessment, human performance/factors. It should include:

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- i. mobilization
- ii. deployment to scene
- iii. scene management
- iv. firefighting
- v. suppression and extinguishment
- vi. application of complementary agents
- vii. post fire security/control
- viii. personnel protective equipment
- ix. rescue teams
- x. aircraft evacuation
- xi. extinguishing agent replenishment (note: the aim is to identify any pinch points within the current workload and proposed workload).

- (q) Appraisal of existing RFFS provision
- (r) future requirements-aerodrome development and expansion
- (s) enclosures could include- airport maps, event trees to explain tasks and functions conducted by the RFFS
- (t) AEP and procedures.

**Note:** *The above list is not exhaustive and should only act as a guide.*

At both certified and public licensed aerodromes, a fully trained senior fire officer or a suitably trained fire officer should arrive at the scene of the incident no later than the first responding rescue and firefighting vehicle. This will allow a nearly appraisal of conditions to assess and direct firefighting operations.

## 4. Training


### 4.1 General

Personnel whose duties consist primarily of the provision of RFFS for aircraft operations are in frequently called upon to face a serious situation involving lifesaving at a major aircraft fire. They will experience a few incidents and a larger number of standbys to cover movements of aircraft in circumstances where the possibility of an accident may reasonably be anticipated, but will seldom be called upon to put their knowledge and experience to the supreme test. It follows, therefore, that only by means of a most carefully planned and rigorously followed programme of training can there be any assurance that both personnel and equipment will be fit to deal capable, in dealing with a major aircraft fire should the necessity arise.

Training of rescue and firefighting personnel falls into two broad categories.

- (a) **Initial training** in the use and maintenance of equipment, and operational tactics training which covers the development of personnel and equipment to accomplish control of fire to permit rescue operations to proceed.
- (b) **Structured learning program (SLP)** should be commenced on completion of the

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initial or training course. All RFFS personnel regardless of previous applicable experience, on or off aerodrome should participate in a SLP. The core content of the program can be organised into nine topics as follows:

- (i) fire dynamics, toxicity and basic first aid
- (ii) extinguishing agents and firefighting techniques
- (iii) handling of vehicles, vessels and equipment
- (iv) airfield layout and aircraft construction
- (v) operational tactics and manoeuvres
- (vi) emergency communication
- (vii) leadership performance
- (viii) physical fitness
- (ix) auxiliary modules (e.g. rescue in difficult terrain, response to biological/chemical threats etc).

The training program, in its entirety, should be designed to ensure that both personnel and equipment are at all times fully efficient. This represents a very high standard of achievement but anything less than full efficiency is unacceptable and may be dangerous both to those in need of aid and also to those who are seeking to give such aid. In addition, the training program should also be designed to build cohesiveness between key functional units of a RFFS team in order to deliver a consistent level of proficiency during emergencies. To ensure a high standard of operational readiness, RFFS should develop a competency audit framework, to assess the effectiveness of RFFS training at both individual and team levels.


All initial training courses and all structured learning programs, should include an assessment of competence with oral technical, practical and written technical tests. The minimum competence standard for students should be established for each course.

#### **4.2 Practical training**

Each RFFS unit should have access to a training ground or training area on their aerodrome at a location that does not compromise their response time. The area identified should be able to accommodate practical operational training activities such as:

- (a) realistic fire drills commensurate with the types of aircraft in use at the aerodrome
- (b) live fires associated with fuel discharge under very high pressure (requirement to be determined at local level)
- (c) drills to maintain operational performance with fire service equipment

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- (d) training to include human performance and team coordination
- (e) breathing apparatus training in heat and or smoke.

All RFFS personnel at each RFFS unit should be periodically assessed to determine their continued competencies in the practical activities identified above ((a)through (e)).

### 4.3 Theoretical training

Each RFFS unit should have access to a training room or training area, on their aerodrome at a location that does not compromise their response time. The area identified should be conducive to learning and able to accommodate theoretical input and self-study.

Each RFFS unit should provide training aids to support the delivery of the nine topics that make up the content of the SLP (refer to paragraph 4.1).

The training aids used for the study and instruction of the nine topics of the SLP can be from a variety of sources and in a variety of formats, such as:

- (a) power point presentations
- (b) visual aids
- (c) fire service manuals
- (d) interactive computer simulation
- (e) locally agreed reference manuals.

All RFFS personnel at each RFFS unit should be periodically assessed to determine their continued competency in each of the nine topics that makeup the content of the structured learning program.


### 4.4 Delivery of training

Each RFFS unit should identify a person that is responsible for the coordination and supervision of rescue and firefighting training, and the maintenance of all training records.

Personnel used for the delivery of training should be suitably trained and experienced in the rescue and firefighting role or specialists in a particular aspect of the training syllabus.

The design of a course for a rescue and firefighting personnel at a licensed aerodrome needs to address the fact that the rescue and firefighting personnel is not supported by a large organization and could be the sole duty rescue and firefighting personnel. The training of such a person should consider this self-sufficiency with emphasis on proficiency at the aerodrome and on the equipment provided.

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Each RFFS unit should establish a training syllabus, competencies and experience requirements for each supervisory and management level. Practical and theoretical forms of training are, understandably, a continuing commitment and should be resourced accordingly.

## 5. Firefighting and Rescue Equipment

### 5.1 Firefighting equipment

Each rescue and firefighting vehicle should be equipped with at least the following firefighting equipment:

- (a) fire delivery hose
- (b) firefighting branches
- (c) standpipe, key and bar.


### 5.2 Rescue equipment

Rescue equipment commensurate with the level of aircraft operations expected should be provided on the rescue and firefighting vehicle(s). The certified aerodromes should have at least the following equipment available for rescue at the scene of any aircraft accident:

- (a) Portable lighting equipment providing flood light and spotlighting
- (b) Power operated cutting tools that can be operated from a portable power source
- (c) Hand tools including wire and bolt cutters, screw drivers of appropriate sizes and designs, crowbars, hammers, axes, metal and wood saws
- (d) Forcing equipment, usually hydraulically operated, for bending or lifting operations
- (e) Four sets of breathing apparatus
- (f) Medical first aid equipment, ideally consisting of pre-packed wound dressings in protective containers, scissors, adhesive dressings and burn dressings, stretchers or spine boards and blankets
- (g) Communications equipment in the form of radiotelephone units and a portable loudhailer
- (h) miscellaneous items including shovels, grab hooks, lines (cordage), harness cutting knives, and ladders of appropriate type and length, related to the likely aircraft types involved
- (i) a powered fan unit capable of extracting contaminated air from aircraft.

Items (a) to (i) inclusive should be carried in the rescue and firefighting vehicles to be available at the accident site within the required response time.

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Licensed aerodromes should have at least the equipment listed in items(c), (f)and (h)except for stretchers, spine boards and blankets. The scale should be in relationship to the number of firefighting personnel being used. The equipment should be carried in the rescue and firefighting vehicles to be available at the accident site within the required response times.

Records of all tests and inspections should be maintained by the RFFS for a minimum period of two years. The records should include details of consequential action where an inspection has revealed a defector deficiency.

### 5.3 Mutual aid emergency agreements

In developing an AEP and the water rescue service at certified and licensed aerodromes, consideration should be given to public services (such as military search and rescue units, harbour police, or fire departments) and private rescue services (such as rescue squads, power and communication companies, offshore oilfield operators, or shipping and waterway operators), that may be available and are capable of rendering assistance. A signal system for alerting private or public services in time of emergency should be prearranged. The following should be considered.

- (a) The close proximity of an airport to surrounding communities and the possibility of an off- airport aircraft accident give rise to the need for mutual aid emergency agreements.
- (b) A mutual aid emergency agreement should specify initial notification and response assignments. It should not specify the responsibilities of the agency concerned as this will be contained in the AEP.
- (c) Mutual aid emergency agreements should be prearranged and duly authorized. The airport authority may have to act as coordinating agency if more complicated jurisdictional or multi-agency agreements are necessary.

### 5.4 Operations in a difficult environment


For certified aerodromes, the plan should include the ready availability of, and coordination with, appropriate specialist rescue services to be able to respond to emergencies, where an aerodrome is located close to water and /or swampy areas and where a significant portion of approach or departure operations takes place over these areas.

At those aerodromes located close to water and/or swampy areas, or difficult terrain, the AEP should include the establishment, testing and assessment at regular interval of a predetermined response for the specialist rescue services.

An assessment of the approach and departure areas within 1,000m of the runway threshold should be carried out to determine the options available for intervention. Guidance material on assessing approach and departure areas within 1,000m of runway thresholds (refers to Part1, Chapter13 of the ICAO Doc9137 *Airport Services Manual*).

For licensed aerodromes, the AEP should have specific procedures and specialist agencies involved when the aerodrome is located near large bodies of water, swamps or where the

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approach/departure areas are over water. This could include the use of coast guard, divers, boats/hovercraft and the local harbour-master. The appropriate rescue services should be involved in testing of the emergency exercises on a regular basis.

If practicable, an assessment of the approach and departure areas within 1,000m of the runway threshold should be carried out to determine the options available for intervention. Guidance material on assessing approach and departure areas within 1,000m of runway thresholds (refers to Part 1, Chapter 13 of the ICAO Doc 9137 *Airport Services Manual*).

## 5.5 Communications

When rescue and firefighting vehicles leave the fire stations and enter the manoeuvring area the RFFS personnel come under the direction of the control tower. These vehicles should be equipped with two-way radio communications equipment, through which their movements can at all times, be subject to direction by the control tower. The choice of a direct air traffic control/fire service frequency, monitored in the master watch room, or a discrete airport fire service frequency, relaying airfield/air traffic control instructions and fresh information, will be a matter for the airport authority to determine, based on local operational and technical considerations.

The radio equipment on rescue and firefighting vehicles should accommodate communication between vehicles, enroute to, and in operation at, an aircraft accident. Within individual vehicles there should be an intercommunication system, particularly between drivers and monitor-operators, to optimize the deployment of the vehicles at an accident. The provision of a communication facility within an appliance must recognize the likelihood of high noise levels, and this may require the use of noise-cancelling microphones, headsets and loudspeakers, for effective intercommunication.

The rescue and firefighting vehicles should be provided with communication equipment capable of communicating directly with an aircraft in a situation of emergency using an aeronautical radio frequency. The aeronautical radio frequency permits the rescue and firefighting service and the emergency aircraft, to communicate with each other directly, allowing the rescue and firefighting crew to issue critical information regarding the exact nature of, and the hazards associated with an emergency in progress, along with recommendations for actions.


## 6. Extinguishing Agents

### 6.1 Complementary extinguishing agents

- The complementary agent(s) required is: (a) carbon dioxide (CO<sub>2</sub>) or  
(b) dry chemical powders or  
(c) a combination of the agents stated in items (a) and (b).

Compatibility must be ensured when selecting dry chemical powders for use with foam.

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	<b>TANZANIA CIVIL AVIATION AUTHORITY</b> AERODROMES AND GROUND AIDS	<b>Revision: 1</b>
<b>Document No.</b> <b>TCAA/QSP/SR/AC/AGA-026</b>	<b>ADVISORY CIRCULAR ON RESCUE AND  FIRE FIGHTING AT AERODROMES</b>	<b>Page 14 of 16</b>

## 6.2 Foam concentrates

Any foam concentrates to be used in rescue and firefighting vehicles should meet or exceed the criteria of the ICAO specifications; so as to achieve performance level B (refers to Part 1 Chapter 8, Paragraph 8.1.3 of the ICAO Doc 9137, *Airport Services Manual*).

There is no direct relationship between this specification and specifications of other organizations such as the international standards organization (ISO). If such foam concentrates are used, users need to be able to show that they will produce foam meeting the ICAO performance level B requirements.

## 6.3 Foam characteristics

The quantity of foam concentrates separately provided on vehicles for foam production should be in proportion to the quantity of water provided and the foam concentrate selected.

The amounts of water specified for foam production are calculated on an application rate of 5.5 L/min/m<sup>2</sup> for foam meeting performance level B.

For agent substitution, the following equivalents should be used:

- 1 kg dry chemical powder or 2 kg CO<sub>2</sub> = 0.66 L water for production of a foam meeting performance level B.

## 6.4 Reserve supply

A 200 percent reserve supply of foam concentrate for the runway category should be maintained on the aerodrome for vehicle replenishment purposes. Where a major delay in the replenishment of this supply is anticipated, the amount of reserve supply should be increased.

If the 200 percent reserve supply of foam concentrate is temporarily not available on the aerodrome the runway rescue and firefighting category need only be reduced, when the quantity of foam concentrates available falls below 100 percent of that for the normal category.


The quantity of foam concentrate provided on a vehicle should be sufficient to produce at least two loads of foam solution.

## 6.5 Water supplies

Supplementary water supplies, for the expeditious replenishment of rescue and firefighting vehicles, should be pre-arranged. The objective of providing additional water supplies at adequate pressure and flow is to ensure rapid replenishment of aerodrome RFFS vehicles. This supports the principle of continuous application of extinguishing media to maintain survivable conditions at the scene of an aircraft accident.

Additional water to replenish vehicles may be required in as little as five minutes after an accident; therefore, an analysis should be conducted to determine the extent to which it, and its associated storage and delivery facilities, should be provided.

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When conducting the analysis, the following factors are amongst those items which should be considered but not limited to:

- (a) sizes and types of aircraft using the aerodrome
- (b) the capacities and discharge rates of aerodrome fire vehicles
- (c) the provision of strategically located hydrants
- (d) the provision of strategically located static water supplies
- (e) utilization of existing natural water supplies for firefighting purposes
- (f) vehicle response times
- (g) historical data of water used during aircraft accidents
- (h) the need and availability of supplementary pumping capacity
- (i) the provision of additional vehicle-borne supplies
- (j) the level of support provided by local authority emergency services
- (k) the pre-determined response of local authority emergency services
- (l) fixed pumps where these may provide a rapid and less resource-intensive method of replenishment
- (m) additional water supplies adjacent to airport fire service training areas
- (n) overhead static water supplies.

## 7. Response Capability


### 7.1 Frequency of rescue and firefighting response verification

The holder of an aerodrome operating certificate should regularly complete a rescue and firefighting response time verification. Response time verifications should normally be held with a periodicity of between 1 and 3 months.

### 7.2 Response location

The verification should require a fire vehicle to produce water through the vehicle's monitor at the correct operating pressure, immediately upon arrival at a nominated location.

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### 7.3 Response timing

The response time verification should be initiated using the normal emergency response activation procedures detailed in the AEP, and the time required from the activation to the production of water at the nominated location should be recorded.

The response timing verification should be carried out during periods of minimal or no traffic so that the fire vehicles are not disrupted during the verification and the vehicles can be serviced before the next scheduled aircraft movement. The timing verification should be carried out during day light hours and with dry surface conditions.



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