Defence Safety Authority

DSA DFSR 02 – Defence Aerodrome Rescue & Fire Fighting (ARFF) Regulations

(JSP 426 Vol3 Lflt2)

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Foreword

The following message reinforces the DFSR Team Leaders commitment to improving safety across Defence and includes our responsibility to ARFF Services in providing assurance that the Services are contributing to aviation safety.

DEFENCE FIRE SAFETY REGULATOR TEAM LEADERS MESSAGE

Whilst the regulations within this document are key to achieving this objective, I am personally committed to enhancing the safe delivery of operational capability and the continuous improvement of the Defence ARFF service through focusing on improved safety and quality management. Key to this is the continued development of a widespread engaged safety culture and greater sharing of information through effective knowledge management.

To enable the DFSR to be recognised as a first-class fire safety regulator we must continue to engage with the Regulated Community (RC) and other regulatory bodies to ensure that our regulatory activity remains effective, relevant and proportional.

Authority

The DSA Charter requires the Director General (DG) on behalf of the SofS to "empower suitably qualified and experienced Crown servants to regulate safety and safety management. The authority of Defence Regulators derives from this Charter and extends wherever Defence activities are conducted including overseas (in which case the expectations of any host nation's relevant authorities are to be considered)". The DFSR ARFF (Assurance(A)) team shall regulate in a manner consistent with UK good practice and the regulators code of practice.

The DFSR ARFF (A) team will focus on improving firefighter safety and key to this is the continued development of a widespread engaged safety culture and greater sharing of information through effective knowledge management.

My goal is for the DFSR ARFF (A) Team to be conducting fully risk-based activity underpinned by evidence and to support this we will continue to develop our people and support other assurance organisations within the RC. We will also improve the knowledge management across the community to enable increased transparency and a greater sharing of information.

Citation

This document will be referred to as the "Defence Aerodrome Rescue & Fire-fighting (ARFF) Regulations."

Regulation and Policy

This document follows the MAA01 direction. Each Regulatory Article contains Rationale, Regulation, Acceptable Means of Compliance (AMC) and Guidance Material (GM).

MAA03: MAA Regulatory Processes describes the processes that enable interaction between the Regulated Community and the MAA amendment process. This document is to be used for submission/ratification of Alternative Acceptable Means of Compliance (AAMC) and the process for requesting Regulatory Waivers and Exemptions.

Reference Material

Defence Publications:

Defence Strategic Direction 2016 (DSD 16)
JSP 441 - Managing Information in Defence
JSP 822 - Defence Direction and Guidance for Training and Education

Military Aviation Authority (MAA) Publications and RAs:

RA 1020 - Roles & Responsibilities: Aviation Duty Holder and Aviation Duty Holder – Facing Organizations
RA 1024 - Accountable Manager (Military Flying) (AM (MF)).
RA 1026 - Roles and Responsibilities: Aerodrome Operator.
RA 1440 - Air Safety Training.
RA 1600 - Remotely Piloted Air Systems (RPAS).
RA 2307 - Rules of the Air.
RA 2335 - Flying Displays and Flypasts.
RA 2415 - Civil Use of Government Aerodromes.
RA 3049 - Defence Contractor Flying Organization responsibilities for UK Air System Operating Locations.
RA 3261 (2) - Aerodrome Emergency Services.
RA 3263 - Aerodrome Classification.
RA 3267 - Aerodrome Vehicle Marking and Lighting Requirements.
RA 3500 Aerodrome Design and Safeguarding
RA 3550 – Temporary Landing Zones
RA 3311 - Controllers Emergency Actions.
Defence Aerodrome Manual (DAM).
Manual of Military Air Traffic Management (MMATM)

North Atlantic Treaty Organisation (NATO) Standardised Agreements (STANAGS):

STANAG 3712 CFR (Edition 7) - Aircraft Rescue and Fire-Fighting (ARFF) Services Identification Categories.
STANAG 3117 Aircraft Marshalling Signals.
Standard AFSP-2 Aircraft Marshalling Signals (Edition A Version 1).
STANAG 7051 CFR (Edition 4) - Minimum Requirements for CFR Operations in Support of Home Station and Deployed Operations.
STANAG 7132 CFR (Edition 2) - Personal Protective and Fire-fighting Equipment Requirements for Fire and Emergency Operations.
STANAG 7133 CFR (Edition 2) - Minimum level of Crash Fire-fighting and Rescue (CFR) Service for Deployed Fixed and Rotary Wing Aircraft.
STANAG 7145 ATM (Edition 5) - Minimum Core Competency Levels and Proficiency of Skills for Firefighters.
STANAG 7162 CFR (Edition 1) - Standardization of Physical Fitness Maintenance Program for Firefighters.

European Aviation Safety Agency (EASA) Documents:

EASA Commission Regulation (EU) No 139/2014 February 2014.
EASA Acceptable Means of Compliance (AMC) and Guidance Material (GM) to Authority, Organisation and Operations Requirements for Aerodromes.
EASA Annex to Decision 2016/009/R Acceptable Means of Compliance (AMC) and Guidance Material (GM) to Authority, Organisation and Operations Requirements for Aerodromes – Amendment 1.

International Civil Aviation Organisation (ICAO) Documents:

ICAO Annex 14 - Volume 1 Aerodromes - Aerodrome Design and Operations 7th Edition July 2016.

ICAO Annex 14 - Volume 2 Aerodromes - Heliports (4th edition 2013).
ICAO Airport Services Manual Part 1.
ICAO Heliport Manual

Civil Aviation Authority (CAA) Documents:

CAP 168 Licensing of Aerodromes.
CAP 699 Framework for Competence of Rescue and Fire-fighting Service (RFFS) Personnel.
CAP 789 Requirements and Guidance Material for Operators.
CAP 1150 Information Paper 04 Task and Resource Analysis
CAP 1168 Guidance material for organisations, operations and design requirements for aerodromes
CAA Information Notice (IN-2016/052) – EASA ED Decision 2016/09/R Rescue and Fire-fighting Services – Remission Factor, Cargo Flights etc.
CAA Information Notice (IN-2017/031) - Aerodrome Rescue and Fire-fighting Service – Provision of Fire Extinguishing Agents.
CAA Initial Emergency Response Training Framework Document.

United Kingdom Emergency Service Publications:

Joint Emergency Services Interoperability Programme (JESIP).
National Operational Guidance Programme (NOGP).

Federal Aviation Administration (FAA) Publications:

FAA 14 CFR Part 139

Nation Fire Protection Association (NFPA) Documents:

NFPA 403 Standard for Aircraft Rescue and Fire-fighting Services at Airports.

DSA 02 DFSR ARFF Regulations

Defence ARFF Regulation mirrors the layout used by the UK National Health and Safety Executive (HSE). A regulation is provided for each DFSR ARFF RA in the following format:

Rationale	*The reason why the Defence Regulation is applied to the MOD, ideally with reference to national legislation, BSIs or industry codes of practice.*
Regulation	**The Defence Regulation is reiterated in the relevant regulation to aid clarity and reinforce the relationship and precedence of the Regulation. Each Regulation may contain a number of Sub-Clauses that are pertinent to that Regulation. (*There may be more than one Regulation referenced*).**
Acceptable Means of Compliance	The Acceptable Means of Compliance (AMC) provides practical advice on how to comply with the Defence Regulation. If the AMC is followed, then this will be considered sufficient to demonstrate compliance. However alternative approaches (Alternative Acceptable Means of Compliance (AAMC) may be utilised where this produces an outcome that can be demonstrated to be as good as required by the ARFF Regulation Article (RA).
Guidance Material	Provides Guidance Material, which, whilst not compulsory, may be considered 'good practice' to further support the Regulations.

This regulation has been substantially re-written: for clarification, no change marks are presented – please read the regulation in entirety

Rationale

Military Aviation Authority (MAA) Regulatory Article (RA) 3261 (2): Stipulates that "Aerodrome Operators (AO) and Heads of Establishment (HoE) shall provide Emergency Services at aerodromes for which they are responsible."

This Defence Regulation has been aligned to:

a. *DSA Charter*
b. *NATO STANAG 3712 CFR (Edition 7) – Aircraft Rescue and Fire-Fighting (ARFF) Services Identification Categories*
c. *EASA Commission Regulation (EU) No 139/2014 February 2014.ICAO Annex 14 Volume 1 Aerodromes - Aerodrome Design and Operations 7th Edition July 2016*
d. *ICAO Annex 14 - Volume 2 Aerodromes – Heliports (4th edition 2013)*
e. *CAP 168 Licensing of Aerodromes*
f. *CAP 699 Framework for competence of Rescue and Fire-fighting Service (RFFS) personnel*
g. *CAP 789 Requirements and Guidance Material for Operators*

And details the requirements and provisions relating to MOD ARFF Services. The purpose of this Regulation is to provide both direction and guidance to AO and ARFF Service providers to establish an ARFF Service at Defence Aerodromes ensuring minimum standards are achieved and are capable of meeting regulatory requirements.

Contents

Regulation 01

DFSR 01: ARFF Service Levels of Protection

01 Aviation Duty Holders (ADH), ADH-Facing (ADH-F) Organizations, Heads of Establishment (HoE) and Accountable Manager (Military Flying) (AM (MF)) **shall** task the ARFF Service Provider to provide Aerodrome Rescue Fire-fighting Services at aerodromes suitable to the appropriate ARFF category for which they are responsible in accordance with (iaw) Front Line Command (FLC) and Industry requirements.

Acceptable Means of Compliance 01

DFSR 01: ARFF Service Levels of Protection

1. ARFF Services **should** be provided to meet the ARFF category promulgated in the Unit Defence Aerodrome Manual (DAM).

2. The provision of ARFF services at MOD aerodromes aligns with the guidance used in NATO/ICAO/EASA/CAA. Within the MOD 14 aircraft categories are used to accommodate all variants of military aircraft types.

Table 1- Minimum useable amounts of extinguishing agents

ARFF Category	Foam meeting performance level B		Foam meeting performance level C		Complementary agents (Kg)	
	Water (Ltrs)	Discharge Rate Foam Solution (Lpm)	Water (Ltrs)	Discharge Rate Foam Solution (Lpm)	Minimum Dry Powder (Kg)	Discharge Rate (Kg/Sec)
Special	90	60	60	40	18	1.25
1	230	230	160	160	45	2.25
2	670	550	460	360	90	2.25
3	1200	900	820	630	135	2.25
4	2400	1800	1700	1100	135	2.25
5	5400	3000	3900	2200	180	2.25
6	7900	4000	5800	2900	225	2.25
7	12100	5300	8800	3800	225	2.25
8	18200	7200	12800	5100	450	4.5
9	24300	9000	17100	6300	450	4.5
10	32300	11200	22800	7900	450	4.5

H1	500	250	350	175	23	2.25
H2	1000	500	700	350	45	2.25
H3	1600	800	1070	535	90	2.25

Notes:

1. The quantities of water shown in columns 2 and 4 are based on the average overall length of aeroplanes in each category.

2. At Category 1 and 2 Aerodromes and Surface Level Heliports up to 100% of the water may be substituted with complementary agents. For substitution, the following equivalents **should** be applied when using performance level B foam:

   a. 1 kg of gaseous agent or dry powder = 0.66 litres of water1

   b. 2 kg of CO2 = 0.66 litres of water

   c. Where substitution up to 100% of the water with complementary agent has occurred, the reserve supply of complementary agent should be increased to 200%

3. If a 'high performance' dry powder[2] is used, it may be permissible to reduce the minimum amount provided.

4. At all aerodromes a quantity of gaseous agent or CO2 **should** be provided for use on small or hidden fires. A minimum extinguisher size is 5 kg for major and 2 kg for smaller vehicles.

5. 'H' aircraft category requirements are based on surface level heliport requirements. If operating from elevated heliports guidance should be sought from the ICAO Heliport Manual.

6. At rotary wing aerodromes there **should** be a minimum 9 kg of gaseous agent or 18 kg of CO2 provided with a suitable applicator for use on engine fires.

3. When non-UK MOD / NATO aircraft visit an aerodrome, the AO is to ensure that the appropriate ICAO aircraft category is provided utilising the information contained within Table 2[3].

Table 2 – ICAO Aerodrome Category for ARFF

Aerodrome Category	Aircraft overall length	Maximum fuselage width
1	0 m up to but not including 9 m	2 m
2	9 m up to but not including 12 m	2 m
3	12 m up to but not including 18 m	3 m
4	18 m up to but not including 24 m	4 m
5	24 m up to but not including 28 m	4 m
6	28 m up to but not including 39 m	5 m
7	39 m up to but not including 49 m	5 m
8	49 m up to but not including 61 m	7 m

[1] ICAO Annex 14 - Volume 2 Aerodromes – Heliports (4th edition 2013) and CAP 168 Licensing of Aerodromes refer.
[2] High performance dry powders **should** be produced in accordance with the EN 615 standard.
[3] Details of the individual ICAO category for aircraft currently in use within UK Defence can be found at Table 3. Aircraft used within NATO can be found at Annex D.

Aerodrome Category	Aircraft overall length	Maximum fuselage width
9	61 m up to but not including 76 m	7 m
10	76 m up to but not including 90 m	8 m
H1	Up to but not including 15 m	2 m
H2	15 m up to but not including 24 m	2.5 m
H3	24 m up to but not including 35 m	3 m

Notes:

To ensure that the aerodrome operations cells provide the correct ICAO Aircraft category when booking in visiting aircraft, aircraft dimensions including length and width **should** be requested from the Aircraft Operating Authority (if the aircraft is not in Table 3 or Annex D).

1. The aircraft category for fixed wing aircraft is based on the aircraft overall length and width. If, after selecting the category appropriate to the length, the aircraft fuselage width is greater than the maximum width in column 3, for that category, then the category for that aircraft should be one category higher.

2. The aircraft category for rotary wing aircraft (helicopters) is based on overall length including the tail boom and the rotors and their fuselage width. If, after selecting the category appropriate to the length, the aircraft fuselage width is greater than the maximum width in column 3, for that category, then the category for that aircraft should be one category higher.

4. The ARFF Service **should** be provided throughout the opening hours of the aerodrome and for 15 minutes after the departure of the last aircraft or until the aircraft has reached its destination, whichever is the shorter.

5. The minimum number of ARFF vehicles provided at an aerodrome to effectively deliver and deploy the agents specified for the aerodrome category **should not** be less than that set out in DFSR 03: ARFF Vehicle and Equipment Requirements.

6. Crewing levels **should** be determined in accordance with DFSR 04: ARFF Personnel Requirements.

7. Table 3 lists the individual category for aircraft currently in service and planned to be in service with the MOD and associated agencies. It is emphasised that this is for individual aircraft categorisation and not for categorisation of aerodromes, which is a FLC and industry responsibility. The table lists the quantity of water required for foam production (using performance Level B foam) to control the fire in the practical critical area and to maintain the control of, and/or extinguish the remaining fire using the ICAO principles of calculation. The list of aircraft categories in Table 3 is compiled, maintained and authorised by the sponsor, DFSR.

Table 3 – Individual Aircraft Fire-fighting Media Requirements

Aircraft Type	Water Calculation (Ltrs)	Aircraft Category	Min Water Required [4] (Ltrs)	Discharge Rate[5] (if different) to that provided in Table 1 (Lpm)
Atlas (A400M)	12920	8	18200	
Avenger	1048	3	1200	
BAE 146 CC Mk2 (RJ 70)	5637	5	5637	3221
BAE 146 C Mk 3 (RJ 100)	7631			
C130	8647	6	8647	4324
C17	18060	8	18200	
Chipmunk	370	1	370	370
Dakota	226	4	2400	
Defender	891	3	1200	
Hawk	937	3	1200	
Hunter	1075	3	1200	
Hurricane	615	2	670	
Islander	677	2	677	
Lancaster	2315	4	2400	
Lightning II	N/A	5	5400	
Pilatus PC-21	680	2	680	
Piper PA-31	670	1	670	
Prefect	411	1	411	411
Phenom	959	3	1200	
Poseidon	11203	7	12100	
Rivet Joint	11773	7	12100	
Robin DR 400[6]	332	1	332	332
Sea Fury	752	3	100	
Spitfire	610	2	670	
Swordfish	658	2	670	
Texan	618	2	670	
Tucano	597	3	1200	
Tutor	364	1	364	364
Typhoon	N/A	5	5400	
Voyager	19380	8	19380	7690

Aircraft Type	Water Calculation (Ltrs)	Aircraft Category	Min Water Required [7] (Ltrs)	Discharge Rate[8] (if different) to that provided in Table 1 (Lpm)
Wedgetail	8323	6	8332	4162
Airbus EC 135 (Juno)	744	H1	744	372
Airbus EC 145 (Jupiter)	860	H1	860	430
Apache	1339	H3	1600	
AW109	804	H1	804	430
AW139	1100	H2	1100	550
AW189	1268	H3	1600	
Bell 212	1229	H3	1600	
Chinook	3585	H3	3585	1793
Dauphin	911	H2	1000	
Gazelle	711	H1	711	356
Griffin	1280	H3	1600	
Merlin	1559	H3	1600	
Puma	1277	H2	1277	639
Sea-King	1559	H2	1559	780
Sikorsky S-61N	1495	H2	1495	748
Wildcat	1164	H3	1600	

8. Flying, Gliding and Parachute Clubs[9] are recreational activities involving Service/civilian personnel with various levels of experience. Where these clubs operate at MOD Aerodromes, the Flying, Gliding and Parachute activities **should** be risk assessed to determine the required ARFF services to be provided. The risk assessment must be recorded and the decision on the appropriate level of ARFF cover documented in the DAM. SQEP advice is to be sought from the Defence ARFF Service Provider to assist with informing the risk assessment (CAP 168 Licensing of Aerodromes Chapter 8 Appendix 8C provides additional guidance).

[4]Categories when using Level B Foam.
[5] In accordance with ICAO Annex 14 Volume 1 Aerodromes - Aerodrome Design and Operations 7th Edition July 2016 Table 9.2.
[6] Awaiting confirmation from ADH that he is content for this aircraft to operate under category special aerodrome requirements.
[7]Categories when using Level B Foam.
[8] In accordance with ICAO Annex 14 Volume 1 Aerodromes - Aerodrome Design and Operations 7th Edition July 2016 Table 9.2.
[9] Refer to RA 2415 - Civil Use of Government Aerodromes

Guidance Material 01

DFSR 01: ARFF Service Levels of Protection

9. Reduced Hazard Profile Categories is the level of ARFF Response required for cargo, mail, ferry, positioning and end-of-life aircraft operations, irrespective of the number of movements may be reduced in accordance with Table 4. This is based on the need to protect only the area around the cockpit of an aircraft in the critical area concept.

10. When operating with reduced hazard profile categories the aircraft is to be crewed by the minimum number of personnel necessary to safely achieve the aims of the sortie. Specifically, the total number of personnel onboard the aircraft is not to exceed the total number of personnel that can safely be contained within the cockpit, thus reducing the size of the 'Hazard Area' that requires ARFF attention.

Table 4 – Reduced Hazard Profile Categories

Aerodrome Category	ARFF Level of Protection Required
1	1
2	2
3	3
4	4
5	5
6	5
7	6
8	6
9	7
10	7

11. Remission is where the number of movements (landing or take-off) of the aircraft performing passenger transportation in the highest category, visiting the aerodrome, is less than 700 in the busiest consecutive three months. The level of protection provided in accordance with Table 1 may be reduced by no more than one category below that identified in Table 2.

12. Reduced Hazard Profile Categories and Remission are not to be applied without the explicit approval of the ADH chain responsible for the aircraft and are to be used independently.

13. Temporary Landing Sites as defined in MAA RA 3550 - Suitably Qualified Experienced Personnel (SQEP) advice can be sought from the Command/Group HQ/Defence ARFF Service Provider to assist with informing the risk assessment.

14. Helicopter Landing Sites (HLS), either permanent or temporary, are unlikely to have Rescue or Fire-fighting Services. Consequently, ADHs/HoEs/AM(MF)s are to conduct a risk assessment providing direction on the level of Rescue and Fire-fighting Services required. A generic guide for "standards of fire cover required at non-aerodrome sites for the safe operation of rotary wing aircraft" is at Annex B. The risk assessment is to be recorded and the decision on the appropriate level of ARFF cover documented in local orders. SQEP advice can be sought from the Defence ARFF Service Provider to assist with informing the risk assessment.

15. Military Low Category (ICAO ARFF categories 1 and 2) Flying Training Schools (FTS) are to conduct a risk assessment to ascertain the level of ARFF protection required on the aerodrome. The risk assessment must be recorded

and the decision on the appropriate level of ARFF cover documented in the DAM. SQEP advice can be sought from the Defence ARFF Service Provider to assist with informing the risk assessment CAP 168 Licensing of Aerodromes Chapter 8 Appendix 8B provides guidance.

16. Where the ARFF services on aerodromes, operating under MAA RA 3261 (2) Aerodrome Emergency Services of Category Special, Initial Emergency Responders (IER) may be used as an alternative to professional firefighters. IER shall be suitably equipped and trained to provide an immediate response during flying operations. IER personnel must receive initial and annual training. All training must be endorsed and assured by the Defence ARFF Service Provider SQEP (CAP 168 Licensing of Aerodromes Chapter 8 Appendix 8C provides additional guidance).

17. ARFF requirements during deployed operations are subject to assessment by the Aircraft Operating Authority (AOA) and/or ADHs/AM(MF)s and the operational chain of command. The assessment is to provide a balance between the operational requirements and the aerodrome operating requirement. For further guidance refer to Annex A "Requirements for Deployed Operations of Fixed and Rotary Wing Aircraft".

18. As deployed operating bases become established and circumstances permit, the complete ARFF capability should be provided and informed by conducting a Task and Resource Analysis (TRA).

19. When operating aircraft to/from aerodromes other than those regulated under MAA RA 3261 (2) Aerodrome Emergency Services, AOA need to satisfy themselves that the ARFF Service is appropriate for the aircraft type. Annex C provides a comparison table to assist AOAs with this requirement.

20. Annex D Table 1 lists the individual category for aircraft currently in service and planned to be in service within NATO.

ANNEX A

REQUIREMENTS FOR DEPLOYED OPERATIONS OF FIXED AND ROTARY WING AIRCRAFT

A.1 Background

A.1.1 Defence Strategic Direction 2016[1] (DSD 16) identifies 2 concurrency sets:

a. Primary concurrency is Warfighting at Scale (W@S) and
b. Secondary concurrency set of 6 Niche, 5 Small and 1 Environmental Medium

Only the primary concurrency set is force driving; however, Defence has yet to model W@S and therefore the secondary concurrency set is used to force model.

A.1.2. Niche and Small interventions are designed to be swift, short term interventions, utilising identified numbers of personnel and equipment. Both W@S and the Environmental Medium are considered longer term activities which will be enduring.

A.2 Planning

A.2.1 Pre-planning for all interventions is essential due to the timescales involved in ensuring that the deployable force is in position within the given timescales. HQ Air A4 utilise the Logistical Functional Area Services (LOGFAS) to ensure that all required equipment is correctly identified. This ensures that once stood up, all Force Elements at Readiness (FE@R) are swiftly transported to the identified deployed location.

A.2.2 The timeframes identified for Niche and Small interventions do not provide sufficient time for a TRA to be carried out. Therefore, minimum levels of response are identified within tables 1 and 2 of this annex providing the Aerodrome Operators (AO) and Delivery Duty Holders (DDH)/Accountable Manager (Military Flying) AM(MF)s with the assurance that ARFF provisions are at a suitable level to carry out effective Fire-fighting operations.

A.3. Risk Assessment for Niche and Small Interventions

A.3.1 For Niche and Small interventions a risk assessment[2] shall ascertain the required resources for crash Fire-fighting and rescue protection based on the type and number of aircraft combined with the anticipated number of sorties and the local resources available.

A.3.2 NATO STANAG 7133 CFT – Minimum Level of Crash, Fire-fighting and Rescue (CFR) Service for Deployed Fixed and Rotary Wing Aircraft is used to determine the minimum number of firefighters and vehicles required to respond to an aircraft emergency. The minimum number of firefighters at the emergency is based on the minimum of three firefighters per vehicle (one driver and two firefighters to perform hand line operations and facilitate self-rescue). Also, within this minimum number of firefighters, at least one fire fighter shall be trained as an Incident Commander. The number of firefighters required may vary and will be based on risk assessment.

[1] Refer to DSD 16 for further detailed requirements.
[2] This Risk Assessment is to be aligned to NATO STANAG 7133 CFT – Minimum Level of Crash, Fire Fighting and Rescue (CFR) Service for Deployed Fixed and Rotary Wing Aircraft

Table 1 - Individual Fixed Wing Aircraft Fire-fighting Requirements

Aerodrome Crash Category										Recommended Firefighters	Recommended Minimum ARFF Vehicles
1	2	3	4	5	6	7	8	9	10		
Maximum Aircraft on the Ground											
1-12	1-12	1-12	1-12							4	1
13+	13+	13+	13+	1-12						6	2[3]
				13+	1-6					8	2
						1-6				10	2
						7+	1+	1-3		12	3
								4+		15	3

Table 2 - Individual Rotary Wing Aircraft Fire-fighting Requirements

Aerodrome/Heliport Crash Category				Recommended Firefighters	Recommended Minimum ARFF Vehicles
H1	H2	H3			
Maximum Helicopter on the Ground					
1-12	1-12			4	1
13+	13+	1-12		6	1
		13+		9	1

Notes

1. Fire fighter numbers should be doubled for 24-hour operations to ensure a minimum of two operational crews to adopt an appropriate shift system.

2. Minimum extinguishing agent quantities and discharge rates must be met.

3. Helicopter Landing Sites or Forward Area Re-arming and Re-fuelling point (FARPS) operations or similar locations are deemed out of scope and should be risk assessed. DFSR 01: ARFF Service Levels of Protection (Paragraph 14) to this regulation refers.

A.3.4 When water supplies are limited, a water tanker and operating crew should be provided. This regulation does not consider structural or tented camps fire protection, therefore additional resources may be required. In addition, when operating at locations with more than one type of aircraft, the larger ARFF requirement applies.

A.4. ARFF Requirements for Enduring Operations

A.4.1 An Enduring Operation will generally follow on from either a Small Intervention or Environmental Medium; as such there will be sufficient time to allow a full TRA to be carried out. This is to be carried out in accordance with DFSR Regulation 04: ARFF Personnel Requirements

[3] The requirement for 2 ARFF vehicles may be reduced to 1 at aerodromes where there is no requirement to respond to structural type incidents.

ANNEX B

GUIDANCE ON THE STANDARDS OF FIRE COVER REQUIRED AT NON-AERODROME SITES FOR THE SAFE OPERATION OF ROTARY WING AIRCRAFT

B.1 Introduction

B.1.1 Standards for aerodrome fire cover are contained within DSA 02 DFSR – Defence Aerodrome Rescue and Fire-fighting (ARFF) Regulations. Front Line Commands (FLC) and Industry must ensure that Aerodrome Rescue Fire-fighting (ARFF) Services are considered when landing away from base. Assessment of a Helicopter Landing Site (HLS) responsibility will enable the Aviation Duty Holder (ADH) or the Accountable Manager (Military Flying) (AM ((MF)) to meet their responsibilities in accordance with RA 1020 – Roles and Responsibilities: Aviation Duty Holder (ADH) and ADH-Facing Organizations and RA 1024 - Accountable Manager (Military Flying).

B.1.2 This annex provides a structured framework, when conducting the risk assessment specified in DSA 02 DFSR – Defence Aerodrome Rescue & Fire-fighting (ARFF) Regulations. Where possible this framework is benchmarked against international civilian and military standards. Appendix B1 is the guidance set by DFSR.

B.1.3 The risk assessment is an executive responsibility, and owned by the risk owner (eg ADH, AM (MF)). The process may be delegated to ADH-Facing individuals ie Aerodrome Operator or SATCO etc. Specialist advice may be sought through SQEP personnel including the Command/Group HQ or Defence ARFF Service Provider.

B.1.4 The mitigations are to be interpreted and applicable to the intensity of operations and be proportionate to the risk identified by the ADH or AM (MF).

B.2 Purposes of fire cover

B.2.1 The principle objective when responding to an air system crash, is to save life by creating and maintaining survivable conditions. Depending on the level of fire cover provided, additional tasks may include initiating rescue, making safe special risks, minimising damage to aircraft, reducing the effects on the environment and preserving evidence at the scene[1].

B.2.2 ARFF response should be positioned on the HLS to achieve response times in accordance with DSA DFSR 02: ARFF Response.

B.2.3 The level of fire support must be addressed through risk assessment and be proportionate to the flying operations being conducted. Factors to be considered during this process are:

a. Total number of planned movements in a 24hr period.

b. Total number of helicopters in use at peak period including other operators.

c. Operating risks. Apart from the type of aircraft and the number of occupants, other operating factors to be taken into consideration include:

(1) Presence of Dangerous Goods.

(2) Fuel quantities.

(3) Aircraft armaments.

(4) Type of flying being conducted.

(5) Time of day and weather considerations including; Night Vision Device (NVD) sorties.

[1] These ‘additional tasks’ will only be provided by the employment of ARFF personnel.

(6) Response time of Civilian Emergency Services (CES) and their ability to provide adequate support[2].

(7) Local topography.

(8) Provision of fire cover for rotors running refuels[3].

d. The establishment of an Emergency Plan is the bare minimum requirement. This may be included within any Safe Operating Environment (SOE) documentation.

B.3 Domestic Helicopter Landing Sites (HLS)

B.3.1 RA 1026 (5) - Use of Domestic Helicopter Landing Sites, stipulates there is no requirement to establish an Aerodrome Operator (AO) at a MOD HLS, but the HoE and ADH and/or AM (MF) are not prevented from doing so, if it is considered, appropriate. The ADH and/or AM (MF) must assess the suitability of all HLS which they have responsibility for Risk to Life (RtL).

B.3.2 All Domestic HLS are to have an emergency plan in place. It is to include but not limited to; emergency contact numbers, rendezvous points, emergency services access, First Aid provision, water supplies available and actions in the event of fire.

B.4 Permanent HLS.

B.4.1 A Permanent HLS (also referred to as a "heliport" in MAA02 Master Glossary) is a facility with a permanent rotary wing presence which is designated for operating, basing, servicing and maintaining helicopters. It may be an entire aerodrome or a defined area within an aerodrome. It may contain one or more landing points.

B.4.2 When Helicopters are permanently based at an HLS an assessment of the intensity of flying operations is to be carried out to confirm the level of ARFF Service provision required. Where this assessment identifies that the flying operations will be that of Standard Intensity, a Task and Resource Analysis[4] (TRA) to confirm ARFF Service, crew numbers, is to be carried out at the earliest opportunity. Where this is not possible due to operational reasons, the guidance provided by Annex A to DFSR01: ARFF Service Levels of Protection is to be followed.

B.5 Low Intensity Operations.

B.5.1 Civilian publications (CAP 789) Requirements and Guidance Material for Operators and CAP 168 Licensing of Aerodromes) allow a greater latitude when helicopter movements are deemed to be of a low intensity. The ADH/AM (MF) is to consider, when conducting a risk assessment, which must be completed prior to the commencement of operations, the intensity of operations that are likely to take place during a 24-hour period. Examples of the level of fire cover available are at Appendix B1. Low Intensity Operations has been defined as; '10 movements or less in a 24-hour period'.

B.6 Standard Intensity Operations.

B.6.1 Where the ADH/AM (MF) assess that the intensity of operations is such that a greater level of cover is required, this needs to be proportionate to the helicopter size and number of personnel carried. Examples of the level of fire cover available are at Appendix B1. A record of the risk assessment must be completed prior to the commencement of operations. DFSR have defined Standard Intensity Operations as; 'Greater than 10 movements in a 24-hour period'.

B.7 Temporary/Tactical HLS

B.7.1 A Temporary facility designated for the movement of passengers, crew or cargo during times of tension, operations, training or exercise. It may also be used for basing, servicing and/or maintaining helicopters. It may be located within the UK or overseas. It may be an

[2] Where practicable the CES are to be offered the opportunity to undertake familiarisation of the aircraft, this may include provision of a copy of the relevant aircraft hazard datasheet.
[3] This activity should be subject to a separate Risk Assessment in accordance with DFSR 06: ARFF Operations.
[4] Facilitated by the Defence ARFF Service Provider on behalf of the ADH via the Aerodrome Operator (AO) if appointed.

entire aerodrome, a defined area within an aerodrome, or any other designated location. It may include one or more landing points.

B.7.2 ADH-facing Organizations must liaise with the relevant ADH/AM(MF) to ensure that there is an adequate level of crash/rescue required for the activity.

B.8 Exercises.

B.8.1 The provision and level of fire cover must be addressed at the Initial Planning phase for any exercise. Early engagement is key to ensure the fire cover is proportionate to the risk assessed. There is substantial lead time for any additional fire cover that may be identified.

B.9 Skills and Training

B.9.1 Skills and training are to be proportionate to the task expected of the personnel undertaking the fire-fighting responsibilities. Where practicable, the training of personnel required to use First Aid Fire Appliances (FAFA) is to include practical use of the FAFA in use at the location of flying operations. The training of SQEP ARFF Service personnel is to be in accordance with DFSR 08: ARFF Training Requirements.

B.10 Summary

B.10.1 The utility brought by rotary wing (RW) air systems must not be constrained by overly prescriptive regulations with regards to providing fire cover. The latitude within the risk assessment process allows ADH/AM (MF) scope to adjust levels of cover dependent upon the ability to operate safely within the concepts of table 1 at Appendix B1. This Appendix will not fit every scenario or operation of RW air systems away from an established aerodrome/heliport. Where doubt exists consult the Defence ARFF Service Provider or SQEP fire advice within FLC.

APPENDIX B1

GUIDANCE ON THE STANDARDS OF FIRE COVER REQUIRED AT NON-AERODROME SITES FOR THE SAFE OPERATION OF ROTARY WING AIRCRAFT

ARFF Cover Matrix

Table 1 describes the available resources and potential application for given scenarios.

Description	Output				Examples of cover
	Water (Litres)	Discharge rate of foam solution (Lpm)	Complementary Agents		
			Dry Powder (Kg)	CO2 (Kg)	
Domestic HLS	As directed by the HoEs risk assessment. Fire cover provision will be declared in HLS Directory				90Ltr Foam,10 KG CO_2 Dry Powder
Refuelling Point[1]	230	230	45	90	4 x 90Ltr Foam,10 KG CO2, Dry Powder
Low Intensity H1	90	60	18	18	1 x 90Ltr Foam, 2 x 10 KG CO2 or 2 x 9 Kg Dry Powder
Low Intensity H2	230	230	45	90	3 x 90Ltr Foam, 2 x 10 KG CO2 or 2 x 9kg Dry Powder
Standard Intensity H1	IAW DFSR 01: ARFF Service Levels of Protection. Table 3				Aerodrome Fire Tender manned by SQEP ARFF Service personnel.
Standard Intensity H2					Aerodrome Fire Tender manned by SQEP ARFF Service personnel.
Low Intensity H3	50% of requirements in DFSR 01: ARFF Service Levels of Protection. Table 3				Aerodrome Fire Tender manned by SQEP ARFF Service personnel.
Standard Intensity H3	IAW DFSR 01: ARFF Service Levels of Protection. Table 3				Aerodrome Fire Tender manned by SQEP ARFF Service personnel.
Permanent HLS	ARFF Service crew numbers are subject to TRA				

Notes:

1. Water requirements are based on the amounts required when using performance level B Fire-fighting foam.

2. For foam meeting performance level B, it is permitted to substitute up to 100% of the gaseous complementary media requirement specified in the table with water for foam production, assuming the following media substitution rates:

   a. 1 kg of gaseous agent or dry powder = 0.66 litres of water[2].

   b. 2 kg of CO2 = 0.66 litres of water.

3. If a 'high performance' dry powder[3] is used, it may be permissible to reduce the minimum amount provided.

[1] Rotors running refuelling is subject to a separate risk analysis iaw DFSR 06: ARFF Operations

[2] ICAO Annex 14 - Volume 2 Aerodromes – Heliports (4th edition 2013) and CAP 168 Licensing of Aerodromes refer.

[3] High performance dry powders are produced in accordance with the EN 615 standard.

ANNEX C

C.1 International and National Aerodrome Rescue Fire-fighting Service Standards

C.1.1 Across the World there are several different standards for ARFF[1] Service provision. The most common are:

a. CAA (United Kingdom)

b. EASA

c. FAA

d. ICAO

e. NATO

f. NFPA

C.1.2 In order to assist Aircraft Operating Authorities (AOA) understand these differing standards, table 1 below provides comparison of the standards identifying the maximum aircraft size that can be operated within each standard.

Table 1 – ARFF Category Comparisons

Airport Category			Overall Length of Aircraft Up to But Not Including	Maximum Exterior Width Up to But Not Including
NFPA/NATO	FAA	ICAO/EASA/CAA	Mtrs	Mtrs
1	A	1	9	2
2	A	2	12	2
3	A	3	18	3
4	A	4	24	4
5	A	5	28	4
6	B	6	39	5
7	C	7	49	5
8	D	8	61	7
9	E	9	76	7
10	E	10	90	8

Notes:

1. The FAA do not have an equivalent category for ICAO/EASA/CAA/NFPA/NATO aircraft categories 1-3. Therefore, the lowest FAA category will be category A.

2. Whilst it is accepted that each standard may have different Fire-fighting media requirements, AOA need not concern themselves with these, concentrating solely on the maximum aircraft size that can be operated in each category.

[1] Also, be referred to as Rescue Fire Fighting Service (RFFS) and is not to be confused with a Local Authority Fire and Rescue Service or other national equivalents.

ANNEX D

Table 1 Individual Aircraft Fire-fighting Media Requirements for NATO Aircraft

D.1 The table lists the quantity of water required for foam production (using performance Level B foam) to control fires in the practical critical area and to maintain control of, and/or extinguish the remaining fire using the ICAO principles of calculation.

Aircraft Type	Water Calculation (Ltrs)	Aircraft Category	Min Water Required (Ltrs)	Discharge Rate[1] (if different) to that provided in
A-10	N/A	5	5400	
A-37	454	1	454	454
A 310	15374	8	18200	
Aermacchi / Embraer AMX	N/A	5	5400	
Alpha Jet	927	3	1200	
AN-2 Colt	859	3	1200	
AN-12	8015	6	8015	4008
AN-26	2622	4	2622	
AN-30	2928	5	5400	
AN-32	2618	4	2618	
AN-124	24913	9	24913	9228
AN-225	31408	10	32300	
AV-8B Harrier II	N/A	5	5400	
B-1	13450	7	13450	5873
B-2	5400	5	5400	
B-52H	TBC	7	TBC	
B747 400 Series	25263	9	25263	9357
B767 200 Series	14279	7	14279	6236
Breguet Atlantique	7634	6	7900	
C-5	26322	9	26322	9749
C-23	1325	3	1019	
C-27J	2724	4	2724	1800
C-101 Aviojet	924	3	1200	
C-160	7904	6	7904	
C-212 Aviocar	1163	3	1200	
C-295M	5144	5	5400	
CL-41 Tutor	632	2	670	

[1] In accordance with ICAO Annex 14 Volume 1 Aerodromes - Aerodrome Design and Operations 7th Edition July 2016 Table 9.2.

Aircraft Type	Water Calculation (Ltrs)	Aircraft Category	Min Water Required (Ltrs)	Discharge Rate[2] (if different) to that provided in Table 1 (Lpm)
CN-235	2444	4	2444	
DHC-6 Twin Otter	1179	3	1200	907
DO 28D / D-2 Skyservant	718	2	718	566
DO 228	1227	3	1227	944
E-2 Hawkeye	TBC	3	TBC	
EA-6 Prowler	N/A	5	5400	
EP-3E Aries II	8723	6	8723	4362
Falcon 20 / 200	1299	3	1299	999
F-4 Phantom II	N/A	5	5400	
F-5 (All Variants)	N/A	5	5400	
F-7 / J-7 Airguard	N/A	5	5400	
F-15 (All Variants)	N/A	5	5400	
F-16 (All Variants)	N/A	5	5400	
F-18 (All Variants)	N/A	5	5400	
F-22	N/A	5	5400	
F-27 Enforcer	5214	5	5400	
F-35	N/A	5	5400	
F-117	N/A	5	5400	
G-4 Super Galeb	730	2	730	575
G-222	2724	4	2724	
IL-28 Beagle	TBC	3	1200	
IL-76	13074	7	13074	5709
J-22 Orao	N/A	5	5400	
Jaguar	N/A	5	5400	
JAS 39 Gripen	N/A	5	5400	
L-39	929	3	1200	
KC-10A	18431	8	18431	7314
KC-135 Strato Tanker	11744	7	12100	

[2] In accordance with ICAO Annex 14 Volume 1 Aerodromes - Aerodrome Design and Operations 7th Edition July 2016 Table 9.2.

Aircraft Type	Water Calculation (Ltrs)	Aircraft Category	Min Water Required (Ltrs)	Discharge Rate[3] (if different) to that provided in Table 1 (Lpm)
M-346	740	2	740	583
MiG 17	N/A	5	5400	
MiG 21	N/A	5	5400	
MiG 23	N/A	5	5400	
MiG 29	N/A	5	5400	
Mirage 2000	N/A	5	5400	
Mirage F1	N/A	5	5400	
Mirage IV	N/A	5	5400	
M.B. 339A	723	2	723	570
P-3 Orion	8740	6	8740	4370
PC-7 Turbo Trainer	592	2	670	
PC-9	617	2	670	
Rafale	N/A	5	5400	
S-2 Tracker	TBC	3	TBC	
SF 260	347	1	347	347
SU-17	N/A	5	5400	
SU-20	N/A	5	5400	
SU-22	N/A	5	5400	
SU-25	N/A	5	5400	
Super Etendard	N/A	5	5400	
T-33	727	2	727	573
T-38	1055	3	1200	
T-45A	765	2	765	602
TR-1	2093	4	2400	
206 Jet Ranger	654	H1	654	327
AH-1 Cobra	TBC	H2	TBC	
Alouette III	931	H1	931	466
AS 350 Ecureuil	826	H1	826	413
CH-53	2459	H3	2459	1230

[3] In accordance with ICAO Annex 14 Volume 1 Aerodromes - Aerodrome Design and Operations 7th Edition July 2016 Table 9.2.

Aircraft Type	Water Calculation (Ltrs)	Aircraft Category	Min Water Required (Ltrs)	Discharge Rate[4] (if different) to that provided in Table 1 (Lpm)
H-2 Sea Sprite	TBC	H2	TBC	
KA-25	953	H2	1000	
KA-27	TBC	H2	TBC	
MD-500 Defender	549	H1	549	275
Mi-8 / 14 / 17 Hip	2370	H3	2370	1185
Mi 24	1307	H2	1307	
NH90	1291	H2	1291	646
S-64 / CH-54	2274	H3	2274	1137
SA 321G Super Frelon	1581	H2	1581	791
SA 332 Super	1603	H3	1603	802
S-64 Skycrane / CH-54	2275	H3	2275	1138
Tiger	958	H2	958	
UH-60 Blackhawk	1383	H2	1383	692
UH-70 Seahawk	1383	H2	1383	692
UH-72	826	H1	826	413
V-22 Osprey	1848	H3	1848	924

[4] In accordance with ICAO Annex 14 Volume 1 Aerodromes - Aerodrome Design and Operations 7th Edition July 2016 Table 9.2.

Regulation 02

DFSR 02: Aerodrome Rescue Fire-fighting (ARFF) Response

02 Aviation Duty Holders (ADH), ADH-Facing (ADH-F) Organizations, Heads of Establishment (HoE) and Accountable Managers (Military Flying) (AM (MF)) **shall** ensure that ARFF Services are organised, operated and respond to all emergency incidents according to the defined principles in a timely manner.

Acceptable Means of Compliance 02

DFSR 02: ARFF Response

1. The ARFF Service **Should** be notified of all aircraft emergencies by ATC operating in accordance with MAA RA 3311 – Controllers Emergency Actions.

2. ARFF services **Should** be organised and operated in such a manner as to ensure their rapid deployment and the effective and efficient use of resources.

3. When aircraft are involved in incidents on, or adjacent to, aerodromes, the principle objectives of the ARFF service **Should** be to:

   a. Save life

   b. Create and maintain survivable conditions

   c. Initiate[1] the rescue of those occupants unable to make their escape without direct aid

   d. Make safe any special risks

   e. Minimise damage to aircraft and associated equipment

   f. Reduce or mitigate effects on the environment

   g. Preserve evidence at incident location

4. The operational objectives of the ARFF Service on aerodromes and Surface Level Heliports are to:

   a. Create and maintain survivable conditions

   b. Provide egress routes for occupants to escape un-aided

   c. Initiate the rescue of those occupants unable to make their escape

5. At an aerodrome the ARFF Services **Should a**chieve the response times of two minutes and not exceeding three minutes to any point of each operational runway, as well as to any other part of the operating area, in optimum visibility and surface conditions[2].

[1] Oxford Concise English Dictionary definition is; *"Cause (a process or action) to begin."*
[2] Optimum visibility and surface conditions are defined as daytime, good visibility, no precipitation or strong wind with normal response route free of surface contamination eg water, ice, snow and aircraft movement restrictions.

6. At a surface level heliport, the ARFF Services **Should** achieve response times not exceeding two minutes in optimum surface and visibility[3].

7. The ARFF Service **Should** make safe progress as quickly as conditions permit to the accidents and/or incidents to maximise the opportunity for saving life. Achieving the response times are dependent on the size of aerodrome, location of fire station(s), disposition of vehicles, personnel and weather conditions at any given time.

8. ARFF vehicles **Should** normally be housed in a fire station to ensure that response times can be met. Their access from the fire station on to the runway area **Should** be clear, direct and requiring a minimum number of turns. The responding ARFF services **Should** be capable of reaching the furthest point of the aerodrome boundary within the stipulated response time.

9. The ARFF Service response area **Should** be identified within the Unit Major Incident Plan (MIP).

10. If the aerodrome is located near a water/swampy area, or other difficult environment, or a significant portion of the approach/departure operations takes place over these areas, the AO **Should** coordinate[4] the availability of suitable rescue equipment and services. Where necessary, if not available from other Emergency Services,[5] the ARFF Service **Should** be appropriately resourced with specialist rescue/Fire-fighting vehicles, equipment and training.

11. All ARFF vehicles **Should** be equipped with Crash Maps and Ordnance Survey Maps in accordance with MAA RA 3261 (2) Aerodrome Emergency Services.

12. A response safe system of work includes a number of elements that must come together to deliver an effective and safe service. A comprehensive Hazard and Risk Analysis **Should** be conducted over the optimum response routes within the aerodrome boundary that ARFF vehicles are likely to use. The analysis and system of work **Should** consider:

a. Standard Operating Procedures.

b. Call handling.

c. Alerting system.

d. Position of the fire station or standby area.

e. Position of training area where a response may be made from suitable access roads and routes.

f. Visibility and surface conditions.

g. A clear route.

h. Vehicle performance.

i. Vehicle maintenance.

j. Effective equipment.

k. Competent staff.

l. Communications.

[3] It is recognised that a two-minute response time for rotary wing aircraft may not always be achievable; particularly in training areas where helicopter movements are outside the aerodrome boundary.
[4] Refer to EASA AMC1 ADR.OPS. B.005(b) Aerodrome Emergency Planning and ICAO Airport Services Manual Part 1 Chapter 13 – Rescue Operations in Difficult Environments.
[5] CES in the UK or HN Support when on Deployed Operations.

m. An effective safety culture.

n. Effective leadership and incident command.

o. Human factors

p. Monitoring and review including records.

When assessing an effective response, the above points **Should** be scrutinised and reviewed; however, each aspect need not be focused on, in isolation when measuring effectiveness.

13. A Response Area Risk Assessment (DFSR Form 0201) **Should** be completed by the Defence ARFF Service Provider and endorsed by the AO. Once completed, the risk assessment **Should** be included in the Unit DAM.

14. Assessment of the approach and departure areas within 1000m of the runway threshold, or suitable point(s) for rotary wing aircraft locations, **Should** be carried out by the Senior ARFF Officer present to determine the options available for rescue. In considering the need for any specialist rescue and access routes, the environment of the risk area, in particular the topography and composition of the surface **Should** be considered.

15. Emergency access roads **Should** be provided on an aerodrome where terrain conditions permit their construction to facilitate achieving minimum response times. Particular attention **Should** be given to the provision of ready access routes to approach areas up to 1000m from the threshold, or suitable point(s) for rotary wing locations, within the aerodrome boundary. Where a boundary fence offers obstruction to the responding ARFF services, appropriate arrangements **Should** be in place to facilitate unobstructed access to outside areas for the largest ARFF vehicle.

16. The Aerodrome 1000m Response Area Assessment (DFSR Form 0202) **Should** be completed and included in the Unit DAM.

17. Defence ARFF Service providers **Should** develop safe systems of work for all incidents likely to be encountered on Defence aerodromes. Tactics, Techniques and Procedures (TTP) **Should** be produced for all incidents likely to occur on all Unit based and frequent visiting aircraft. Generic hazards may be reduced to As Low As Reasonably Practicable (ALARP) and tolerable by the introduction of these TTP.

18. The duty Crew of the ARFF Service **Should** be placed under the orders of the DATCO/ATCO IC who will be responsible for its deployment and state of readiness during aerodrome operating hours. The DATCO/ATCO IC **Should** be responsible for immediately authorising the response of the ARFF service to attend all emergency incidents or accidents on or near the aerodrome if an aircraft is involved. The DATCO/ATCO IC **Should** be responsible for disseminating the implications of the reduction of ARFF capability.

19. The Senior ARFF Officer present **Should** retain Incident Command and Control of all deployed ARFF assets until the incident is handed over to an appropriate member of an emergency response service or until the incident emergency response phase is terminated.

20. ARFF crews are to respond to all emergency incidents within their areas of responsibility as a priority, when life may be at risk and/or an effective contribution to the incident can be made. Any consequent effect on aerodrome operations, through a reduction or loss of ARFF category, is to be considered secondary to the saving of life (MAA RA 3261 (2) Aerodrome Emergency Services refers).

21. When an incident occurs off an aerodrome, the action to be taken depends on whether the exact location of the incident is known. When the location is known, the DATCO/ATCO IC or other emergency coordinating body will initiate emergency action in accordance with the local emergency plan. If the location of the incident is unknown, ATC personnel or other emergency coordinating body will initiate search activity in accordance with MAA RA 3261 (2).

Guidance Material

02

DFSR 02: ARFF Response

1. States of readiness for aircraft emergencies are defined as:

   a. State 1 - Aircraft Accident: A crash on or seen from an aerodrome.

   b. State 2 - Full Emergency: An incident on the aerodrome where doubt exists about the safety of the aircraft or its occupants, or to anticipate a "State 1". The ARFF vehicles and emergency medical services are deployed to the incident or to pre-arranged positions on the aerodrome.

   c. State 3 - Local Standby: A precautionary measure to cater for a possible incident on the aerodrome or when an aircraft has crashed off the aerodrome, but the position is unknown. ARFF vehicles are crewed with engines running at their normal locations.

2. Response time is considered to be the time between the initial call to the ARFF service, and the time when the first responding vehicle(s) is (are) in position to apply foam at a rate of at least 50 per cent of the discharge rate specified in DFSR Regulation 01 ARFF Service Levels of Protection Table 1.

3. Any vehicle(s), other than the first responding vehicle, required to achieve continuous agent application is/are to arrive no more than one minute after the first responding vehicle(s).

4. When determining response time, the aerodrome operators need to consider:

   a. Providing direct access to the operational runway(s).

   b. Designating access routes to the response area.

   c. The maintenance of roads and access routes.

   d. Eliminating the possibility of any vehicle blocking the progress of responding emergency vehicles.

   e. Accounting for the gross weight and maximum dimensions of the ARFF vehicle(s) expected to use them.

   f. Ensure Roads are capable of being traversed in all conditions.

   g. Exit gates or frangible sections in the security fence are suitable to allow access of the largest ARFF vehicle utilised on the aerodrome.

   h. Exit points will need to be clearly identified. Reflective tape or markers will be of assistance where aerodrome may need to be accessible during the hours of darkness or conditions of low visibility.

   i. Providing sufficient vertical clearance from overhead obstructions for the largest vehicle.

5. ARFF vehicles will approach any aircraft incident by the quickest route commensurate with safety, although this might not necessarily be the shortest

distance to the scene. Traversing through uneven or rough terrain areas can take longer than travelling a greater distance on paved surfaces. Therefore, a thorough knowledge by ARFF personnel of the topography of the aerodrome and its immediate vicinity is fundamental. The use of grid maps and careful selection of routes is essential for success in meeting the response objective.

6. Air transport incidents will highly likely involve a multi-agency response, therefore it is important that the Defence ARFF Service provider ensures collaboration with civil emergency responders forming the Pre-Determined Attendance (PDA) for incidents at individual aerodromes. To support Interoperability and Intraoperability it will be necessary to embed the basic principles of the JESIP in to the Unit MIP.

7. To ensure interoperability with Civil Emergency Services (CES) it will be necessary to ensure that tactics, techniques and procedures for dealing with all foreseen emergency incidents on aerodromes reflect the information provided by the National Operational Guidance Programme (NOGP) where relevant.

Regulation 03

DFSR 03: ARFF Vehicle and Equipment Requirements

03 Aviation Duty Holders (ADH), ADH-Facing (ADH-H) Organizations, Heads of Establishment (HoE), Aerodrome Operator (AO) and Accountable Managers (Military Flying) (AM (MF)) **shall** provide Aerodrome Rescue Fire-fighting Services with adequate numbers and type of vehicles and equipment at aerodromes for which they are responsible.

Acceptable Means of Compliance 03

DFSR 03: ARFF Vehicle and Equipment Requirements

1. The minimum number of ARFF vehicles provided at an aerodrome to effectively deliver and deploy the agents specified for the aerodrome category **should** not be less than that set out in Table 1.

Table 1 – The minimum Number of ARFF Vehicles at Aerodromes

Aerodrome Category	**Special**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**H1**	**H2**	**H3**
Minimum Number of ARFF vehicles	1	1	1	1	1	2 [30]	2	2	3	3	3	1	1	1

2. The minimum performance specification for ARFF vehicles **should** be in accordance with the DSA DFSR 02 ARFF Regulations and ICAO Airport Services Manual Part 1 - Rescue and Fire-fighting.

3. A system of preventative maintenance of ARFF vehicles **should** be employed to ensure effectiveness of the equipment and compliance with specified response time throughout the life of the vehicle.

4. Where a structural response capability is provided by the ARFF Service, the ability to deliver water jets would be desirable. Care **should** be taken in providing this additional capability to ensure the primary role of the vehicle (aircraft Fire-fighting) is not impaired.

5. Rescue equipment commensurate with the level of aircraft operations **should** be provided on the ARFF vehicles, taking into consideration:

a. The level of aircraft operations.

b. A Task Needs Analysis (TNA).

c. The Task and Resource Analysis (TRA).

[30] The requirement for 2 ARFF vehicles may be reduced to 1 at aerodromes where there is no requirement to respond to structural type incidents.

d. Relevant Health and Safety legislation eg Provision and Use of Work Equipment Regulations (PUWER), Personal Protective Equipment at Work Regulations (PPE) which require that equipment is:

1) Suitable for the intended use;

2) Safe for use; maintained in a safe condition and, in certain circumstances, inspected to ensure this remains the case;

3) Used only by personnel who have received adequate information, instruction and training; and

4) Accompanied by suitable safety measures, eg protective devices, markings, warnings.

e. A suitable test and inspection regime for which appropriate records **should** be maintained (for a minimum period of five years).

f. Records **should** include details of consequential action where an inspection has revealed a defect or deficiency.

6. If the aerodrome is located near a water/swampy area, or other difficult environment, or a significant portion of the approach/departure operations takes place over these areas, the AO **should** coordinate the availability of suitable rescue equipment and services. Where necessary, if not available from other Emergency Services[31] the ARFF Service **should** be appropriately resourced with specialist rescue/Fire-fighting vehicles, equipment and training.

7. All ARFF[32] personnel **should** be provided with Personal Protective Equipment (BS EN 469:2005) to enable them to perform their duties in a safe and effective manner.

8. A discrete communication system **should** be provided linking the Fire Station with Air Traffic Control (ATC) and all ARFF vehicles.

9. An alerting system for ARFF personnel, capable of being operated from that station, **should** be provided at the Fire Station and ATC.

10. Communications equipment **should** be provided, which will have an effective range that ensures reception within all response areas that the ARFF Service may be required to operate in. The ARFF service response area **should** be identified within the Unit Major Incident Plan (MIP).

11. Communication equipment to enable the ARFF Service to communicate with the responding CES **should** be provided.

12. Radio equipment to enable ARFF personnel to maintain communications with ATC when not in their vehicles **should** be provided.

13. A reliable method of summoning assistance from external emergency services **should** be provided. (MAA RA 3261 (2) Aerodrome Emergency Services refers).

[31] Civil Emergency Services (CES) in the UK or Host Nation (HN) Support when on Deployed Operations.
[32] IER personnel are not to be considered as ARFF. PPE for IER personnel is to be kept to the absolute minimum necessary to perform their duties. It is not expected for IER personnel to be provided with Fire Fighting PPE. This is to be confirmed by the 1* TRA following the TNA.

Guidance Material 03

DFSR 03: ARFF Vehicle and Equipment Requirements

14. In accordance with MAA RA 3267 Aerodrome Vehicle Marking and Lighting Requirements, ARFF vehicles utilised within the UK are to be signal red in colour.

15. Guidance on the rescue equipment to be provided at an aerodrome is given in NATO STANAG 7132 CFR – Personal Protective and Fire-fighting Equipment Requirements for Fire and Emergency Operations and ICAO Airport Services Manual Part 1.

16. At category 'Special', ICAO category 1 and 2 Aerodromes, any vehicle provided is to be mechanically reliable, fit for purpose, and capable of accommodating personnel. The vehicle is to be capable of conveying and delivering at least the minimum quantities of extinguishing agents as specified in DFSR Regulation 01 ARFF Service Levels of Protection Table 1.

17. Non-self-propelled appliances (trailers) are permissible, at category 'Special', 1 and 2 Aerodromes. But, they are to be connected to a suitable towing vehicle during aircraft movements. Where soft or other difficult terrain is immediately adjacent to, or comprises part of the response area, a suitable all-wheel drive vehicle will be required to ensure an effective response. In other situations, the vehicle is to be suitable for the terrain at the specific aerodrome.

18. At category 'Special', 1 and 2 aerodromes following a TNA a minimum quantity of ancillary equipment resource appropriate to the sizes and types of the aircraft is to be provided. CAP 168 Chapter 8 Appendix 8B and 8C provide further details of equipment requirements for these aerodromes.

19. The management of information and record keeping including the disposal of records can be found in JSP 441 Managing Information in Defence.

20. At certain locations communication equipment, may also include a requirement for ground to air[33] radio systems. Any requirement will be determined by HOE/AO.

21. In order that ARFF personnel can communicate with an aircraft captain without the need for ground to air communications, it is acceptable for ARFF personnel to be supplied with a headset and microphone which can be connected to the aircraft once it has come to rest.

22. In accordance with MAA RA 2307 Rules of the Air, ARFF personnel are to utilise NATO Standardised Marshalling Signals as identified within NATO STANAG 3117 - Standard AFSP-2 Aircraft Marshalling Signals when operating in the vicinity of aircraft.

[33] The use of ground to air radio systems is limited to direct communications between the senior ARFF Officer present and pilot, when the aircraft is on the ground and only within the period of a declared emergency.

Regulation 04

DFSR 04: ARFF Personnel Requirements

04 Aviation Duty Holders (ADH), ADH-Facing (ADH-D) Organizations, Heads of Establishment (HoE), Aerodrome Operator (AO) and Accountable Managers (Military Flying) (AM (MF)) shall provide Aerodrome Rescue Fire-fighting Services with appropriate numbers of Suitably Trained and Competent Personnel (TCP) at aerodromes for which they are responsible.

Acceptable Means of Compliance 04

DFSR 04: ARFF Personnel Requirements

1. The Defence ARFF Service Provider **should** ensure that:

   a. During flight operations and, at least, 15 minutes after the departure of the last flight, an appropriate number of suitably TCP are detailed and readily available to respond to an incident and operate the equipment at the maximum capacity.

   b. All ARFF personnel required to act in aviation emergencies, must demonstrate their medical fitness[1] to execute their role, taking in to account the type of activity.

   c. All personnel are deployed in a way that ensures the minimum response times can be achieved and continuous agent application at the appropriate rate can be fully maintained. Consideration should also be given to the use of hand lines, ladders and other rescue and Fire-fighting equipment normally associated with aircraft rescue and Fire-fighting operations.

   d. All responding ARFF[2] personnel are provided with protective clothing and respiratory equipment to enable them to perform their duties in an effective manner.

2. A Task Resource Analysis[3] (TRA) **should** determine the appropriate level of rescue and Fire-fighting equipment, personnel and supervisory grades. It **should** also identify training needs for personnel to deal with the Worst Credible Scenarios for all ICAO ARFF categories promulgated within the Unit DAM.

3. A TRA **should** be completed in consultation between the HoE/AO and Defence ARFF Service Provider. By using a qualitative risk-based approach which focuses upon worst credible scenarios (WCS)[4]

4. During operations when no Civilian Emergency Services (CES) or Host Nation (HN) support is available, the provision of ARFF services **should** be

[1] Medical fitness assessments specific to ARFF Services should be conducted for pre-employment entry as a fire fighter as well as ongoing medical fitness assessments for existing staff.
[2] IER personnel are not to be considered as ARFF personnel. PPE for IER personnel is to be kept to the absolute minimum necessary to perform their duties. It is not expected for IER personnel to be provided with Fire Fighting PPE. This is to be confirmed by the 1* TRA following the Task Needs Analysis (TNA).
[3] Refer to ICAO Airport Services Manual Part 1 Paragraph 10.5 Task Resource Analysis and CAP 1150 Information Paper 04 Task and Resource Analysis for further detail.
[4] A TRA seeks to identify the most appropriate number of personnel required to undertake identified tasks in real time before supporting external services are able to effectively assist the ARFF service.

scaled to ensure that all tasks associated with the WCS are effectively and safely dealt with by on-site arrangements.

5. The TRA process **should** commence by ascertaining the aerodrome category required by the Front-Line Command[5] (FLC) and Industry. This will allow the AO to confirm the minimum number of vehicles, minimum extinguishing agent requirements and discharge rates. This **should** also allow the Defence ARFF service provider to determine the minimum number of personnel required to functionally operate the vehicles and equipment.

6. The outcome of the TRA **should** be agreed with the HoE/AO and is to be shared with the CES or Host Nation (HN) equivalent and Local Resilience Forums.

7. Independent assurance of the TRA process **should** be provided by the DFSR ARFF (Assurance) Team. Once completed, the TRA **should** be recorded in the Unit's Defence Aerodrome Manual (DAM).

8. The objective of providing the appropriate number of competent personnel **should** be based on the 'Safe Person Concept' to have available sufficient staff at all responsibility levels operating Safe Systems of Work (SSoW) to ensure that:

a. The ARFF Service can achieve the Operational objective.

b. All vehicles and equipment can be operated effectively and safely.

c. Continuous agent application at the appropriate rate(s) can be maintained.

d. Sufficient supervisory grades can initiate an Incident Command System.

e. ARFF personnel are able to assist in aircrew, passenger and crew self-evacuation.

f. Access aircraft to carry out specific tasks if required, eg Fire-fighting, create survivable conditions, initiate rescue[6], make safe special risks.

g. Support and sustain the deployment of Fire-fighting and rescue equipment.

h. Support and sustain the delivery of supplementary water supplies.

i. The ARFF elements of the Aerodrome Emergency Response Plan (AERP) can be effectively achieved.

Note: *The above list is not exhaustive, and all relevant tasks must be identified before moving to Phase 2. Each task may include numerous functional activities.*

[5] For aerodromes operating under MAA CFAOS this will be set by the AM (MF)
[6] Oxford Concise English Dictionary definition is; "Cause (a process or action) to begin."

9. The AO **should** ensure that a TRA is carried out for each ICAO aircraft category promulgated within the aerodrome DAM. Other reasons requiring a TRA include, but are not limited to, the following:

a. Where the aerodrome category published within the DAM has changed.

b. Introduction of new Air System(s).

c. Change of WCS.

d. Change in flying operations i.e. Defence Exercise, Airshow etc, that require the aerodrome to operate at a different ICAO aircraft category than promulgated within the Unit DAM.

e. Change in type of ARFF vehicle(s) which introduce new technology.

f. Change in the Pre-Determined Attendance (PDA) delivered by CES/HN Support.

g. Adoption of new FRS Guidance where change impacts upon operational response.

h. Where an EAW operational deployment is identified to become an Enduring Operation.

i. Continuous Improvement, following Lessons Identified (LI) from incidents, exercises reports including DASORs etc.

10. At category 1 – 10 and H1 – H3 aerodromes/heliports all personnel forming part of the appropriate staffing level **should** be a qualified and ARFF, who have maintained the competencies required to be considered as suitably TCP SQEP for the role.

11. Where the required level of ARFF services on aerodromes operating under MAA RA 3261 (2) Aerodrome Emergency Services is that of Category Special, the AO **should** promulgate clear and concise emergency procedures including the use of Initial Emergency Response (IER) personnel, as an alternative to professional firefighters. IER **should** be suitably equipped and trained to provide an immediate response during flying operations.

12. An appropriate number of competent IER personnel **should** be detailed to operate the IER equipment.

13. Training of both ARFF and IER personnel **should** be carried out in accordance with DFSR Regulation 08: ARFF Training Requirements.

Guidance Material 04

DFSR 04: ARFF Personnel Requirements

14. Medical standards for ARFF personnel is a Single Service (sS) requirement. However, guidance can be found in NATO STANAG 7162 Standardization of Physical Fitness Maintenance Program for Firefighters on a maintenance of fitness programme.

15. It is recognised that ARFF/IER personnel may be engaged in duties other than those directly associated with the ARFF role. These 'extraneous' duties, which are to be the subject of an impact assessment, are to be

organised so not to create conditions likely to compromise individual or crew performance or introduce additional hazards.

16. ARFF/IER personnel designated as part of the appropriate level for response, who are engaged on extraneous duties, must be able to disengage safely to meet the response time objective.

17. ARFF/IER personnel designated as part of the appropriate level for response are not to be engaged on duties involving the handling of flammable liquids.

18. Until a TRA has been carried out, each individual aerodrome will provide ARFF Services in accordance with Annex A Transitional arrangements for Defence Fire Rescue (DFR) ARFF Services.

ANNEX A

A.1 TRANSITIONAL ARRANGEMENTS FOR DFR ARFF SERVICES

A.1.1 ARFF crewing levels at Defence aerodromes are to remain extant until a TRA has been completed. This will ensure the appropriate number of TCP to deal with aircraft incidents is provided at each aerodrome.

<table>
<tr><th colspan="7">DEFENCE AERODROMES</th></tr>
<tr><th>ICAO Aerodrome Category</th><th>Previous MOD Category</th><th>Vehicle Requirements</th><th>Total Water Capability (Ltr)</th><th>Foam Solution Discharge Rate (Lpm)</th><th>Minimum Complementary Media Dry Powder (Kg)</th><th>Minimum Crew Levels</th></tr>
<tr><td>Special</td><td></td><td rowspan="15">As per DFSR 03: ARFF Vehicle and Equipment Requirements Table 1 The minimum Number of ARFF Vehicles at Aerodromes.</td><td colspan="3" rowspan="15">As per DFSR 01: ARFF Service Levels of Protection Table 1- Minimum useable amounts of extinguishing agents.</td><td>Minimum No of IER personnel[40]</td></tr>
<tr><td>1</td><td></td><td>N/A</td></tr>
<tr><td>2</td><td>1A</td><td>3</td></tr>
<tr><td>3</td><td></td><td>3</td></tr>
<tr><td>4</td><td>2A</td><td>4</td></tr>
<tr><td rowspan="2">5</td><td>3A</td><td>6</td></tr>
<tr><td>H3A</td><td>5[41]</td></tr>
<tr><td>6</td><td></td><td>8</td></tr>
<tr><td>7</td><td>4A</td><td>10</td></tr>
<tr><td>8</td><td>5A</td><td>12</td></tr>
<tr><td>9</td><td>6A</td><td>15</td></tr>
<tr><td>10</td><td></td><td>N/A</td></tr>
<tr><td>H1</td><td></td><td>3</td></tr>
<tr><td>H2</td><td></td><td>4</td></tr>
<tr><td>H3</td><td></td><td>5</td></tr>
</table>

[40] The minimum number of IER personnel identified to operate the equipment provided, is to be recorded within the Unit Risk Register.

[41] It is to be noted that during Task Resource Analysis (TRA) of aerodromes, this manning level has proven to be inadequate for fixed wing ICAO 5 aircraft utilising the current ARFF vehicle fleet at time of this regulation being released.

Regulation 05

DFSR 05: ARFF Fire-fighting Media

05 Aviation Duty Holders (ADH), ADH-Facing (ADH-F) Organizations, Heads of Establishment (HoE), Aerodrome Operator (AO) and Accountable Managers (Military Flying) (AM (MF)) **shall** provide Aerodrome Rescue Fire-fighting Services with adequate quantities and properties of fire extinguishing agents at aerodromes for which they are responsible.

Acceptable Means of Compliance 05

DFSR 05: ARFF Fire-fighting Media

1. The Defence ARFF Service providers **should** ensure that provision of ARFF Fire-fighting Media remains compliant with DFSR Regulation 01 ARFF Service Levels of Protection Table 1.

2. Fire-fighting foams **should** be tested in accordance with ICAO Level B or Level C performance test method as set out in ICAO Airport Services Manual, Part 1, Rescue and Fire-fighting 4th Edition (2014), Chapter 8 (Doc 9137-AN/898 Part 1).

3. The foam produced by an ARFF vehicle, or other such appliance, **should** be of an acceptable quality. The delivery parameters ie monitors, jet range and pattern **should** be maintained and meet the appropriate operational requirement.

4. In order to ensure foam production by an ARFF vehicle or other such appliance of an acceptable standard, a foam production performance test (ie an acceptance test) **should** be carried out when:

   a. A vehicle is first acquired.

   b. Significant maintenance, refurbishment or component replacements have been undertaken on an ARFF vehicle that could affect a change in the foam quality or production performance of the foam-making system. This includes a change of foam making branches, nozzles or monitors. Only those parts of the system that could have been affected by the work undertaken or the component change need to be tested.

5. The foam production performance test **should** confirm the following:

   a. The induction percentage for all foam making devices can be checked using water instead of foam (if the foam production system is fitted with an Induction Monitoring System, the test results obtained from analysis of the foam sample **should** correspond with those provided with the monitoring system)

   b. The expansion ratio from all foam making devices.

   c. The quarter draining time from all foam making devices.

   d. The jet range of the main monitor.

e. The spray pattern of the main monitor.

6. For vehicles equipped with foam monitors capable of producing foam on the move, the test **should** include an assessment of this capability.

7. Induction systems **should** induce with a tolerance of +/- 10% of the desired induction percentage at optimum working conditions. Pre-mixed foam systems **should** have a foam concentration introduced to within a tolerance of 1.0 to 1.1 times the manufacturer's desired induction rate.

8. The in-service test **should** be carried out, at least every twelve months, or in accordance with equipment manufacturers' instructions (if more frequent), to ensure the on-going capability of the foam production system.

9. Due to changes in environmental legislation and the SofS for Defence commitment to environmental protection, Fire-fighting media **should** deliver a Fire-fighting capability, whist at the same time be sympathetic to the environment.

10. The foam solution **should** be acceptable to the local water utilities for discharge into the foul sewer, minimising the impact on the environment and reducing the risk of enforcement action from an environmental release.

11. The Fire-fighting agents **should** be compliant with Persistent Organic Pollutant Regulations. The foam products must be free of any PFOS/PFOA or any derivative that is persistent in the environment (there should be no acceptable lower limit or threshold).

12. The complementary extinguishing agent **should** be a dry chemical powder suitable for extinguishing hydrocarbon fires, or any other alternative agent having equivalent Fire-fighting capability.

13. The complementary agents **should** comply with the appropriate specifications of the International Organisation for Standardisation (ISO).

14. Where the main complementary agent is a gaseous agent including CO2, a quantity of dry powder[42] **should** be provided to assist in dealing with a running fuel fire.

15. Systems **should** be capable of delivering the agent through equipment which will ensure its effective application.

16. The discharge rate of complementary agents **should** be selected for optimum effectiveness of the agent.

17. The required quantities of extinguishing agents **should** be in accordance with the aerodrome category, as identified within DFSR Regulation 01 ARFF Service Levels of Protection Table 1[43]. And, be available for immediate discharge from ARFF appliances.

18. For aerodrome categories Special, 1 and 2, hose line(s) of sufficient length(s) appropriate to dealing with fires involving the sizes and types of aircraft normally using the aerodrome and which include a hand-controlled foam-making branch **should** be provided.

19. For aerodrome categories 3-10, the discharge rates for foam **should** be met using vehicle mounted monitor(s).

[42] Refer to DFSR 01: ARFF Service Levels of Protection – Table 1

[43] The amounts of water specified for foam solution production are predicated on an application rate of 5.5 Ltrs/min/m² for foam meeting performance level B and 3.75 Ltrs/min/m² for foam meeting performance level C.

20. Where different types of extinguishing agents are used on an Aerodrome, care **should** be taken to ensure that incompatible types are kept apart and stored in accordance with manufacturer's guidance.

21. The quantity of foam concentrates separately provided on vehicles for foam production, **should** be in proportion to the quantity of water provided being sufficient to produce at least two full discharges of foam solution. The discharge rate of foam solution **should** not be less than the rates shown in DFSR Regulation 01 ARFF Service Levels of Protection Table 1.

22. It is essential that the foam produced by ARFF vehicles is of an acceptable quality and that delivery parameters are maintained to the appropriate operational requirements. To ensure that foam production is of an appropriate standard, foam production tests **should** be carried out in accordance with manufacturer's instructions and a record of the results of these tests maintained.

23. Vehicle foam tanks **should** be kept full at all times when the vehicle is in operational service.

24. A reserve supply of foam concentrate equivalent to 200% of the quantities required to produce at least two full discharges of foam solution for the aerodrome ICAO category as detailed in Table 1 below **should** be maintained on the aerodrome for vehicle replenishment purposes. Foam concentrate carried on fire vehicles more than the quantity required to deliver two full discharges of foam solution can contribute to the reserve.

Table 1 – ICAO Foam Requirements when using Performance Level B Foam.

Crash Category	Foam to meet Water on Wheels Requirement (Ltr)		200% Foam Requirement (Ltr)	
	3%	6%	3%	6%
1	14	28	28	56
2	40	80	80	160
3	72	144	144	288
4	144	288	288	576
5	324	648	648	1296
6	474	948	948	1896
7	726	1452	1452	2904
8	1092	2184	2184	4368
9	1458	2916	2916	5832
10	1938	3876	3876	7752
H1	30	60	60	120
H2	60	120	120	240
H3	96	192	192	384

Notes:

1. To calculate foam requirements for vehicle tanks - ICAO Water On Wheels Requirement x foam percentage / 100 x 2 = Vehicle Tank Requirement.
2. To calculate Reserve Foam requirements – Vehicle Tank Requirement x 2 = 200%.

25. A reserve supply of complementary extinguishing agents equivalent to 100% of the quantities identified within DFSR Regulation 01 ARFF Service Levels of Protection Table 1 **should** be maintained on the aerodrome.

26. Reserve extinguishing agents **should** be available within agreed and acceptable timescales as dictated by the Aerodrome Emergency Response Plan (AERP).

27. Supplementary water supplies, for the expeditious replenishment of ARFF vehicles at the scene of an aircraft incident, **should** be provided.

28. Where insufficient water supplies are identified, it **should** be recorded on the Establishment Station Risk Register, the Aerodrome Operating Hazard Log within the DAM and elevated to the AO with the implications for the provision of the ARFF crash category.

Guidance Material

05

DFSR 05: ARFF Fire-fighting Media

29. The objective of fire-fighting media is to extinguish/suppress a fire on which it is applied. Principal agents provide an air-excluding blanket which prevents volatile flammable vapours from mixing with air or oxygen and provide for permanent control, ie for a period of several minutes or longer. Complementary agents may provide rapid-fire suppression but generally only offer transitory control during application.

30. The ICAO Critical Area Concept is not intended to ensure extinguishment of the entire fire; it seeks to control the area of fire adjacent to the fuselage. The objective is to safeguard the integrity of the fuselage and maintain tolerable conditions for its occupants.

31. Principal extinguishing agents include:

a. Foam meeting the minimum performance level B

b. Foam meeting the minimum performance level C; or

c. A combination of these agents

32. Both Principal and Complementary agents are to be provided at a Defence aerodrome.

33. Manufacturer standard test procedures and equipment requirements are to be detailed in the ARFF Vehicle Army Equipment Support Publication (AESP), Technical Support Documents or ARFF Service Provider equivalent publication.

34. A quantity of gaseous agent or CO_2 will need to be provided for use on aircraft engine fires.

35. Extinguishing agent quantities designated as reserve (including the stocks on the vehicle) are to be held in an appropriate manner which easily allows vehicles to be replenished promptly.

36. In addition to any statutory or legal requirements, ARFF Services are to ensure that they:

a. Comply with manufacturers storage instructions.

b. Complete regular inspection and testing.

c. Maintain log books and records.

d. Comply with manufacturers recommended service and test intervals.

37. Training foams do not comply with any recognised national or international standards; however, they will be quality assured by the

manufacturer. They may be formulated to mimic the operational foams for induction, drainage and expansion properties; however, their Fire-fighting properties may be reduced. Personnel must understand this feature of training foams before they are used. Care is to be taken to prevent confusion between the storage and use of training foams with their operational counterparts.

38. Where the manufacturer can demonstrate that the training foam produces identical test results to those expected to be obtained by the operational Fire-fighting foam, it may be used to conduct the foam production performance and 'in-service' tests. Training foam is to be managed in the same manner as operational foam.

39. The objective of providing additional water supplies at adequate pressure and flow is to ensure rapid replenishment of ARFF vehicles. This Supports the principle of continuous application of extinguishing media to maintain survivable conditions at the scene of an aircraft incident for far longer than that provided for by the minimum amounts of water detailed in DFSR Regulation 01 ARFF Service Levels of Protection Table 1.

40. Additional water to replenish vehicles may be required in as little as five minutes after an incident. Therefore, the aerodrome senior ARFF Officer is required to conduct an analysis to determine the extent to which it, and its associated storage and delivery facilities, should be provided.

41. The aerodrome senior ARFF Officer is to consider the following when assessing Aerodrome water supplies:

a. Size and type of aircraft using the aerodrome.

b. The capacities and discharge rates of ARFF vehicles.

c. The provision of hydrants.

d. The provision of static water supplies.

e. Utilisation of existing natural water supplies.

f. Vehicle response times.

g. Historical data of water used during aircraft incidents.

h. The need and availability of supplementary pumping capacity.

i. The provision of additional vehicle-borne supplies.

j. The level of support provided by Civil Emergency Services

k. The Pre-Determined Attendance (PDA) response of Civil Emergency Services.

l. Fixed pumps, where these may provide a rapid and less resource-intensive method of replenishment.

42. A Water Assessment is at (DFSR Form 0203) once completed this is to be included in the Unit Defence Aerodrome Manual (DAM).

Regulation 06

DFSR 06: ARFF Operations

06 Aviation Duty Holders (ADH), ADH-Facing (ADH-F) Organizations, Heads of Establishment (HoE), Aerodrome Operator (AO) and Accountable Managers (Military Flying) (AM (MF)) **shall** ensure that Aerodrome Rescue Fire-fighting Services are provided to cover all operations considered necessary at locations for which they are responsible.

Acceptable Means of Compliance 06

DFSR 06: ARFF Operations

1. The ARFF capability **should** be commensurate with the appropriate category of the operating aircraft at that location[1]. The ARFF capability **should** be maintained for a period of not less than 15 minutes prior to or following flying operations.

2. The ARFF Service **should** respond as quickly as possible to accidents and/or incidents to create maximum opportunity for saving life. Achievements of response times are dependent on the size of aerodrome, location of fire station(s), disposition of vehicles, personnel and weather conditions at any given time.

3. At an Aerodrome, the operational objective of the ARFF Service **should** achieve response times of two minutes and not exceeding three minutes to any point of each operational runway, as well as to any other part of the operating area, in optimum surface and visibility[2].

4. At a surface level heliport, the operational objective of the ARFF Services **should** be to achieve response times not exceeding two minutes in optimum surface and visibility.

5. It is recognised that a two-minute response time for rotary wing aircraft, may not always be achievable; particularly in training areas where helicopter movements are outside the aerodrome boundary. In these cases, the ARFF Services **should** respond with due care and attention.

6. To achieve this operational objective, a response safe system of work, including Tactics, Techniques and Procedures (TTP) for dealing with all foreseen aircraft incidents, to achieve an effective and safe ARFF Service **should** be produced. This is to be achieved by carrying out a comprehensive hazard and risk assessment in accordance with DFSR Regulation 02: ARFF Response.

7. During routine flying operations the ARFF Service Immediate Readiness' allowing personnel to carry out maintenance, training and extraneous duties in accordance with DFSR Regulation 02: ARFF Response. However, there will be circumstances and operational tasks that require a pre-determined response from the ARFF Service.

8. The minimum operating category for aircraft carrying Dangerous Goods (DG) **should** be maintained. ARFF Services **should** be at Readiness

[1] FLC requirements may require aerodromes to operate at a higher category than the aircraft normally operating from the aerodrome.
[2] Optimum visibility and surface conditions are defined as daytime, good visibility, no precipitation or strong wind, with normal response route free of surface contamination eg water, ice or snow and aircraft movement restrictions.

State 3 (in accordance with DFSR Regulation 02: ARFF Response) for air transport movements carrying DG 1.1, 1.2 and 1.3. During unloading / loading of all UN class 1 (except 1.4S) a manned ARFF vehicle **should** be located near the operation for optimum response.

9. Aero-med Flights may carry passengers who are not capable of evacuating an aircraft in an emergency unaided and may necessitate additional assistance from the ARFF Service. The ARFF services **should** be at Readiness State 3 (in accordance with DFSR Regulation 02: ARFF Response) during the aircraft movement, and in some circumstances, this may necessitate an ARFF vehicle to follow the aircraft to parking or to the take-off point.

10. ARFF services **should** be of the category appropriate to the aircraft involved for Royal Flights. The ARFF services **should** be at Readiness State 3 (in accordance with DFSR Regulation 02: ARFF Response) for the duration of the aircraft movement. In circumstances where the normal ARFF provisioning are inadequate, the parent Command HQ **should** seek the necessary augmentation. Where this not possible, the aircraft operating authority **should** carry out a risk assessment in accordance with DFSR Regulation 07: ARFF Reductions in ARFF Cover.

11. The HoE/AM(MF) is responsible for specifying the level of ARFF cover post the cessation of flying operations. Advice **should** be obtained from the aerodrome senior ARFF Officer present, with consideration given to higher risk aircraft operations such as:

a. Ground runs (including APUs).

b. Fuelling/de-fuelling operations.

c. Fuel flow testing.

d. Hot work (heat producing) procedures being carried out on or adjacent to aircraft.

e. Loading and unloading of Dangerous Goods (DG).

12. Subject to a risk assessment, the aerodrome crash category provided may be maintained/lowered or removed as necessary. The HoE/AM(MF) **should** complete the risk assessment (DFSR Form 0204[3]/0205)[4] confirming the decision regarding the level of ARFF cover to be provided, adding any caveats as necessary. Once completed the risk assessment **should** be placed in the Unit DAM.

[3] For all Defence Aerodromes.
[4] For Aerodromes operating under Contractor Flying Approved Organization Scheme (CFAOS).

Guidance Material

06

DFSR: ARFF Operations

13. There is no requirement to increase the ARFF crash category for Armed Aircraft, where the principle objectives contained within DFSR Regulation 02: ARFF Response are met with the available resources (listed in DFSR Regulation 01: ARFF Service Levels of Protection Table 2).

14. A reduction in the ARFF services below that stated in DFSR Regulation 01: ARFF Service Levels of Protection Table 2 is not aircraft operating in an armed role.

15. The hazardous nature of rotors turning/engines running refuelling, requires a risk assessment to be undertaken by HoE/ADHs/AM(MF)s with advice from the aerodrome senior ARFF Officer to identify appropriate levels of fire protection commensurate to the risk. Agreed procedures are to be published within Unit Orders.

16. Due to the dynamic nature of aircraft display flying[5] the aerodrome may need to increase its crash category status. Consequently, it is the responsibility of the HoE/AO in consultation with the aerodrome senior ARFF Officer to facilitate the necessary increase in ARFF provision.

17. Following a risk assessment, the agreed level of ARFF capability, including personnel levels confirmed by completion of a Task Resource Analysis (TRA) in accordance with DFSR Regulation 04: ARFF Personnel Requirements, and state of readiness for a flying display will be recorded[6] and agreed by all stakeholders.

18. Remotely Piloted Air System (RPAS) ADHs/AM(MF)s are required to conduct a risk assessment to determine a level of ARFF service that is appropriate and proportionate to the risk and record the findings. Hazard Data Sheets and Post-Crash Management plans are to be kept up to date and Units are to pre-plan with all relevant Civilian Emergency Services in areas where RPAS may be operated[7].

19. Ground Instructional Aircraft (GIA) are used in the training of aircraft handlers and do not take-off or land. Typically, these aircraft have reduced fuel loads, are unarmed and operate at reduced power levels. Due to the reduced hazard profile and kinetic movements of the GIAs, a risk assessment is to be undertaken by DH/AM(MF)s utilising the Senior ARFF Officer SQEP advice to identify appropriate levels of fire protection commensurate to the risk. This risk assessment is to be recorded and details of actions to be taken published in Local Orders.

[5] As defined within MAA RA 2335 Flying Displays and Flypasts
[6] DFSR Form 0204 or DFSR 0205 is to be used to record the outcome of the risk assessment.
[7] Refer to MAA RA1600 Remotely Piloted Air Systems.

Regulation 07

DFSR 07: ARFF Reductions in Cover

07 Aviation Duty Holders (ADH), ADH-Facing (ADH-F) Organizations, Heads of Establishment (HoE), Aerodrome Operator (AO) and Accountable Managers (Military Flying) (AM (MF)) **shall** ensure that processes are in place for informing the Duty Holder(s) when there are reductions to the correct aircraft category at aerodromes for which they are responsible or when aircraft are due to operate at aerodromes below the specific aircraft category.

Acceptable Means of Compliance 07

DFSR 07: ARFF Reductions in Cover

1. The AO **should** confirm that the ARFF Service Provider has sufficient policy/procedures in place to notify the DH/AM(MF) chain of any reductions in ARFF Services ensuring, through risk assessment, flying operations either continue, are restricted or cease.

2. The ARFF Service Provider **should** have policy/procedures in place to notify the Aircraft Duty Holder (ADH), Aerodrome Operator (AO) and Accountable Manager (Military Flying) (AM (MF)) of the risks associated with operating aircraft at aerodromes that are below the aircraft category for a specified aircraft.

Guidance Material 07

DFSR 07: ARFF Reductions in Cover

3. The ARFF services provided is to be appropriate to the aerodrome category as detailed in DFSR Regulation 01: ARFF Service Levels of Protection. Exceptions include:

   a. ‘Remission’ or

   b. ‘Reduced Hazard Profile Categories’.

4. There is no requirement to increase the ARFF crash category for Armed Aircraft where the principle objectives contained within DFSR Regulation 02: ARFF Response are met with the available resources (listed in DFSR Regulation 01: ARFF Service Levels of Protection Table 2).

5. In the event of an unexpected reduction in ARFF capability eg unserviceability of a vehicle, specialist equipment or unplanned shortage of fire personnel, the senior ARFF Officer on duty will implement the risk assessment in accordance with (DFSR Form 0206[1]/0207.[2]

   a. Complete the relevant section of the ARFF Risk Assessment Form.

   b. Detail the nature of the reduction in ARFF capability.

   c. State what ARFF capability remains.

[1] For all Defence Aerodromes.
[2] For Aerodromes operating under Contractor Flying Approved Organization Scheme (CFAOS).

d. Provide an estimate of how long the reduced capability is expected to persist.

6. Once completed by the Senior ARFF Officer present, the DFSR Form 0206/0207 is to be sent to the DATCO/ATCO IC to allow the HoE or AO[3] to determine what, if any, action will be taken concerning continuance of flying operations. The decision to stop, restrict or continue flying operations will depend on the nature of the reduction of ARFF capability. The HoE or AO is required to complete DFSR Form 0206/0207[4] confirming the decision regarding the status of flying operations, adding any caveats as necessary. Completed appendices constitute the formal audit trail of the Risk Assessment and are to be included within the Unit DAM.

7. When the AOA/ADH/AM(MF) is content to use an aerodrome at lower than required ARFF category, the agreement of the receiving aerodromes HoE/AO is to be obtained before use. The HoE/AO of the receiving aerodrome will endeavour to meet the required ARFF category, but where this is not possible he/she may approve the use. Any decision not to support the below ARFF category movement is to be communicated to the relevant AOA/ADH/AM(MF). The risk assessment process detailed in Annex A is to be used to assist the ADH/HoE/AM(MF) decision. It is permissible for the AOA to issue standing dispensation for regular activity.

8. When dealing with an in-flight aircraft emergency the aircraft commander may elect to land at an aerodrome which will not meet the criteria set out in this document.

[3] AM (MF) operating iaw MAA RA 3049 Defence Contractor Flying Organization responsibilities for UK Military Air System Operating Locations will complete DFSR Form 0207
[4] AM (MF) operating iaw MAA RA 3049 Defence Contractor Flying Organization responsibilities for UK Military Air System Operating Locations will complete DFSR Form 0207

ANNEX A

ARFF RISK ASSESSMENT GUIDANCE SHEET

A.1. Introduction

A.1.1 Where circumstances dictate that flying is conducted to/from aerodromes with reduced levels of ARFF services the HoE/ADHs/AM(MF) may approve such activity following a risk assessment informed by advice from the Senior ARFF Officer on duty.

A.1.2 The risk assessment is conducted using (DFSR From 0206[55]/0207[56] which is to be archived within the Unit Defence Aerodrome Manual (DAM) once completed, providing an auditable record of the HoE/ADH's/AM(MF) decision. Aircraft Operating Authorities (AOA) are responsible for detailing in Orders who can make risk-based decisions and to the level of reduced ARFF category will require elevation to the appropriate risk owner.

A.1.3 The risk assessment must consider the associated risks and potential outcomes prior to exposing not only aircraft, aircrew, passengers, and equipment, but also MOD resources and emergency services personnel to any increased exposure to potential hazards.

A.1.4 This guidance sheet is intended to assist in the formulation of a risk assessment, considering all factors prior to accepting a reduction in ARFF cover. The risk assessment, including any action taken to reduce identified hazards, are to be recorded.

A.2. Considerations

A.2.1 When compiling a risk assessment, the following factors are to be considered as a minimum:

Aircraft Type:

a. Does the a/c have ejection seats or other assisted escape systems?

b. Does the a/c construction include large quantities of Composite Materials?

c. Is the a/c carrying weapons/armaments and/or significant pyrotechnic stores?

d. Is the a/c carrying its full complement of crew/passengers?

e. Would rescue of crew/passenger's entail firefighters entering a fuselage?

f. Would rescue of crew/passenger's entail firefighters having to utilise additional rescue equipment eg ladders, hydraulic rescue equipment, etc?

g. What is the a/c fuel load (Hydrazine/AVTUR/AVGAS)?

h. Number of aircraft moves (low intensity, high intensity)?

Aircraft Operations:

a. Are paired/multiple take offs and landings being conducted?

b. Are paired/multiple take offs and landings of training a/c (pilots under instruction) being conducted?

c. Are 'first solo flights' being conducted?

d. Are aerobatic manoeuvres being performed?

e. Is the a/c carrying Dangerous Air Cargo/Dangerous Goods?

f. Is the a/c operating in an Aero-med role?

[55] For all Defence Aerodromes.
[56] For Aerodromes operating under Contractor Flying Approved Organization Scheme (CFAOS).

g. Are rotors turning or engine running refuels being conducted?

h. Is the a/c operating in accordance with its release to service?

Location:

a. Are adequate water supplies for emergency purposes readily available?

b. Does the terrain provide problems for access/egress of emergency service vehicles; eg marshy land or watercourses?

c. Are there other ground hazards in close proximity to the a/c operating area; eg fuel installations, armament/weapons stores, etc?

d. Are emergency medical/ambulance services available to support rescue operations?

e. Are the Civil Emergency Service (CES) capable of providing adequate support (eg back-up water supply) within an acceptable timeframe?

f. Does the location afford good radio communications (eg no radio black spots)?

g. Are remaining firefighters able to be transported to the scene of operations by alternative means to assist with initial Fire-fighting operations?

Regulation 08

DFSR 08: ARFF Training Requirements

08 Aviation Duty Holders (ADH), ADH-facing Organizations, Heads of Establishment (HoE) and Accountable Managers (Military Flying) (AM (MF)) **shall** ensure that Aerodrome Rescue Fire-fighting Services are properly trained and qualified to operate at aerodromes for which they are responsible.

Acceptable Means of Compliance 08

DFSR 08: ARFF Training Requirements

1. Personnel providing ARFF Services for aircraft operations are seldom called upon to deal with major aircraft fires/incidents. The maintenance of skills and core competencies required, are to be maintained by carefully following a planned and meticulous training programme. This assures both personnel and equipment will be capable in dealing with an aircraft fire/incident and great emphasis **should** be placed upon the training of ARFF personnel.

2. The Aviation Duty Holders (ADH), ADH-Facing (ADH-F) Organizations, Heads of Establishment (HoE) and Accountable Manager (Military Flying) (AM (MF)) **should** ensure that:

a. All ARFF personnel required to act in aviation emergencies, demonstrate their medical fitness to execute their function satisfactorily, taking in to account the type of activity.

b. All ARFF personnel are provided with training, including standardized aircraft rescue and fire-fighting information[1] allowing personnel to safely isolate aircraft systems and carry out rescue procedures from all station based and regular visiting aircraft.

c. All ARFF personnel have access to standardized ARFF specific training information for all NATO aircraft.

d. All ARFF personnel are trained to carry out the role in which they are expected to perform operational ARFF duties.

e. All ARFF personnel maintain the required competencies through a Maintenance of Competence Scheme (MOCS) endorsed by the relevant Training Requirements Authority (TRA).

f. Suitable facilities or means for conducting the required training are provided. This is to include the use of aircraft 'live' fire simulators corresponding to the dominant risk profile of the aerodrome.

g. All ARFF personnel participate in 'live' fire drills commensurate with the types of aircraft and the type of rescue and Fire-fighting equipment in use at the aerodrome.

3. 'Live' fire training facilities **should** make provision for ARFF personnel to practice the tactics, techniques and procedures for the control and extinction of aviation fuel fires, including pressure fed fires. 'Live' fire frequencies are set

[1] Training material is to be in accordance with NATO STANAG 3896 - Aerospace Emergency Rescue and Mishap Response Information (Emergency Services).

in accordance with NATO STANAG 7145 ATM – Minimum Core Competency Levels and Proficiency of Skills for Firefighters as follows:

a. Daytime - no less than once every 6 months.

b. Darkness - no less than once per year[2].

c. ARFF training programmes **should** include Air Safety training[3] and training in human performance, including team co-ordination.

4. The ADH, ADH-F Organizations, HoE and AM (MF) **should**:

a. Ensure there are sufficient numbers of Suitably Qualified Experienced Personnel (SQEP) trainers and assessors, as per JSP 822 Defence Direction and Guidance for Training and Education, for the effective implementation of the MOCS at the aerodrome.

b. Implement proficiency checks at adequate intervals to ensure continued competence of all ARFF personnel.

c. Ensure assessment of the competency of the individual(s) determining, evaluating and conducting training is in accordance with JSP 822 Defence Direction and Guidance for Training and Education.

d. Ensure that all ARFF personnel maintain appropriate qualification, training and proficiency check records to demonstrate compliance to this regulation.

5. All ARFF training **should** meet the requirements of the individual Role Performance Statements (Role PS) endorsed by the relevant TRA[4].

6. ARFF training **Should** include initial and recurring[5] familiarization of all station based and regular visiting aircraft. Training **should** be in accordance with all aircraft engineering authorizations.

7. At category 1 and 2 aerodromes ARFF training requirements **should** comply with at least those identified in CAP 168 Licensing of Aerodromes Chapter 8 – Appendix B.

8. At category 'Special' aerodromes, operating under MAA RA 3261 (2) Aerodrome Emergency Services, training requirements **should** comply with, at least those identified within, CAP 168 Licensing of Aerodromes Chapter 8 – Appendix C[6].

9. Proficiency checks **should** be carried out as agreed by the TRA in accordance with JSP 822 Defence Direction and Guidance for Training and Education.

10. Qualification, training and proficiency check records, endorsed by the TRA **should** be maintained and held for each individual of the ARFF Service for a minimum of 4 years following the end of an individual's employment[7].

[2] Only required for ARFF Service personnel that are required to operate on an aerodrome that operates during the hours of darkness.
[3] Refer to MAA RA 1440 – Air Safety Training.
[4] The Task Resource Analysis process may identify training needs within individual aerodrome to deal with aircraft Worst Case Scenario's.
[5] Frequency is to be determined by a Task Needs Analysis.
[6] Greater detail of an IER Training Manual is contained within the CAA Initial Emergency Response Training Framework Document.
[7] CAP 699 Framework for competence of Rescue and Fire Fighting Service (RFFS) personnel.

Guidance Material

08

DFSR 08: ARFF Training Requirements

11. Medical standards for ARFF personnel are a Single Service (sS) requirement. However, guidance can be found in NATO STANAG 7162 CFR – Standardization of Physical Fitness Maintenance Program for fire-fighters.

12. Training of ARFF personnel, employed within Defence, is to utilise the Defence Systems Approach to Training (DSAT) in accordance with the authoritive policy as directed by Joint Service Publication (JSP) 822 Defence Direction and Guidance for Training and Education. This policy directs and guides Defence personnel to ensure that training and education are appropriate, efficient, effective, risk focussed and most importantly, safe.

13. AOC 22 Trg Gp is the Training Requirements Authority (TRA) for all Service training, this is delegated to the Battlespace Management Force Commander (BMFC) as the delegated 1 Star (1*) Joint TRA for Shore-Side Professional Fire-fighting within Defence. 22 Trg Gp Director Ground Training (DGT) has been identified as the 1* TRA for IER personnel operating under MAA RA 3261 (2) Aerodrome Emergency Services at Defence aerodromes.

14. In accordance with JSP 822 Defence Direction and Guidance for Training and Education, following a thorough Task Needs Analysis (TNA), Role Performance Statements (Role PS) are to be developed for each role required by ARFF Service providers. These Role PS provide the requirements that are needed for each role within the ARFF Service, as such all training is to be designed to meet the requirements of the Role PS.

15. At category 1-10 and H1-H3 aerodromes/surface level heliports all ARFF personnel are to be at Training Performance Standard (TPS) following attendance at an ARFF Training Centre, prior to carrying out operational fire fighter duties.

16. At category ‘Special’ aerodromes IER personnel are to be provided with sufficient training, prior to carrying out their role.

17. A generic MOCS is to be utilised for all ARFF Service personnel. However, this can be individually tailored to ensure that it meets all requirements of each aerodrome. The aerodrome senior ARFF Officer is to ensure that all local aerodrome training requirements are covered by the generic MOCS. Any shortfalls identified are to be met by the introduction of local training packages endorsed by the TRA.

18. The provision of training facilities at each aerodrome allow ARFF personnel to train, maintaining core competences and key skills to ensure that all personnel remain SQEP.

19. Where training facilities are unavailable, training can be provided externally to the aerodrome. Where a Unit elects to use an external training provider, it is important to ensure that ARFF personnel train with equipment that is used at the aerodrome at which they are employed.

20. The tactics, techniques and procedures used during training scenarios are to be compliant with the service providers operational policy and procedures.

21. Ideally, live fire training will involve Class B liquid fires. However, considering the various environmental requirements and sources of guidance, the use of Liquefied Petroleum Gas (LPG) may be considered as a suitable alternative.

22. It is important that, if LPG is used during live fire drills, ARFF personnel are provided with suitable training to enable them to recognise the differing characteristics of LPG as opposed to Class B fires when used to simulate realistic fire training[8].

23. The training facilities are to enable ARFF personnel to periodically practice the application of multiple extinguishing agent application at the aerodrome.

24. The aircraft simulator is to make provision for ARFF personnel to practice:

a. Command and control.

b. Aircraft external fires.

c. Aircraft internal fires.

d. Gaining entry.

e. Search and rescue.

f. Specialist equipment drills e.g. High Reach Extendable Turret (HRET), aerial appliances, rescue/emergency stairs.

25. ARFF Service providers operating under MAA RA 3049 – Defence Contractor Flying Organisation responsibilities for UK Military Air System Operating Locations, may choose to utilise CAA CAP 699 - Framework for the competence of Rescue and Fire-fighting Service (RFFS) personnel, to meet this Regulation.

[8] 1* TRA for Shore-side Professional Fire-fighting within Defence has confirmed that “A small residual Trg gap exists for aerodromes with LPG only Trg facilities and this should be reflected in the Formal Trg Statement (FTS) as a Residual Trg Gap (RTG)”

	DFSR Aerodrome Rescue & Fire-fighting Service FORM INDEX		
Form No.	**Issue**	**Name**	**Date**
DFSR Form 0201	1.0	Response Area Assessment	XX Jun 19
DFSR Form 0202	1.0	Aerodrome 1000m Response Area Assessment	XX Jun 19
DFSR Form 0203	1.0	Water Assessment	XX Jun 19
DFSR Form 0204	1.0	Category for Specific Tasks Hazard Assessment (DDH)	XX Jun 19
DFSR Form 0205	1.0	Category for Specific Tasks Hazard Assessment (AM(MF)	XX Jun 19
DFSR Form 0206	1.0	Reduction of ARFF Category – Hazard Assessment (DDH)	XX Jun 19
DFSR Form 0207	1.0	Reduction of ARFF Category – Hazard Assessment (AM(MF)	XX Jun 19

Amendment Record

Date:	Issue:	Author:	Comments
XX Jun 2019	1.0	DSA-DFSR-ARFF_SFRI	New document - Initial issue

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DFSR Form 0201 (V1.0)
DSA DFSR 02 ARFF Regulation
Date XX Jun 2019

Defence Safety Authority

(Insert Station Name)

Aerodrome Rescue & Fire-fighting Service Response Area Assessment

Date: XX XXX 20XX

Contents

Fire Station Manager (FSM)

FSM Name	
FSM Signature	
Date	

Aerodrome Operator (AO)

AO Name	
AO Signature	
Date	

Review

Review Date	Reason for Review	Assessor Signature	AO Signature	Remarks

A.1 Introduction

A.1.1 The operational objective of the ARFF Service is to achieve response times of two minutes and are not to exceed three minutes to any point of each operational runway, as well as to any other part of the operating area (response area), in optimum surface and visibility.

A.2 Aim

A.2.1 The aim of this assessment is to analyse the optimum response routes within the aerodrome boundary that ARFF vehicles are likely to use.

A.3 Objective

A.3.1 To assess response routes from the fire station to five predetermined locations. One of the locations must capture the furthest point on the aerodrome from the fire station where aircraft operate.

A.4 Risk Analysis - Optimum Response

A.4.1 Response exercises were conducted at the five predetermined locations identified below:

a. ***(Insert location)***

b. ***(Insert location)***

c. ***(Insert location)***

d. ***(Insert location)***

e. ***(Insert location)***

Route 1 ***(Insert location)***		***(Description of route)***			
Driving Conditions		Time		Date	
Route 2 ***(Insert location)***		***(Description of route)***			
Driving Conditions		Time		Date	
Route 3 ***(Insert location)***		***(Description of route)***			
Driving Conditions		Time		Date	
Route 4 ***(Insert location)***		***(Description of route)***			
Driving Conditions		Time		Date	
Route 5 ***(Insert location)***		***(Description of route)***			

Driving Conditions		Time		Date	

A.4.2 Additional factors which affect an effective response.

Standard Operating Procedures	*(Description of SOP effecting response)*
Call handling	*(Description of call handling procedures)*
Alerting system	*(Description of Alerting Systems)*
Position of the fire station or standby area	*(Describe location of Fire Station, State 2 position and identify on crash map)*
Position of training area where a response may be made from	*(If applicable - identify location, describe response route and response time)*
Suitable access roads and routes	*(Description of main access roads suitable for response)*
Visibility and surface conditions	*(Describe policy for visibility and surface conditions)*
Clear route	*(Describe the shortest route(s) to the active runway)*
Vehicle performance	*(Describe the ARFF Vehicle fleet performance)*
Vehicle maintenance	*(Describe the ARFF flee maintenance regime)*
Competent staff	*(Describe how Fire Section personnel meet Defence Fire Rescue (DFR) policy)*

Communications	*(Describe how Emergency Responders communicate when responding to incidents)*
Effective safety culture	*(Describe how Fire Section personnel meet Defence policy)*
Effective leadership and Incident Command	*(Describe the Incident Command System (ICS) structure regarding response)*
Human factors	*(Describe how Fire Section personnel meet Defence policy)*
Monitoring and review including records	*(Describe how the Fire Section monitors and reviews records of responses)*
Extraneous Duties	*(Describe any impacts extraneous duties may have in meeting the response time criteria)*

A.4.3 Identified risks are recorded in the Station Risk Register, the Aerodrome Operating Hazard Log within the DAM and are elevated to the DDH/AM(MF) with the implications for the provision of the ARFF category

A.5 Conclusion

A.5.1 xxxx

A.5.2 xxxx

A.6 Review

A.6.1 Review of the Response Area assessment is undertaken by the FSM on an operational needs basis and revisited at planned two yearly intervals or when any material change has occurred at the aerodrome which may affect the emergency response.

(Insert Crash Map, aerial photographs etc. - identify main routes)

Intentionally Blank

Defence Safety Authority

(Insert Station Name)

Aerodrome Rescue & Fire-fighting Service Aerodrome 1000m Response Area Assessment

Date: XX XXX 20XX

B.1 Contents

Introduction	X
Aim	X
Observations	X
Conclusion	X
Photos	X
Maps	X

B.2 Fire Station Manager

Date of Assessment	
Assessor Name	
Assessor Signature	

B.3 Aerodrome Operator (AO)

AO Name	
AO Signature	
Date	

B.4 Review

Review Date	Reason for Review	Assessor Signature	AO Signature	Remarks

B.5 Introduction

B.5.1 Historical data suggests the majority of aircraft accidents occur in and around the immediate vicinity of aerodromes during the take-off or landing phase of flight. There is a responsibility placed on the AO, whereby aircraft which depart or approach over difficult environments, if required, are to provide specialist facilities or equipment to cover a distance of 1000 metres from either threshold ***(if required, insert Rotary Wing operational requirements)***. This assessment details specific pre-planned access and egress routings to the ***(insert numbers)*** undershoot/overshoot areas for ***(insert Threshold/FATO)*** runway**(s).**

B.5.2 This assessment provides procedural guidance and procedure in relation to the full or limited response of *Insert Station Name* Aerodrome Rescue & Fire-fighting (ARFF) service to incidents in the stated areas.

B.6 Aim

B.6.1 In accordance with DSA DFSR02: Defence Aerodrome Rescue & Fire-Fighting Regulations DFSR 02: ARFF Response[1] the aim is to assess the approach and departure areas within 1000m of the runway threshold ***(if required, insert Rotary Wing operational requirements)***

B.7 Difficult Environment Analysis - 1000m Response Area

B.7.1 The following factors were analysed for normal flying operations at *Insert Station Name*:

(Insert Threshold/ Final Approach Take Off (FATO) Area)

The environment, in particular the topography and composition of the surface	
Physical hazards and associated risks that exist within the area	
Options for access and for ARFF purposes	
Hazards, risks and control measures of the options for rescue	
Use of alternative routes	

[1] Paragraph 22 Assessment of the approach and departure areas within 1000m of the runway threshold or suitable point(s) for rotary bases), will be carried out by the Senior ARFF Officer present to determine the options available for rescue. In considering the need for any specialist rescue and access routes, the environment of the risk area, in particular the topography and composition of the surface should be considered.

(Insert Threshold/FATO)

The environment, in particular the topography and composition of the surface	
Physical hazards and associated risks that exist within the area	
Options for access and for ARFF purposes	
Hazards, risks and control measures of the options for rescue	
Use of alternative routes	

B.7.2 Identified risks are recorded on the unit's risk register, the Aerodrome Operating Hazard Log within the DAM and are elevated to the HoE/AM(MF) with the implications of the ARFF response within the 1000m response area. ***(amend/delete accordingly)***

B.8 Off Aerodrome Driver Training

B.8.1 xxxx

B.9 Conclusion

B.9.1 xxxx

B.10 Review

B.10.1 Review of the 1000 metre assessment is undertaken by the FSM on an operational needs basis and revisited at planned two yearly intervals or when any material change has occurred at the aerodrome which may affect the emergency response.

(Insert - Aerial maps, crash maps, photos of emergency exits (airside/landside view) etc.)

(Insert Crash Map, aerial photographs etc. - identify main routes)

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DFSR Form 0203 (V1.0)
DSA DFSR 02 ARFF Regulation
Date: XX Jun 19

Defence Safety Authority

(Insert Station Name)

Aerodrome Rescue & Fire-fighting Service Water Assessment

Date: XX XXX 20XX

A.1 Contents

A.2 Fire Station Manager (FSM)

Date of Assessment	
Assessor Name	
Assessor Signature	

A.3 Aerodrome Operator (AO)

AO Name	
AO Signature	
Date	

A.4 Review

Review Date	Reason for Review	Assessor Signature	AO Signature	Remarks

A.5 Introduction

A.5.1. Additional water to replenish vehicles may be required in as little as five minutes after an incident. The objective of providing additional water supplies at adequate pressure and flow is to ensure rapid replenishment of Aerodrome Rescue and Fire-fighting (ARFF) vehicles. This supports the principle of continuous application of extinguishing media to maintain survivable conditions at the scene of an aircraft incident for far longer than that provided for by the minimum amounts of water set out in Table 1 of DSA DFSR 02 - Aerodrome Rescue & Fire-fighting (ARFF) Regulations. DFSR 01: ARFF Service Levels of Protection.

A.6 Aim

A.6.1. To assess the availability of additional water supplies required for the for the expeditious replenishment of ARFF vehicles at the scene of an aircraft incident in accordance with DSA DFSR 02 - Aerodrome Rescue & Fire-Fighting.

A.7 Water Needs Analysis

A.7.1 The following were analysed for normal flying operations at RAF XXXX: ***(delete accordingly)***

Aircraft type using the aerodrome. (water requirement for aircraft type)	
The capacities and discharge rates of ARFF vehicles (continuous application)	
The provision of strategically located hydrants	
The provision of strategically located static water supplies	
Utilisation of existing natural water supplies	
Vehicle replenishment times	
Historical data of water used during aircraft accidents	
The need and availability of supplementary pumping capacity	

The provision of additional vehicle-borne supplies	
The level of support provided by Local Authority Emergency Services (Host Nation Support)	
The Pre-Determined Response of Local Authority Emergency Services	
Fixed pumps	
Additional water supplies adjacent to ARFF service training areas	
Overhead static water supplies	

A.7.2 Identified risks are recorded on the Unit's Risk Register, the Aerodrome Operating Hazard Log within the DAM and are elevated to the HoE/AM(MF) with the implications for the provision of the ARFF category ***(amend/delete accordingly).***

A.8 Conclusion

A.8.1 xxx

A.9 Review

A.9.1 Review of the aerodrome water assessment is undertaken by the FSM on an operational needs basis and revisited at planned two yearly intervals or when any material change has occurred at the aerodrome which may affect the water supplies.

(Insert Maps, Plans, Photos)

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DFSR Form 0204 (V1.0)
DSA DFSR 02 ARFF Regulation
Date: XX Jun 2019

Defence Safety Authority

(Insert Station Name)

Aerodrome Rescue & Fire-fighting Service Category for Specific Tasks Hazard Assessment (DDH)

Date: XX XXX 20XX

DFSR Form 0206 (V1.0)
DSA DFSR 02 ARFF Regulation
Date: XX Jun 2019

ARFF CATEGORY FOR SPECIFIC TASKS- HAZARD ASSESSMENT

This Form is to be used when the level of ARFF services are to be ascertained to provide an adequate level of response for specific tasks.

Aerodrome	
Established ARFF Category	
ARFF Category at time of task	
Aircraft type	
Task(s) that is being conducted	
Implications	*Include any special risks which would require to be covered.*
Any Compensatory Measures Taken	*Include water supplies, CES support and any alternative arrangements.*

Briefing Notes			
Senior ARFF Manager's Comments	*Recommended compensatory actions.*		
Senior ARFF Manager	Signature	Rank/Role	Date
Aerodrome Operator Comments			
Aerodrome Operator	Signature	Rank	Date
Delivery Duty Holder / Head of Establishment Comments			
Delivery Duty Holder / HoE	Signature	Rank	Date

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DFSR Form 0205 (V1.0)
DSA DFSR 02 ARFF Regulation
Date: XX Jun 2019

Defence Safety Authority

(Insert Station Name)

Aerodrome Rescue & Fire-fighting Service Category for Specific Tasks Hazard Assessment – (AM(MF))

Date: XX XXX 20XX

ARFF CATEGORY FOR SPECIFIC TASKS - HAZARD ASSESSMENT

This Form is to be used when the level of ARFF services are to be ascertained to provide an adequate level of response for specific tasks.

Aerodrome	
Established ARFF Category	
ARFF Category at time of task	
Aircraft type	
Task(s) that is being conducted	
Implications	*Include any special risks which would require to be covered.*
Any Compensatory Measures Taken	*Include water supplies, CES support and any alternative arrangements.*
Briefing Notes	

Senior ARFF Manager's Comments	*Recommended compensatory actions.*		
Senior ARFF Manager	Signature	Rank/Role	Date
Aerodrome Operator Comments			
Aerodrome Operator	Signature	Rank	Date
Accountable Manager (Military Flying) Comments			
Accountable Manager (Military Flying)	Signature	Rank	Date

DFSR Form 0206 (V1.0)
DSA DFSR 02 ARFF Regulation
Date: XX Jun 2019

Defence Safety Authority

(Insert Station Name)

Aerodrome Rescue & Fire-fighting Service ARFF Reduction of Cover – Hazard Assessment – (DDH)

Date: XX XXX 20XX

REDUCTION OF ARFF CATEGORY - HAZARD ASSESSMENT

This Form is to be used when ARFF services are reduced and when considering operating to other aerodromes with reduced ARFF services. AOAs/ADHs will define who can approve flights at reduced levels of ARFF category.

Aerodrome	
Established ARFF Category	
Required ARFF Category	
Reason for Reduction in ARFF Category	
Estimated Time that ARFF Category will be Reduced	
Implications	*Include any special risks which would not be covered.*

Aircraft Category that can be fully supported		Crew Size	
Number and Capacity of ARFF Vehicles			
Any Compensatory Measures Taken	*Include water supplies, CES support and any alternative arrangements.*		
Senior ARFF Officer's Comments	*Recommended compensatory actions.*		

Senior ARFF Officer	Signature	Rank/Role	Date

AO's Comments	
AOA's Comments	

Accept Risk				Elevate to DDH				Approve Flight			
Yes		No		Yes		No		Yes		No	

AO	Signature	Rank	Date

AOA	Signature	Rank	Date

Delivery Duty Holder /Head of Establishment Comments	

Accept Risk			Elevate to ODH			Approve Flight	
Yes		No	Yes		No	Yes	No
Delivery Duty Holder			Signature			Rank	Date
Operating Duty Holder's Comments							
Accept Risk			Elevate to SDH			Approve Flight	
Yes		No	Yes		No	Yes	No
Operating Duty Holder			Signature			Rank	Date
Senior Duty Holder's Comments							
Accept Risk						Approve Flight	
Yes		No				Yes	No
Senior Duty Holder			Signature			Rank	Date

DFSR Form 0207 (V1.0)
DSA DFSR 02 ARFF Regulation
Date: XX Jun 2019

(Insert Station Name)

Aerodrome Rescue & Fire-fighting Service Reduction of ARFF Category - Hazard Assessment (AM(MF))

Date: XX XXX 20XX

REDUCTION OF ARFF CATEGORY - HAZARD ASSESSMENT

This Form is to be used when ARFF services are reduced and when considering operating to other aerodromes with reduced ARFF services.

Aerodrome			
Established ARFF Category			
Required ARFF Category			
Reason for Reduction in ARFF Category			
Estimated Time that ARFF Category will be Reduced			
Implications	*Include any special risks which would not be covered.*		
Aircraft Category that can be fully supported		Crew Size	
Number and Capacity of ARFF Vehicles			

Any Compensatory Measures Taken	*Include water supplies, CES support and any alternative arrangements.*
Senior ARFF Officer's Comments	*Recommended compensatory actions.*

Senior ARFF Officer	Signature	Rank/Role	Date

AO's Comments	

AO	Signature	Rank	Date

Accountable Manager (Military Flying) Comments	

Accept Risk					Approve Flight			
Yes		No			Yes		No	

Accountable Manager (Military Flying)	Signature	Rank	Date