CAG

FIRE SAFETY MANUAL

FOR CHANGI & SELETAR AIRPORT

Version V2/2024
21.10.2024

Record of Amendments

S/No	Amendment No.	Date of Amendment	Reviewed By
1	01/1999	15 Apr 1999	OC(FS)
2	01/2000	01 Jul 2000	OC(FS)
3	01/2001	18 Aug 2001	OC(FS)
4	01/2002	9 Sep 2002	OC(FS)
5	01/2004	15 Mar 2004	OC(FS)
6	02/2004	7 Sep 2004	Supt (FS)
7	01/2005	1 Feb 2005	Supt (FS)
8	02/2005	1 Jul 2005	Supt (FS)
9	01/2006	27 Nov 2006	Supt (FS)
10	01/2008	30 May 2008	Supt (FS)
11	01/2009	1 Jul 2009	SO (FS)
12	01/2010	18 Nov 2010	1SO, FS
13	01/2011	14 Feb 2011	2SO, FS
14	01/2012	1 Nov 2012	1SO, FS
15	01/2014	1 Aug 2014	2SO, FPS
16	01/2016	1 Mar 2017	FWO Alex
17	01/2017	12 May 2017	SO, FPS
18	02/2017	22 Sep 2017	FWO Alex
19	01/2018	22 May 2018	FSSGT Yunos
20	01/2019	1 Aug 2019	FWO Gerald
21	02/2019	1 Dec 2019	FWO Ashraf
22	01/2020	1 Sep 2020	FWO Ashraf
23	02/2020	1 Dec 2020	FWO Ashraf
24	01/2021	17 Sep 2021	FWO Alex
25	02/2021	15 Nov 2021	FWO Alex
26	03/2021	10 Dec 2021	FWO Alex
27	01/2022	15 Nov 2022	FWO Alex
28	01/2023	31 Jan 2023	FWO Alex
29	02/2023	10 May 2023	FWO Alex
30	03/2023	30 Sep 2023	1SO Effendi, FWO Alex
31	04/2023	13 Oct 2023	1SO Effendi, FWO Alex
32	01/2024	20 Feb 2024	1SO Effendi, FWO Alex

S/No	Amendment No.	Date of Amendment	Reviewed By
33	02/2024	21 Oct 2024	1SO Effendi, FWO Alex

Where to download the Fire Safety Manual

The Fire Safety Manual is available online for airport stakeholders.

https://www.changiairport.com/en/conditions-of-use.html

Abbreviations

A&A	-	Addition and alteration
ACD	-	Airside Concession (Commercial)
AEL	-	Annual Electrical License
AES	-	Airport Emergency Service
AMC	-	Airside Management Centre
AO	-	Airport Operation
AOC	-	Airport Operation Centre
APD	-	Airport Police Division
ARI	-	Aircraft Refuelling Inspection
ATC	-	Air Traffic Control
AVI	-	Airfield Vehicle Inspection
AVSEC	-	Aviation Security
AVTUR	-	Aviation Turbine Fuel
BCA	-	Building and Construction Authority
BCF	-	Bromochlorodifluoromethane
BMC	-	Building Maintenance Contractor
BS	-	British Standards
CAC	-	Changi Airfreight Centre
CAG	-	Changi Airport Group (Singapore) Private Limited
CAR	-	Central Announcement Room
CBD	-	Cargo Business Division
CAAS	-	Civil Aviation Authority of Singapore
CAES	-	Chief, Airport Emergency Service
CAFHI	-	Changi Airport Fuel Hydrant Installation
CCS	-	Casualty Clearance Station
CSO	-	Customer Service Officer
CERT	-	Company Emergency Response Team
CP	-	Code of Practice
DECAM	-	De-centralized Alarm Monitoring
DTM	-	Duty Terminal Manager
DNATA	-	DNATA Singapore Pte Ltd
EAA	-	Evacuation Assembly Areas
ESCS	-	Engineering Smoke Control System
E&D	-	Engineering & Development
EDR	-	Emergency Door Release
EN	-	European Standards
EMA	-	Energy Market Authority
ERP	-	Emergency Response Plan
ES	-	Enterprise Singapore
EV	-	Electric Vehicle
FA	-	Fire Alarm
FCC	-	Fire Command Centre
FPS	-	Fire Prevention Section
FPC	-	Fire Prevention Circular
F&B	-	Food & Beverages
FM	-	Facility Management
FMC	-	Fault Management Centre
FSA	-	FSC Advice Letter
FSC	-	Fire Safety Certificate
FSM	-	Fire Safety Manager
Head, FPS	-	Head, Fire Prevention Section

HT	-	High Tension
IBMS	-	Integrated Building Management System
iFM	-	Integrated Facilities Management
IM	-	Incident Manager
KFSS	-	Kitchen Fire Suppression System
LCD	-	Landside Concession (Commercial)
LED	-	Light-Emitting Diode
LEW	-	Licensed Electrical Worker
LORADS	-	Long Range Radar Station
LPG	-	Liquefied Petroleum Gas
LT	-	Low Tension
NFPA	-	National Fire Protection Association
MINDEF	-	Ministry of Defence
M&E	-	Mechanical and Electrical
MV	-	Mechanical Ventilation
OC	-	Officer Commanding
OIC	-	Officer-In-Charge
OPC	-	Operation Commander
PA	-	Public Address
P&FM	-	Petroleum and Flammable Material
POI	-	Pre-Opening Inspection
PTW	-	Permit to Work
PWD	-	Persons with Disabilities
QP	-	Qualified Person
RA	-	Risk Assessment
RP	-	Rentable Properties (Commercial)
SAA	-	Singapore Aviation Academy
SASCO	-	ST Aviation Services Company Pte Ltd
SATCC	-	Singapore Air Traffic Control Centre
SATS	-	Singapore Airport Terminal Services
SCDF	-	Singapore Civil Defence Force
SDS	-	Safety Data Sheet
SCS	-	Smoke Control System
SFSM	-	Senior Fire Safety Manager
SS	-	Singapore Standards
SSU	-	Security Screening Unit
SWP	-	Safe Work Procedure
UL/FM	-	Underwriters Laboratories / Factory Mutual
URA	-	Urban Redevelopment Authority
AES WRO	-	AES Watch Room Operator

Documents

Singapore Standard References

CP52	Code of practice for automatic fire sprinkler system
SS510	Code of practice for safety in welding, cutting and other operations involving the use of heat
SS532	Code of practice for the storage of flammable liquids
SS546	Code of practice for emergency voice communication systems in buildings
SS563	Code of practice for the design, installation and maintenance of emergency lighting and power supply systems in buildings
SS575	Code of practice for fire hydrant, rising mains and hose reel system
SS578	Code of practice for the use and maintenance of portable fire extinguishers
SS638	Code of practice for electrical installations
SS645	Code of practice for the installation and servicing of electrical fire alarm systems

Other Relevant Guides References

NFPA 10	Standard for portable fire extinguishers
NFPA 111	Standard on stored electrical energy emergency and standby power systems
NFPA 407	Standard on aircraft fuel servicing
NFPA 410	Standard on aircraft maintenance

Foreword

Airport terminal buildings are designed with large and spacious hall, any fire outbreak can spread rapidly and will draw adverse publicity as well as disrupting airport operations, resulting in high losses to the airport businesses as well as the nation reputations.

Aims

This manual is aimed to cover both CAG and non - CAG owned / managed properties in the Changi and Seletar Airport but are by no means exhaustive and where appropriate should be used in conjunction with the codes of other authoritative bodies such as the Codes of Practice for Fire Precautions in Buildings (Fire Code) under Singapore Civil Defence Force, Singapore Standards issued under Enterprise Singapore, and National Fire Protection Association

General Terms of Reference

This manual seeks to spell out: -

a. Fire Safety Precautions Plan for Changi and Seletar Airport building.
b. Duties of Responsible Parties.
c. Maintenance of Fire Alarm System.
d. General Procedures in the Event of a Fire Outbreak
e. Other Specific Fire Hazards Identified in Fire Risk Assessment.

AES Service Charge

Airlines, air carriers, ground handling agents, cargo agents, facilities managers, project/maintenance contractors, owners, tenants; or any contractors/sub-contractors engaged by them; and theirs parties operating or working in Changi Airport, the Changi Airfreight Centre or Seletar Airport shall comply with fire safety requirements, safety instructions, permit to work system and hot work procedures required by SCDF and as stipulated by CAG's Fire Safety Manual.

Any non-compliance that resulting in false fire alarm activations and turnout of AES resources may result in a service charge being levied as per the schedule of rates listed in Table 1 below. (See Appendix 1-4 – Sample of AES Service Charge Form)

To prevent abuse of AES resources, AES may levy a service charge on Airlines, air carriers, ground handling agents, cargo agents, facilities managers, project/maintenance contractors, owners, tenants; or any contractors/sub-contractors engaged by them; and their parties operating or working in Changi Airport, the Changi Airfreight Centre, or Seletar Airport for any of the following services:

a. Removal of Fuel Hazards
b. Refueling / Defueling Standby
c. Explosives Escort
d. Hot Work Standby
e. First Aid Fire Appliances (FAFA) training
f. False fire alarm activation turnout
g. Vehicle escort
h. Fire Patroller duties

AES Suspension of Operation

In accordance with AES safety protocols, a compulsory suspension of operations is mandated in the event of a fire incident within CAG owned / managed properties.

This stop-work directive is crucial to uphold the safety standards for personnel and assets. The suspension of Activities will be enforced for a minimum period of three (3) days (to be determined by Head, Fire Prevention Section after the incident investigation). This will facilitate comprehensive safety assessments and the implementation of necessary preventive measures.

The recommencement of operations is subject to approval by designated authorities, contingent upon a thorough evaluation of the incident site by AES.

The schedule of service charge rates is listed in Table 1 below:

Table 1

S/No	Service	Charge*
i)	Fire Vehicle	$600 per vehicle per hour or part thereof*
ii)	Sea Rescue Craft	$1010 per vessel per hour or part thereof*
iii)	Fire Officer (SAEO)	$100 per officer per hour or part thereof*
iv)	Firefighter (AEO)	$60 per firefighter per hour or part thereof*
v)	Engineer and Technician	$400/ 500 per team per incident*
vi)	Auxiliary Police	$400 per team per incident*

**Excludes prevailing government taxes and the revised rates*

Updating and re-issuing of the Fire Safety Manual

This Fire Safety Manual is a controlled document. Any changes or updates to this Manual shall be in accordance with the procedures described below:

The complete and current copy of the Fire Safety Manual are available at Singapore Changi Airport official website https://www.changiairport.com/en/conditions-of-use.html It is the responsibility of the airport partners to ensure that his copy is kept up to date.

This Fire Safety Manual shall be reviewed annually.

a) Amendments to this Fire Safety Manual are the responsibilities of the respective Heads of Division overseeing fire safety operations in CAG. Any request for amendment shall be prepared by the respective divisional staff and approved by the Head of Division concerned. The set of changes to the Fire Safety Manual shall be submitted to the controller of the Fire Safety Manual in CAG Airport Emergency Service (AES) via fire.safety@changiairport.com for compilation and distribution after it has been approved.

b) Where amendments to the Fire Safety Manual relate to changes at the Changi and Seletar Airport that are planned and or arise out of unforeseen circumstances, the CAG AES shall be notified of such amendments to the Fire Safety Manual before effecting the change.

c) The relevant CAG Divisions shall be responsible for ensuring that the respective sections of the Fire Safety Manual under their purview are always kept complete and current. Where the processes captured in the Fire Safety Manual concern external stakeholders, the CAG Division is responsible for maintaining these sections of the Fire Safety Manual and engage the relevant stakeholders to ensure that their processes are current and accurate and provide necessary evidence of such compliances to any authority when requested.

PART ONE: FIRE SAFETY MANAGEMENT OF CAG OWNED / MANAGED PROPERTIES

Chapter 1 – General Fire Safety Duties and Responsibilities

1.1 General

1.1.1 The responsibility of ensuring the integrity of fire safety measures at each CAG owned/ managed building shall be that of the owner, The respective Head of Division in charge of the leasing or occupying premises shall be responsible as the " owner". They are responsible to supervise and oversee the tenants and staff activities that occupying such premises; plan maintenance regime and safe keep evidence of maintenance to any authority when requested.

1.2 Duties and Responsibilities of Divisions in CAG owned / managed properties.

1.2.1 The duties and responsibilities of each CAG division shall be as follows:

CAG Division	Duties and Responsibilities
Airport Emergency Service (AES) • AES (FPS) • AES (OPS)	**General Responsibilities** a) Appoint FSM (on behalf) for building owner on CAG owned buildings (T1, T2, T3, T4, Nexus One and Megaplex 1) according to SCDF FSM appointment conditions. b) Carry out FSM duties and responsibilities in accordance with Fire Safety (Fire Safety Managers) Regulations Part III. c) Chairing Fire Safey Committee and ensure the agenda items are updated. d) Disseminate any requirement changes in Fire Code to the respective Fire Safety Committee Members and for them to update their Division Head if there are any process changes in their work activities. **Additional Responsibilities – AES (OPS) and or Reps** a) Response to reported fire incident and conduct firefighting. b) Coordinate with SCDF for incident management. c) Supervising the FCC operation and assist AES (Ops) during fire emergencies that required evacuation before the arrival of FSM.

Airport Operations (AO) • FM (T2) • IFM (T1, T3 & T4)	**General Responsibilities** a) Provide technical advice for housekeeping, maintenance/servicing of fire extinguisher and hosereel at CAG owned / managed properties in accordance with Fire Code and the relevant Singapore Standards. b) Review Fire Code and Singapore Standards and ensure fire extinguisher and hosereel system "check and maintenance policy" are accurate. c) Conduct check on fire extinguisher and hosereel and to provide necessary evidence of checks, maintenance and fault rectification to authority when requested. **Additional Responsibilities - IFM T1,3,4** a) Work with E&D and ensure the fire alarm and protection systems check and maintenance policy are accurate. b) Conduct check and follow up on any observations and finding relating to fire protection and detection system and to provide necessary evidence of checks, maintenance and fault rectification to authority when requested. (listed in Chapter 3).
Airport Operations (AO) • Seletar Management	**General Responsibilities** a) Provide technical advice for fire alarm and protection systems, electrical and wiring installation at CAG owned / managed properties in accordance with Fire Code and the relevant Singapore Standards. b) Review Fire Code and Singapore Standards and ensure fire protection and detection system "check and maintenance policy" are accurate according to its maintenance plans. c) Conduct check and follow up on any observations and finding relating to fire protection and detection system and to provide necessary evidence of checks, maintenance and fault rectification to authority when requested. (Listed in Chapter 3).

Engineering & Development (E&D) • E&D (M&E) • E&D (T2) • E&D (CAC & ANC)	**General Responsibilities** a) Provide technical advice for fire alarm and protection systems, electrical and wiring installation at CAG owned / managed properties in accordance with Fire Code and the relevant Singapore Standards. b) Review Fire Code and Singapore Standards and ensure fire protection and detection system "check and maintenance policy" are accurate and to work with IFM on any discrepancy. **Additional Responsibilities - E&D T2 and CAC & ANC** a) Conduct check and follow up on any observations and finding relating to below fire protection and detection system and to provide necessary evidence of checks, maintenance and fault rectification to authority when requested. (Listed in Chapter 3)
Cargo Business Division (CBD)	**General Responsibilities** a) Provide technical advice for management of Cargo Compound at CAG owned / managed properties. b) Assist AES to liaise with Cargo Compound occupants for resolving any fire safety matters reported in the Cargo Compound (if required by AES). c) Assist AES in managing crowd control at Cargo Compound during evacuation.
Commercial Division (CD) • CD (LCD) • CD (ACD) • CD (RP)	**General Responsibilities** a) Manage commercial division tenants at the Terminal and CAC buildings and ensure they are to comply with the fire safety precautions by obtaining Fire Safety Certificate (FSC). b) Ensure that commercial division tenants are aware of the fire preventive measures listed in the CAG Tenancy Agreement (where applicable). c) Ensure that renovations, alterations and additions work permits applied by commercial division tenants are authorised in accordance with Chapter 5 of this section. d) Assist IFM when required on commercial division tenants' submission of documents for annual checks on electrical wiring and systems. e) Ensure that commercial division tenants participate in the annual Tenant Fire Safety Declaration Training, complete the assessment quiz, and submit the declaration form to AES outlined in this manual. f) Notify commercial division tenants promptly if they fail to submit the required annual Tenant Fire Safety Declaration within the specified timeframe listed in Appendix 1-2.

	g) Take appropriate action against commercial division tenants who do not proactively address and eliminate fire hazards within their premises.
Aviation Security (AVSEC)	**General Responsibilities** a) Provide advice for security management at CAG owned / managed properties. b) Assist AES to liaise with CAG security partner for crowd management during fire emergency.
Other Divisions	**General Responsibilities** a) The respective Head of Division in charge of the premises shall be responsible as the " owner". b) Report any Addition/Alteration (A&A) works and keep CAG work permit approval parties involved. c) Report if there is an infringement/ breeches of safety in the premises to CAG FMC via 65412424. d) Remove fire hazards as soon as reasonably practicable. e) Educate his staff to familiar with the evacuation path. f) Maintain electronic equipment within their premises. g) Follow up on any observations and finding relating to below fire protection and detection system and to provide all necessary evidence of rectification when requested.
Airport Staffs	**General Responsibilities** a) Familiar with the evacuation path. b) Ensure good housekeeping at the premises by not littering and discard any item that would block the emergency fire escape and or firefighting equipment. c) Do not smoke illegally at prohibited place under NEA (NEA | Overview) d) If there is any fire alarm activated at the terminal that required evacuation, follow the CAG instruction, and evacuate the building in an orderly manner.

Chapter 2 – General Fire Preventive Measures

2.1 General

2.1.1 Airport has a wide range of occupancies such as restaurants, duty-free shops, lounges, etc., and a large overall volume of combustibles such as alcohol, furniture, carpets etc. These together with the large number of aircraft passengers commuting through the airport daily result in a high fire load at the terminal buildings. Therefore, fire preventive measures need to be practiced by staff, occupants and tenants of buildings at Changi and Seletar Airport.

2.1.2 Fire preventive measures may be grouped into distinct categories, such as fire alarm and protection systems, passive fire safety measures, general housekeeping, electrical and wiring systems, and other fire hazards.

Categories	General Key Preventive Measures
Fire Alarm Systems	a) Fire alarm signal connection shall be linked between the building fire protection systems to Main Alarm Panel (MAP), MAP to DECAM Panel and AES Fire Station.
Fire Protection Systems	a) Fire extinguishers and fire hose reel shall be serviced annually.
Passive Fire Safety Measures	a) Exit signs and directional exit signs shall be illuminated. b) Exit doors shall not be locked, otherwise Emergency Door Release (EDR) shall be provided to release the lock when the fire alarm is activated. c) Means of egress and escape routes shall be free of obstruction.
General Housekeeping	a) Smoking is not allowed at NEA prohibited areas. b) Cigarette butts should be completely extinguished before disposed in the cigarette tray. c) Combustible waste should be disposed in a non-combustible container. d) No burning of oil lamps, candles, joss sticks or any forms of offerings within the buildings and on the airside. e) Devotees working in the airport area are advised to use electrical or battery-operated joss sticks if they wish to perform their prayers. Burning of offerings will only be permitted at burning sites designated by AES during the Lunar 7th month festival. Where burning of any sort is required, the prior approval of CAG shall be obtained. f) For storage of approved quantities of flammable liquids under SCDF, the owner shall comply with SCDF P&FM storage license requirement.
Electrical and Wiring Systems	a) Electrical work installation shall be submitted to CAG project officer and to seek permit approval from CAG IFM T1,3,4, and E&D T2. b) Connections between wires and plugs should not be loosen. c) Conduit and raceways are fastened into position and secured to outlets boxes. d) Electrical boxes are closed to prevent contact with combustible material.

	e) Fixtures, switches, and sockets are well maintained and not frayed. f) Electrical appliances are of an approved type and not left operation unattended. g) Electrical equipment should be switched off and not left energised when not in use, especially after-working hours. h) No overloading on the electrical circuit. If necessary, engage LEW to redesign the electrical system. i) New lighting fixtures shall be installed with electronic ballast or LED type of lighting systems. Conventional ballast shall not be used in the terminal buildings lighting systems for any new installation. Users are also required to monitor the usage and life span of the lighting systems and change before its end of life. j) Prior to any changes/redesign on the existing electrical system, the tenant shall engage a LEW for the redesign and inform CAG Project Officer. The LEW approval shall be submitted to IFM T1,3,4, and E&D T2 for comments. Tenant shall also continue engage LEW for the maintenance of the-electrical installations as per EMA guidelines. k) The Annual Electrical License (AEL) is to submit to IFM T1,3,4, and E&D T2.
Other Fire Hazard - Kitchen Fire Safety	a) Kitchen restaurant cooker hoods shall be degreased/cleaned on a regular basis as appropriate. Other than kitchens of restaurants where KFSS are installed, there shall be no naked flame allowed, unless prior approval is sought from CAG. b) Tenants operated with a kitchen facility that using open flame (LPG) cooking shall comply with the following (please note LPG cylinder is not allowed): <u>Tenant manager and supervisor, or equivalent shall:</u> i. Attend the AES Kitchen Fire Safety Assessment Train the Trainer Session annually during the scheduled Fire Safety Inspection. ii. Train and assess their staff using the Kitchen Fire Safety Assessment Form on monthly basis. (See Appendix 1-7 – Kitchen Fire Safety Assessment Form) iii. Safe keep the Kitchen Fire Safety Assessment forms and ensure their staff's particulars documented in the tenant's staff register and provide to Commercial upon request by CAG and or authorities. iv. Ensure there are no stowage racks or other forms of obstructions installed or mounted between the cooker hood and KFSS discharge nozzle as such racks/obstructions may affect the activation of the KFSS system. v. Ensure their staff do not leave cooking unattended.

Chapter 3 – Maintenance of Fire Alarm and Protection Systems

3 General

3.1.1 This chapter spells out the maintenance procedures for fire alarm and protection systems in CAG owned / managed properties in Changi and Seletar Airport.

3.2 Duties and Responsibilities on Checks and Maintenance

3.2.1 CAG and airport stakeholders are responsible to engage an approved/ system vendor to check and maintain their Fire Alarm and Protection System according to the Fire Code and Singapore Standards (refer to below table). The responsible partis shall safely keep the evidence of checks/ maintenance and to provide to authorities when requested.

Fire Alarm and Protection Systems	Fire Code and Singapore Standard (SS) Requirement
DECAM	Fire Code: Chapter 6 Firefighting system, Clause 6.3 Electrical Fire Alarm system installed shall comply with SS CP 10 (replaced by SS645 CoP for the installation and servicing of electrical fire alarm systems)
Manual Fire Alarm System Automatic Fire Alarm System	Fire Code: Chapter 6 Firefighting system, Clause 6.3 Electrical Fire Alarm system installed shall comply with SS CP 10 (replaced by SS645 CoP for the installation and servicing of electrical fire alarm systems)
Emergency Voice Communication	Fire Code: Chapter 8 Emergency lighting and voice communication systems, Clause 8.2 Emergency Voice Communication System shall comply with SS546 COP for Emergency Voice communication system in buildings
Emergency Lighting	Fire Code: Chapter 8 Emergency lighting and voice communication systems, Clause 8.1 Emergency lighting to comply with SS563 COP for the design, installation and maintenance of emergency lighting and power supply systems in buildings
Sprinkler Systems	Fire Code: Chapter 6 Firefighting system, Clause 6.4 Fire Sprinkler Installation shall comply with SS CP52 CoP for Automatic Fire Sprinkler Systems
Mechanical Ventilation & Smoke Control Systems	Fire Code: Chapter 7 Mechanical ventilation & smoke control systems, Clause 7.1 requires CAG to comply with the requirement for installing air-conditioning and mechanical ventilation systems

3.2.2 Check and Maintenance Responsibilities Parties for CAG Owned Systems

Fire Alarm and Protection Systems	FM	E&D (M&E)	IFM	E&D (Code Compliance)	Seletar Management	E&D CAC *ANC	AES
DECAM	-	-	-	-	Seletar Airport	-	T1,2,3,4, CAC
Manual Fire Alarm System	-	T2	T1,3,4	T1,2,3,4	Seletar Airport	CAC & ANC	-
Automatic Fire Alarm System	-	T2	T1,3,4	T1,2,3,4	Seletar Airport	CAC & ANC	-
Emergency Voice Communication	-	T2	T1,3,4	T1,2,3,4	Seletar Airport	CAC & ANC	-
Emergency Lighting	-	T2	T1,3,4	T1,2,3,4	Seletar Airport	CAC & ANC	-
Sprinkler Systems	-	T2	T1,3,4	T1,2,3,4	Seletar Airport	CAC & ANC	-
Mechanical Ventilation & Smoke Control Systems	-	T2	T1,3,4	T1,2,3,4	Seletar Airport	CAC & ANC	-
Others System	**FM T2**	**E&D T2**	**IFM**	**E&D (Code Compliance)**	**Seletar Management**	**E&D CAC *ANC**	**AES**
Total Gas Flooding System	-	T2	T1,3,4	T1,2,3,4	Seletar Airport	CAC & ANC	-

3.2.3 Check and Maintenance Responsibilities Parties for Non-CAG Owned Systems

Additional Protection and Detection System	Responsible Parties for Check and Maintenance
Total Gas Flooding Fire Protection Systems (not owned by CAG)	a) The respective system owner shall engage an approved vendor to service and maintain their TGFS system as per their operation manual. b) The system owner shall also safely keep the maintenance and servicing record and to provide the evidence to CAG when authorities requested.
Gas Pipes and Detection Systems	a) Commercial tenant - F&B operator with open flame (LPG) cooking are responsible to engage an approved vendor to inspect and service their Gas system and piping. (please note LPG cylinder is not allowed) b) The operator shall also safely keep the servicing record and to provide the evidence to Commercial when authorities requested. c) The approved vendor shall ensure the general interlinking test between gas solenoid valve, gas detection system and ventilation system are functional.
Kitchen Fire Suppression Systems	a) Commercial tenant - F&B operator with open flame cooking (LPG) and deep-frying activities are responsible to engage an approved vendor to inspect and service their KFSS system on an annual basis according to Fire Code. (please note LPG cylinder is not allowed) b) The operator shall also safely keep the servicing record and to provide the evidence to Commercial when authorities requested. c) The approved vendor shall ensure the general interlinking test between gas solenoid valve, gas detection system and ventilation system are functional.

Chapter 4 – Provision and Usage of Fire Extinguishers & Fire Hosereel

4.1 General

4.1.1 This chapter spells out the maintenance procedures for fire extinguisher and fire hosereel in CAG owned / managed properties in Changi and Seletar Airport.

4.2 Inspection and Maintenance Responsibility of Fire Extinguishers and Fire Hosereel

4.2.1 CAG and airport stakeholders are responsible to engage an approved vendor to service their Fire Extinguisher according to the Fire Code and Singapore Standards (refer to below table). The responsible parties shall safely keep the evidence of check/ maintenance and to provide to authorities when requested.

Fire Alarm and Protection Systems	Fire Code and Singapore Standard (SS) Requirement
Fire Extinguishers	Fire Code: Chapter 6 Firefighting system, Clause 6.1 Portable fire extinguishers to be tested and maintained in accordance with SS 578 CoP for the use and maintenance of portable fire extinguishers
Fire Hose Reel	Fire Code: Chapter 6 Firefighting system, Clause 6.2 Hydraulic hose reels to confirm with requirements in SS 575 CoP for Fire Hydrant, Rising Mains and Hose Reel System

4.2.2 Check and Maintenance Responsibilities Parties for CAG Owned Fire Extinguisher

Fire Extinguisher	FM	E&D	IFM	E&D (Code Compliance)	Seletar Management	E&D CAC *ANC	AES
Fire Extinguishers	T2	-	T1,3,4	T1,2,3,4	Seletar Airport	CAC & ANC	-
Fire Hose Reel	T2 (Drum)	T2 (Pump)	T1,3,4 (Drum and Pump)	T1,2,3,4	Seletar Airport	CAC & ANC	-
Trolley Fire Extinguishers	-	-	-	-	-	-	Airside

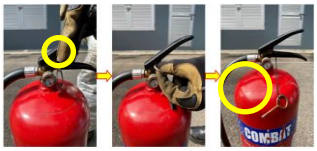
4.2.3 Check and Maintenance Responsibilities Parties for Non-CAG Owned Fire Extinguisher

Fire Extinguisher	Responsible Parties for Inspection and Maintenance
Fire Extinguishers Belong to Tenants, Contractor. *(I.E. Tenant, Renovation Work Site Etc)*	a) The occupier shall engage an approved vendor to service the fire extinguisher annually according to Fire Code and to provide the evidence to CAG Project Officer when authorities requested. b) **Additional Point** – F&B tenant operated with KFSS shall have an additional Class F Fire Extinguisher according to QP design.
Fire Extinguishers Belong To New And Unoccupied Building Under Construction *(I.E. Registered Factory, Construction Site)*	a) The owner of the construction site where CAG transferred the ownership shall engage an approved vendor to service the fire extinguisher annually according to their Fire Code and to provide the evidence to authorities when requested.

4.3 Usage of Portable Fire Extinguisher and Fire Hosereel

4.3.1 When a fire is discovered by airport staff, they shall as soon as reasonably practicable contact AES Hotline (Changi via 6541 2525/ Seletar via 6481 3377), raise the alarm by activating the nearest fire Manual Call Point (MCP) and within his/her means, take the nearest fire extinguisher in the area and follow the instruction as below simple steps (refer to 4.3.2 & 0). Before attempting to put out the fire, user shall ensure that he/she own safety is not compromised before approaching for firefighting.

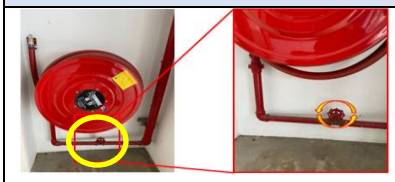
4.3.2 The following are simple steps (**P.A.S.S**) to operate the fire extinguisher:

Portable Fire Extinguisher			
Step 1	**Step 2**	**Step 3**	**Step 4**
			
Pull the Extinguishers/ Safety Pin	**Aim** the extinguisher at the source of the flames	**Squeeze** the trigger and hold it	**Sweep** the source of the flames until the extinguisher runs dry

4.3.3 For trolley fire extinguishers (only at Aircraft Parking Bay), the method of application is similar with the portable fire extinguisher; as below:

Trolley Fire Extinguisher			
Step 1	**Step 2**	**Step 3**	**Step 4**
			
Keep extinguisher **Upright** and uncoil hose	**Pull** out safety pin and **Open** quick release valve	**Aim** at the base of fire, **Squeeze** level, **Sweeping** from side to side	**Release lever** to interrupt discharge

4.3.4 The following are simple steps to operate the fire hosereel as below:

Fire Hosereel			
Step 1	**Step 2**	**Step 3**	**Step 4**
			
Open the valve fully	**Pull** out the hose	**Turn on** nozzle to discharge water	**Aim** at the base of fire and remain low posture

Chapter 5 – Fire Safety Requirements for Renovations, Alterations & Additions to CAG Owned / Managed Properties

5.1 General

5.1.1 These requirements are intended to ensure that the general safety of occupants and building fire safety are not compromised in accordance with the CAG tenancy agreement (where applicable).

5.2 Fire Safety Requirements

5.2.1 For any renovation, alterations and additions work in buildings, Tenant shall engage QP and consult if there would be any changes on the existing buildings fire safety measures.

5.2.2 Records on the consultations of the changes, the fire safety work approvals and waiver records from relevant authorities such as SCDF, BCA and URA shall be safe keep by the tenant and email to coordinating division - CAG Project Officer.

5.2.3 CAG project Officer shall send a copy of the SCDF waiver record to AES for record purposes. The coordinating division - CAG Project Officer is also responsible for following up and ensuring their tenant are incompliance with the recommendations made by SCDF and AES.

5.2.4 Copies of the relevant floor plans, showing the scope of renovations, modifications/ expansions, as well as fire safety measures; including fire exits and signage, should be provided to CAG Project Officer for evaluation and submit to CAG work permit clearing parties for work permit clearance.

5.2.5 CAG Project Officer shall ensure their contractor obtained CAG permit before allowing their contract start work at CAG buildings. He/she shall supervise the contractor to ensure they resolve any deficiency found by CAG that required closure.

5.2.6 Hoarding materials used shall be of non-combustible material [i.e. Gypsum Board] in accordance with Fire Code and submit to IFM T1,3,4, and FM T2 for approval.

5.3 Fire Alarm Isolation & Hot Work

5.3.1 Isolation of fire alarm system / draining of sprinkler system and hot work are required CAG Isolation and Hot Work permit. Both CAG Isolation and Hot Work permit can be applied via CAG permit to work system https://oc.changiairport.com. The manual permit could also be found in Appendix 1-5 – AESs Fire Alarm Isolation and Hot Work Manual Permits

5.3.2 Permits shall be applied at least 14 working days before the work start.

5.3.3 If there are work required urgent approval, CAG Project Officer shall be notified, and approval shall be sought with the concurrence from AES, IFM T1,3,4 /E&D T2 and BMC before commencement of works (Changi Airport – 9639 3843/ Seletar Airport 6481/ 2277)

5.3.4 Any negligent resulting in false fire alarm activations and/or turnout of AES resources may result in a service charge being imposed on owners, tenants or any contractors or sub-contractors engaged by them as listed in this Fire Safety Manual. (See Appendix 1-4– Sample of AES Service Charge Form)

Work Commencement and Reporting.

Permit	Reporting Process
Isolation	a) Applicant who requires to isolate any fire alarm system shall obtain a valid CAG Isolation permit and "Sign In" and "Sign Out" with the Terminal BMC before their works. b) Terminal BMC who on behalf of IFM and E&D shall maintain constant monitoring of fire alarm isolation work and managed the start and end time of the isolation of the fire alarm systems. c) Terminal BMC shall also report to AES Fire Prevention Section Duty Officer via 9639 3843 on the isolation work.
Hot Work	a) Applicant who requires to conduct hot work shall obtain a valid CAG hot work permit. b) CAG Project Officer shall ensure their appointed contractor (Applicant) submit the photo evidence before work start and end of the hot work to AES Fire Prevention Section Duty Officer via 9639 3843. c) The appointed contractor shall also ensure 30 minutes post hot work standby to prevent any re-ignition on the hot work site.

The coordination division CAG Project Officer should:

a) Monitor and ensure their tenant/ contractor work boundary are within the declared location inside the work permit.
b) Supervise the work and ensure their tenant/ contractor carry their work according to the submitted proposed plan that approved by the CAG Permit to Work (PTW) approval parties.

Shortcoming and or infringement, The coordination division CAG Project Officer should:

5.3.5 If there are any

a) **Serious shortcomings** - Inform tenant/ contractor that they will not be allowed to resume operations until rectification is completed. Contingency arrangements shall be made by the coordination division CAG project officer with the PTW approval parties if the operations are critical for airport operation. (subject to CAG approval)

b) **Minor shortcomings** - Inform tenant/ contractor that he will be given 7 days to rectify this shortcoming, failing which CAG would exercise the necessary clause from the respective contract signed by the tenant/ contractor with CAG. Any request on the extension of time (EOT) for rectification, the tenant/ contractor shall write in officially to CAG. (subject to approval by CAG)

After Work Completion

5.3.6 The coordination division CAG Project Officer is responsible for supervising the completion of the Alteration and Addition (A&A) work and shall upon completion of such works, notify CAG PTW approval's parties.

5.3.7 Inspection shall be conducted when tenant/ contractor work site completed. The coordination division CAG Project Officer shall coordinate with the CAG PTW approval's parties for the inspection of the work site and to confirm that all final work set out were fully complied with the CAG PTW and authorities' approval.

The coordinating division CAG Project Officer should ensure that tenant/ contractor to

a) Follow up and rectify all recommendation given by CAG PTW approval's parties given in the inspection.
b) Obtain Fire Safety Certificate (FSC) and FSC Advice Letter (FSA) from SCDF under QP advice.
c) Provide FSC and FSA to CAG AES inspector sighting before their official operation.
d) Email the FSC and FSA to AES inspector within 7 days after the sighting.

Chapter 6 – Emergency Response Plans for CAG Owned / Managed Buildings Including Those at CAC

6.1 General

6.1.1 Fire alarm systems of Changi and Seletar Airport buildings are linked to the AES Fire Stations at Changi and Seletar Airport respectively (refer to Chapter 2 & Chapter 3)

6.1.2 Any person discovers an outbreak of smoke and fire, must report the incident by

a) Call AES emergency hotline (Changi via 6541 2525/ Seletar via 6481 3377), or
b) Activate the nearest Manual Call Point (MCP).

6.1.3 Any person who extinguished the fire, however small it may be before the arrival of AES, must also report the incident by

a) Calling AES emergency hotline again (Changi via 6541 2525/ Seletar via 6481 3377)

6.1.4 The informant shall provide the following information to AES when reported the incident:

a) Location of fire.
b) Nature of fire (if known)
c) Injury to personnel (if known)
d) Informant's particulars and contact number.

6.2 Objective

6.2.1 The objectives of this plan are to establish

a) Roles and responsibilities of Fire Safety Committees
b) Concept of fire alarm activation and evacuation sequences.
c) Process for alert announcement and evacuation message
d) Control and preventive measure any further spread of fire, minimizing total property damage.

6.3 Fire Safety Committee

6.3.1 The Fire Safety Committee is chaired by CAG AES, and it is formed to administer any fire safety matter and improvement work within the CAG Airport Terminal Buildings. Its members comprised of various CAG division representatives that hold a role which documented in the Fire Safety Committees Term of References (TOR) shall assist the chairman and building owner to resolve fire safety matters and carrying out the discussed improvement work within the Changi Airport Terminal Buildings.

6.4 Fire Alarm Activation Concept

6.4.1 The fire alarm signal can be activated by the QP designed building fire alarm system (Manual or Automatic System).

6.4.2 The evacuation concept is the **"2 stage alarm"** and **"total evacuation".**

a) The sounding of the **1st fire alarm** – it should be treated as an **alert signal** to occupants and standby for evacuation message.
b) Upon confirmation of a fire situation, if the **2nd continuous fire alarm** sounded, and **immediate evacuation** should be initiated by the incident manager of the building.

1st Fire Alarm Signal (Alert Signal) – Changi Airport Only

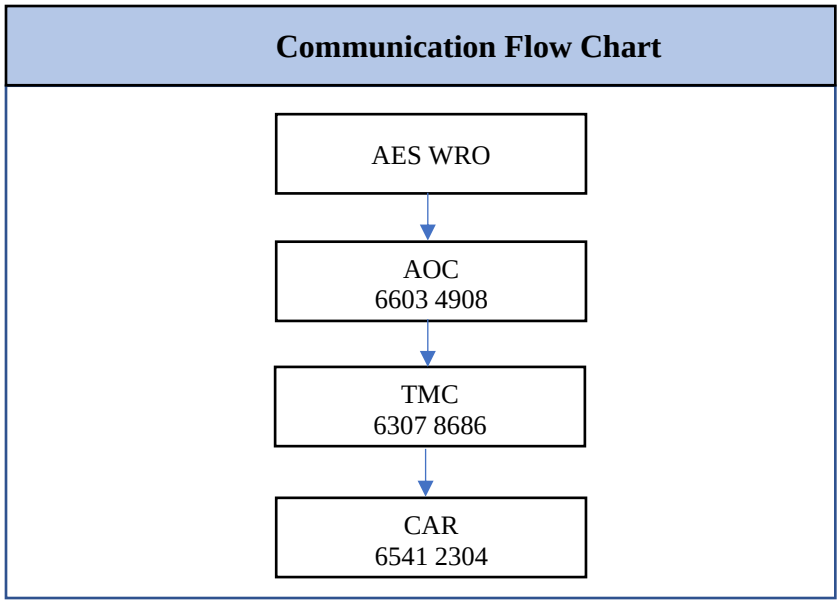
a) When the 1st fire alarm activated, the affected
   i. Floor Sub Fire Alarm Panel (FAP) will indicate the affected location on which fire device activated.
   ii. An audio and visual signal will also show at the FAP indicating the activation.

b) The alarm bells of the affected zone shall ring not less than 15 seconds before the automated alert message kick in.

c) Main alarm panel located at the Fire Command Centre (FCC) and Mimic panel located at AES Watchroom and FMC will also receive the alarm signal on which Fire Alarm Panel (FAP) has been activated.

d) Upon receiving the alarm activation by AES Watchroom, they shall activate AES firefighting team for incident turn out and inform AOC via 6603 4908 to ensure that the following information are communicated:
   i. Activated Fire Alarm (FA) zone; and
   ii. Status of AES response, i.e. investigation in progress, confirmed fire, etc.

e) AOC shall inform TMC and TMC to inform CAR to broadcast a general alert announcement over the Public Address (PA) system (See Annex 5 – TEXT 1) if there is any emergency that the automatic alert message could not be broadcasted. Refer to communication flow chart below:



f) Upon AES firefighting team arrived at the location, they shall link up with the Terminal BMC at the affected fire alarm panel.

g) If it is confirmed to be false fire alarm activation, AOC shall inform TMC and TMC to inform CAR to broadcast a general alert announcement over the PA system (See Annex 5 – TEXT 2). if there is any emergency that the automatic alert message could not be broadcasted. Refer to communication flow chart in 6.4.2

2nd Fire Alarm Signal (Total Evacuation)

a) The alarm bells of the affected zone shall ring continuously. Upon confirmation of a fire situation, up to the discretion of AES Ops Commander, the evacuation announcement (See Annex 5 - TEXT 4) shall be made via the FCC PA System.

b) The rest of the floors shall be evacuated subsequently (if deemed necessary by the AES Ops Commander/SCDF). Notwithstanding the above, a total evacuation of the building may be declared in an extreme situation.

6.4.3 Action to be taken in event of fire emergency (Include actual fire activation and incident without activation of fire alarm systems),

Informants	**The person who discovers the fire shall as soon as reasonably practicable:** a) Refer to 6.1.2, 6.1.3, 6.1.4
Terminal BMC	**In the event of fire emergency, the BMC shall:** a) Activated by FMC. b) Response to the affected fire alarm panel. c) Direct AES turnout crew to the affected area. d) Assist AES turnout crew at FCC to operate the fire alarm and protection system as well as other building facilities' controls. e) Isolate the system during investigation and obtain AES approval to reset the system after investigation completed. **For Non-Activation of Fire Alarm Provision, the BMC shall:** (Smoke/burning smell, visible smoke, fire in the terminal) a) Activated by FMC. b) Response to the affected location.

	c) Direct AES turnout crew to the affected area. d) Assist AES turnout crew (if required) at FCC to operate the fire alarm and protection system as well as other building facilities' controls. e) Isolate the system during investigation and obtain AES approval to reset the system after investigation completed.
Airport Emergency Service (AES Ops Commander)	**In the event of fire emergency, the AES OPC shall:** a) Exercise command and control of evacuation and fire-fighting operations and take charge at the FCC or the affect area. b) Handover command and control to the SCDF IM upon SCDF arrival. **c)** Ensure that evacuees are directed to the nearest EAA if evacuation is required.
CAG FSM or his representative (AES ER Crew)	**In the event of fire emergencies, the CAG FSM/ representative shall:** a) Monitor the fire alarm activation sequences at the affected FCC and report to AES Ops Commander before the arrival of CAG FSM. b) Assist evacuees at EAA that directed to the nearest assembly area and (if evacuation is required)
Airport Police Division	**In the event of fire emergency, the Airport Police shall:** a) Dispatch Police or Auxiliary Police resources to the scene and control traffic movements to facilitate movement of evacuees at the assembly areas b) Assume initial control of situation at EAA until the arrival of CAG FSM /AES Ops Commander c) Establish liaison with the CAG FSM/ AES Ops Commander. d) Ensure that main entrances and exits to/from the building are adequately manned to prohibit unauthorized re-entry and intensify patrolling in the building vicinity.
Fire Warden / Assistant Fire Warden	**In the event of fire emergency, the Fire Warden shall:** *On hearing the instructions (Evacuation Message) to evacuate* a) Alert staff to evacuate in a safe orderly manner. b) Check his premises and as much confirmed that no one is left behind. c) Closed the doors after everyone left the premises. d) Pay particular attention to PWD, children, pregnant women for their safety. e) Ascertaining those occupants following his/her order are moving out calmly. f) Conduct roll call of the evacuees in the floor register and report any missing persons to the officer in-charge at the EAA. (AES/ SCDF IM)

Tenants/ Staff	**In the event of fire emergency, the Tenant/ Staff shall:** *On hearing the instructions (Evacuation Message) to evacuate* a) Lock important items and evacuate as soon as reasonably practicable b) Follow their fire warden instruction and safety exit via the nearest exit point to the designated EAA. c) Airport staff (officers from ICA, SSU, Auxiliary Police, Ground Handling Agents, Airlines and concessionaire/shop, who are attending to the passenger and member of public at the time shall guide them to the nearest designated EAA. d) Evacuees shall only be allowed to re-enter the building only when the "ALL Clear" signal is given by the AES Ops Commander/ SCDF officer.

6.5 Fire Evacuation Drills

6.5.1 Fire evacuation drills shall be conducted at least twice a year for buildings appointed with FSM/SFSM.

6.5.2 Tenant in the selected building section (fire alarm zone) for the fire evacuation drill shall participate in the fire evacuation drills.

Annexes

Annex 1	**Emergency Contact Numbers**
Annex 2	**Site Plan of Assembly Areas (Contact FPS for Details)**
Annex 3	**Typical Floor Plans (Contact FPS for Details)**
Annex 4	**Evacuation Drill Record Sheet**
Annex 5	**Standard PA Announcement Texts During Activation of Fire Alarm**
Annex 6	**Floor Register**

Annex 1a – Emergency Contact Numbers – Changi

Agency	Contact Number
Changi Airport Emergency Service, Hotline - Watch Room (FS1) • For fire calls • For isolation, hot work, and other matters	 6541 2525 6541 2526
Airport Emergency Service, Fire Prevention Section • For fire safety consultation • For urgent permit application	 9639 3843
Airport Police Division (APD)	6546 0000
Ambulance Services • For médical emergency	 65432223
Airside Management Centre (AMC) - Changi • For airside accident & incident reporting • For fuel spillage reporting • For baggage incident Airside Control Centre (ACC)	 6541 2275 6541 2275 6541 2273 6541 2151
Fault Management Centre (FMC) • For defects & hazard reporting	 6541 2424
Airport Operations Centre (AOC)	6603 4908
Terminal Management Centre (TMC)	6307 8686
Central Annoncement Room (CAR)	6541 2304

Annex 1b – Emergency Contact Numbers – Seletar

Agency	Contact Number
<u>Seletar Airport Emergency Service, Hotline - Watch Room</u> • For fire calls • For isolation, hot work, and other matters • For urgent permit application <u>Airport Emergency Service, Fire Prevention Section</u> • For fire safety consultation	 6481 3377 6481 1246 9639 3843
Securities Services (Certis Cisco)	6482 4870
Ambulance Services • For médical emergency	 995
Airside Control Centre (ACC)	6481 5077
Terminal Operations Officers	9010 8781

Annex 2 – Site Plan of Assembly Areas

Contact FPS for Details

Annex 3 – Typical Floor Plan

Contact FPS for Details

Annex 4 – Evacuation Drill Record Sheet

I, the undersigned, designated as coordinator of the fire drill held by _____ hereby certify that all the facts shown on the line or lines herein below opposite my signature are correct and further that each drill was successfully conducted in full compliance with the approved ERP.

Date of Drill	Time	Location	No. of participants	Evacuation Time	Name & Signature of Coordinator

Annex 5 – Standard PA Announcement Texts During Activation of Fire Alarm

Fire Evacuation Standard Announcement

TEXT 1	**<u>In the event of a fire alarm activation in the building</u>** "Attention please, Attention please. "The fire alarm has been activated and investigation is in progress. Please standby for further information." If you see any danger, please inform our staff immediately and proceed to a safer location. **(Announce Twice)**
TEXT 2	**<u>In the event of a false fire alarm</u>** "Ladies and gentlemen," "May I have your attention please" The cause of the fire alarm has been investigated and is found to be a false alarm. We regret any inconvenience caused. Thank you **(Announce Twice)**
TEXT 3	**<u>In the event where evacuation is not required</u>** "May I have your attention please." The cause of the fire alarm has been investigated. The situation is now under control. We regret any inconvenience caused. Thank you **(Announce Twice)**
TEXT 4	**<u>In the event where evacuation is required Announcement to be made by AES Operations Commander</u>** "Attention! Attention! There is an emergency. Please leave the building immediately by the nearest exits. Remain calm and do not use the lifts." **(Announce Twice)**

Testing of Fire Alarm in the Terminal Buildings
**Announcements to be made by CAR upon request by M&E BMC*

TEXT 5	**<u>Testing of Fire Alarm</u>** "Attention please, Attention please. "The fire alarm has been activated and investigation is in progress. Please standby for further information." If you see any danger, please inform our staff immediately and proceed to a safer location. **(Announce Twice)**
TEXT 6	**<u>Completion of testing of Fire Alarm</u>** "May I have your attention please. This is a test of the fire and voice evacuation system. Please do not be alarmed." **(Announce Twice)**
TEXT 7	**<u>Testing of the generator set</u>** "Ladies and gentlemen." "We are having a partial power failure. Sorry for the inconvenience." **(Announce Twice)**

Fire Evacuation Drill in the Terminal Buildings
**Announcements to be made by CSO, except for TEXT 9*

TEXT 8	**<u>Pre-fire drill announcement (5 mins prior to activation)</u>** "Attention please, Attention please" We will be conducting a fire drill for all participating airport staff in five minutes. All passengers and members of the public are advised not to be alarmed." **(Announce Twice)**
TEXT 9	**<u>Fire drill activation announcement</u>** **<u>Announcement to be made by AES Operation Commander]</u>** "Attention please, Attention please. This is a fire drill for all participating airport staff. All participants are to remain calm and evacuate by the nearest exits. Do not use the lifts. All passengers and members of the public are advised not to be alarmed***."* **(Announce Twice)**
TEXT 10	**<u>Termination of Fire Drill announcement</u>** "May I have your attention please" The fire drill for airport staff is now terminated. We regret any inconvenience caused. **(Announce Twice)**

Annex 6 – Floor Register

To: Changi Airport Group (Singapore) Pte Ltd
Airport Emergency Service
P O Box 1
Singapore Changi Airport
Singapore 918141
Fax No. 65457072

FLOOR REGISTER

Tenant Company Name:	
Building and Floor Level:	**Unit/Room No:**
Official Contact No	
Name of Fire Warden & Official Contact No:	
Name of Assistant Fire Warden & Official Contact No:	

(Please use a separate form for each level)

S/No	Name of Occupants / Staff	Evacuation Status (For official use during emergency)		
		Present	Absent	Remarks
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
Submitted By:				

Chapter 7 – Fire Safety Inspection on CAG Tenanted Premises By AES

7 General

7.1.1 Tenants shall permit the Landlord (or any other authorised by the Landlord) to perform unannounced fire safety inspection of the premises at any time based on Appendix 1-3 – Summary of Fire Safety Requirements for CAG Managed Buildings following which the Tenants and affected CAG division will receive a fire safety inspection report if any non-compliances are found.

7.1.2 After receiving the fire safety inspection report, tenants shall

a) Rectify any non-compliance listed in the fire safety inspection report within such time/ period stated in that fire safety inspection report according to the recommendation(s) mentioned by Landlord.
b) If any outstanding deficiencies are not rectified to the satisfaction of the Landlord as observed during the re-inspection after the stipulated period, the Landlord shall have the right to exercise its rights under the relevant tenancy agreement by the respective CAG divisional leasing officer.

7.1.3 In addition, fire safety patrol will be conducted by AES at CAG owned/ managed properties (only at common circulation areas). If any irregularities observed by AES, it will be notified to the respective CAG division officer for follow-up actions on closure.

7.1.4 The above inspection and patrol findings will be presented to the CAG Fire Safety Committee quarterly. Any fire safety irregularities that discovered in the Changi Airport Terminal Buildings would be addressed and outlined with proper control measure. For others CAG owned / managed properties. It would be managed at the various internal CAG meetings regularly. Any fire safety concerns would be resolved with the supervision of the respective “Owner” of the premises (refer to clause 1.1.1)

PART TWO: FIRE SAFETY MANAGEMENT OF NON-CAG OWNED / MANAGED PROPERTIES

Chapter 8 – General Fire Safety Duties and Responsibilities

8.1 General

8.1.1 Non-CAG owned / managed properties that are located within close boundary with the Changi and Seletar airport are an important threat if there exist a fire emergency in their building, as it would cause direct business impact on Changi and Seletar airport operations (i.e. black smoke affecting runway visibility that resulted an aircraft unable to takeoff/ landing) , thus necessitating the maintenance of high fire safety standards of these buildings that managed by the direct building owner are crucial.

8.1.2 Furthermore, some of the companies of these buildings are providing the airport ground servicing activities to Changi and Seletar Airport, which if in an emergency that resulted their business could not be continued will servery impact the airport operation.

8.1.3 Henceforth, those non-CAG owned/ managed properties appointed FSM would need to practice a high standard of fire safety to ensure the safety of their building are planned according to SCDF requirements.

8.2 Responsibilities

8.2.1 The owners and FSM of those properties not CAG owned / managed should:

a) Take references from this manual and provide reasonable measures to prevent false fire alarm activations and fire incident in their premises.

b) Perform duties and responsibilities of building owner and FSM as per Fire Safety Act.

c) Encourage to provide AES a copy of their ERP and invite AES to witness the fire evacuation exercise.

8.2.2 The specific duties and responsibilities of relevant Building Owners shall be as follows:

Air Traffic Services Division (CAAS)	**LORADS complex and the Control Tower Manager shall:** a) Conduct check and maintenance on their fire alarm and protection system based on their QP advice and SCDF requirements. b) Appoint and manage their owned fire warden. c) Observe their staff follow the fire preventive measures listed by the facilities manager. d) Establish evacuation plans in accordance with the requirements prescribed by the SCDF. e) Exercise surveillance over the staff and occupants to ensure that they comply with fire safety requirement. f) Ensure that electronic equipment installed, and airfield installations are checked and properly maintained and in working condition. g) Co-ordinate with CAG AES inspector for inspection on specific CAAS Premises that listed under the CAG AES Inspection List. Follow AES instruction and rectify any deficiencies found.
Singapore Aviation Academy (CAAS)	**SAA Facilities Manager shall:** a) Conduct check and maintenance on their fire alarm and protection system based on their QP advice and SCDF requirements. b) Appoint and manage their owned fire warden. c) Observe their staff follow the fire preventive measures listed by the facilities manager. d) Establish evacuation plans in accordance with the requirements prescribed by the SCDF. e) Exercise surveillance over the staff and occupants to ensure that they comply with fire safety requirement. f) Ensure that electronic equipment installed, and airfield installations are checked and properly maintained and in working condition.

Other's non-CAG owned/ managed properties owner.	**Each non-CAG owned/ managed properties owner shall:** a) Appoint their own Fire Safety Manager b) Conduct check and maintenance on their fire alarm and protection system based on their QP advice and SCDF requirements. c) Appoint and manage their owned fire warden. d) Observe their staff follow the fire preventive measures listed by the facilities manager. e) Establish evacuation plans in accordance with the requirements prescribed by the SCDF. f) Exercise surveillance over the staff and occupants to ensure that they comply with fire safety requirement. g) Ensure that electronic equipment installed, and airfield installations are checked and properly maintained and in working condition.

8.3 Fire Preventive Measures

8.3.1 Owners of non - CAG owned / managed properties could take references on the fire safety measures listed in this Fire Safety Manual.

8.4 Renovations, Alterations and Additions to Buildings

8.4.1 Owners of non - CAG owned / managed properties and their FSM are to ensure their fire safety measures, access for fire vehicles, escape routes and other fire precautions, and for renovations, alterations and additions to their buildings are comply with the Fire Code and relevant Singapore Standards.

8.4.2 The owner of the building and FSM shall be responsible in maintaining the existing and the new fire alarm and protection systems should there be any, in proper working order after the renovations, alterations and/or additions made to the building. The owner of the

buildings and FSM of non – CAG owned properties shall also adhere to the following procedures to prevent unnecessary false fire alarm activations on their premises.

Procedures for non – CAG Building Management during Fire Alarm Maintenance and Fire Drills for Non-CAG Buildings.

a) Before fire alarm maintenance / fire drill:
   i. Building management shall inform AES Watchroom at Tel: 65412525.
   ii. Provide details of caller (*Name/ Caller's contact no./Name of company*)
   iii. Name of affected Building to be tested along with duration of test (*e.g. Building XYZ from 1000 LT to 1400 LT*).

b) After fire alarm maintenance / fire drill:

   i. Building management shall immediately inform AES Watchroom upon completion of test.
   ii. If no signal received by AES Watchroom, the operator would inform building management accordingly.

Note:
1) During fire alarm testing, building management shall monitor the fire alarm panel closely. Should there be a real alarm, building management is to call AES immediately.

8.5 Emergency Response Plan and Fire Evacuation Drill Exercises

8.5.1 It is the responsibility of the building owners of major airport buildings that not owned by CAG or lessees of CAG owned / managed properties (private developer) to establish their own ERPs for their premises and conduct fire evacuation drill exercises in accordance with the SCDF requirement. It is encouraged for the building owner/ FSM to invite AES to witness the fire evacuation drill.

8.6 Other Fire Hazards

8.6.1 Building owners of major airport buildings that not owned by CAG or lessees of CAG owned / managed properties (private developer) should ensure they have adequate control on any other fire hazards within their compounds.

PART THREE: FIRE SAFETY MANAGEMENT OF OTHER SPECIFIC FIRE HAZARDS

Chapter 9 – Aircraft Fuel Servicing and Maintenance of Aircraft Fuel System

9.1 General

9.1.1 "Aircraft fueling" shall be regarded as fueling and defueling, aircraft fuel tank calibration, aircraft fuel tests and the draining of fuel tanks. Generally, Aircraft fueling activities shall comply with the latest editions of NFPA 407 Standard for Fuel Servicing. AES shall conduct at least 3 random Aircraft Refueling Inspection (ARI) per month at the airside ramp based on Appendix 2-1 – Fire Safety Requirements involving Aircraft Fuel Servicing.

9.1.2 Operational, it is necessary for fuelling crew to perform their duties efficiently and quickly under any types of weather conditions, at all hours, and concurrent with transport and military aircraft. These aggravate the situation and make it imperative to establish basic fire safety procedures.

9.1.3 These guidelines are intended to help prevent accidents. It is recognized that there are certain hazards over which safety cannot be controlled without interference with operations.

9.2 Objective

9.2.1 These requirements are intended to represent as reasonably as practicable fire-safe practice for Aircraft fuel servicing operations on the ground.

9.3 Spillage Plan

9.3.1 For fuel spillage, informant shall inform AES Hotline (Changi via 6541 2525/ Seletar via 6481 3377) and refer to safety procedures as follows:

Fuel Operator shall:

a) Releasing the Deadman Control to stop the fuel flow.

b) Activate the emergency fuel shut-off if spill continues from a hydrant system,

c) Notify AMC as reasonable as possible. AMC shall also inform AES Hotline (Changi via 6541 2525/ Seletar via 6481 3377) subsequently for the follow up action.

d) Prevent the movement of unauthorized persons or vehicles into the area.

e) Notify Airline representative who should use his discretion to determine if the operation already in progress can be continued safely or if it should be stopped until the emergency is over.

f) Ensure, as far as reasonably possible, that activities in the vicinity including the movement of aircraft, vehicles, or ground equipment, are restricted to reduce the risk of igniting the fuel until the area is deemed safe by AES and airline rep / aircraft engineer.

Airline Operator shall:

a. The fuel spillage shall be investigated by the airline or its engineering services to determine the cause and necessary corrective measures to be taken. Such information shall be provided to AES investigating officer.

b. Passengers and crew on board aircraft shall be instructed not to smoke.

AES shall:

a. Blanketed with foam at the discretion of the AES officer in attendance for large spill.

b. The final treatment for fuel spillage, whether small or large, is by washing them up with water and detergent, or if necessary, with oil dispersant.

9.4 Disposition of the Aircraft

9.4.1 If the safety of an aircraft near a spillage is seriously jeopardised, the aircraft should be towed to an uncontaminated area before cleaning up shall be allowed to commence.

9.4.2 Aircraft on which fuel has been spilled shall be carefully inspected for any accumulation of fuel or fuel vapour. Any fuel contamination discovered on the aircraft must be cleaned up, and the fuel vapour shall be cleared.

9.4.3 Out-going cargo, mail, and baggage on the ramp at the time of the spill shall be examined carefully before they are placed on board. Traces of fuel contamination must be removed or allowed to evaporate before boarding.

9.5 Neighbouring Turbine Aircraft

9.5.1 No fuelling operations shall be conducted within 46m directly downstream from the tail pipe of an operating turbo-jet engine, or within 23m directly downstream from an operating turboprop engine. Should a turbine-powered aircraft move within these distances, fuelling shall be stopped at once. Fuelling operations downstream of an operating wide-body aircraft shall be stopped until such time that the refuelling can be conducted safely.

9.6 Static Electricity and Stray Current

9.6.1 Static electricity is a constant threat to safe fuelling. The presence of static electricity is not readily apparent until a discharge or spark occurs. The danger is increased during fuelling operations.

9.6.2 *Generation of Static Electricity*

a) Static electricity may be generated during fuelling as follows:
   i. When fuel is pumped through a service hose.
   ii. When fuel is allowed to fall freely through the air from a filler spout into the dome of a truck, or from a tank or line draining into a container; and
   iii. Turbulence in the fuel generates static electricity.

b) In addition, static electricity may be present under the following circumstances:
   i. A charge may accumulate in an aircraft during flight or on the ground.
   ii. Particles of rain or other liquid crystals of dust blowing across the aircraft can produce a very heavy charge of static electricity.
   iii. The servicing vehicles, like any rubber-tyre vehicle may become electrified.
   iv. Static electricity can also be built-up by induction from an electrically charged atmosphere.

9.6.3 Stray Electric Current

a) Stray current may provide a source of ignition during fuelling operations.

9.6.4 Bonding

a) Hydrocarbon fuels, such as aviation gasoline and Jet A, generate electrostatic charge when passing through the pumps, filters, and piping of a fuel transfer system. Splashing, spraying, or free-falling of fuel will further enhance the charge. When charged fuel arrives at the receiving tank (cargo tank or aircraft-fuel tank) either of the following two possibilities can occur.
   i. The charge relaxes harmlessly to ground; or

ii. If the charge on the fuel is sufficiently high, a spark discharge may occur. Whether or not an ignition will follow depend on the energy (and duration) of the discharge and the composition of the fuel/air mixture in the vapor space, i.e. whether the vapor is within its flammability range.

b) The amount of charge on a fuel when it arrives at the receiving tank, and hence its tendency to cause a spark discharge, will depend on the nature and amount of impurities in the fuel, its electrical conductivity, the nature of the filter media, and the relaxation time of the system. i.e. the residence time of the fuel in the system between the filter (separator) and the receiving tank. The time required for this charge to dissipate is dependent upon the conductivity of the fuel. The duration may be a fraction of a second or several minutes.

c) No amount of bonding or grounding will prevent discharge from occurring inside a fuel tank. Bonding will ensure that the fuelling equipment and the receiving tank (aircraft or fueller) are at the same potential and to provide a path for the charges which are separated in the fuel transfer system, primarily the filter/separator and therefore to neutralise the charges in the fuel.

d) For over-wing fuelling and top loading of cargo tanks, bonding will ensure that the fuel nozzle or the fill pipe is at the same potential as the receiving tank, so that a spark will not occur when the nozzle or fill pipe is inserted into the tank opening. For this reason, the bonding wire must be connected before the tank is opened.

9.6.5 Use of Chamois Filters

a) The practice of using a chamois filter should be discouraged, as its use is extremely hazardous under any condition. Ordinary plastic funnels or other non-conducting materials can increase static generation. They must be properly bonded.

9.6.6 Aircraft Engines and Heaters

a) Fuel servicing shall not be done on an aircraft until the aircraft's engine(s) has (have) been stopped (ignition OFF). Aircraft combustion heaters shall not be operated during fuelling operations.

9.7 Safeguard Against Incidents arising from Automotive Operation

9.7.1 No vehicle, other than those performing servicing functions, shall be permitted within 15m of the aircraft during fuelling operations. Hand brakes should be applied on vehicles before the driver leaves the cabin of his vehicle.

9.7.2 Vehicles performing aircraft servicing functions, other than fuel servicing (i.e. baggage trucks, air conditioning vehicles, etc) shall not be parked under aircraft wings while fuelling is in progress. The starting of equipment or any vehicle shall not be done whilst refuelling is in progress. Drivers shall be thoroughly instructed as to the hazards inherent in operating or parking of such vehicles near fuelling operations. (Aircraft servicing normally requires mechanised equipment and it is most often impractical to suspend such operations during fuelling. Minimum precautions dictate superior apron vehicle maintenance and educating vehicle operators in recognising potentially hazardous conditions such as spills).

9.8 Prevention of Arcing of Electrical Circuits

9.8.1 Electrical circuits frequently produce arcs when switched on or off, when connections are made, or when equipment is not operated properly. The precautions are as follows:

a) Aircraft batteries shall not be installed, removed, raised, or lowered during fuelling.

b) Aircraft ground-power units should be located as far away from the fueling points as practical. These shall not be connected or disconnected during fuelling. They should not be placed under the wings of aircraft or just aft of

the trailing edge except when the design of the aircraft permits no other suitable location.

c) Electric hand lamps or flashlights used in the immediate proximity of the fuelling operations shall be of the approved type.

d) No electrical tools, drills, buffers, vacuum cleaners or similar tools likely to produce sparks or arcs shall be used during fuelling operations.

e) Aircraft electric switches, which control units in the wings or tank areas not needed for the fuelling operations, should not be operated during fuelling except in an emergency.

f) Photographic flash bulbs shall not be used within 15m of the aircraft. Electronic flash shall not be used within 15m of fuelling zones.

9.9 Elimination of Open Flames

9.9.1 Open flames may be used during maintenance work. The presence of the following is sometimes overlooked during aircraft fuelling operations:

a) Flare-pots and similar open flame lights.

b) Welding or cutting torches.

c) Blow torches.

d) Exposed flame heaters (liquid, solid or gaseous devices including portable and wheeled petrol or kerosene heaters).

9.9.2 No fuelling shall be done while any open flame device is in use within 75m of the aircraft.

9.9.3 There shall be no fuelling where the aircraft engine(s) or the aircraft combustion heater(s) is (are) running. These include wing and tail de-icing heaters. Engine ignition shall be switched off.

9.10 Control of Radar Equipment

9.10.1 The beam from radar equipment can cause ignition of flammable vapour-air mixture from inductive electric heating of solid materials or from electrical arcs or sparks from charge resonant conditions. The ability of an arc to ignite flammable vapour-air mixture depends on the total energy of the arc and the time lapse involved in the arc's duration, which is related to the dissipation characteristics of the energy involved. The intensity or peak power output of the radar unit is thus the key factor in establishing safe distances between the radar antenna and fuelling operations, fuel storage or fuel leading rack areas, fuel tank truck operations, or any operations where flammable liquid or vapour may be present or created. Radar shall not be operated within 35m of fuelling.

9.11 Use of Communication Equipment

9.11.1 Communication equipment used during aircraft fuel servicing operations within 3m of the fuelling equipment or the fill or vent points of aircraft fuel systems shall be intrinsically safe in accordance with UL913.

9.12 Additional Precautions

9.12.1 Fuelling location

a) Aircraft fuel servicing shall be done outdoor at least 15m from any building to minimise the danger of ignition of flammable vapour discharged during fuelling operations by sources of ignition likely to exist in such buildings. When it is necessary to perform fuelling operation under shelter, special permission must be obtained from CAG Airside Management Division and AES

9.12.2 Concurrent operations

a) Concurrent operations during fuelling operations are allowed if equipment, other than that performing aircraft servicing functions, shall not be permitted within 15 m of aircraft during fuel servicing operations.

b) AES may impose a service charge on airlines, ground handling agents, contractors or sub-contractors engaged by them based on the rates listed in this Fire Safety Manual.

9.13 Positioning of Aircraft Fuel Servicing Vehicles

9.13.1 Indiscriminate positioning of fuelling trucks, air conditioning plants, etc, near an aircraft where fuelling is in progress should be discouraged to avoid impedance to the rapid removal of the aircraft and other servicing vehicles in case of emergency.

9.13.2 A free passage shall always be maintained to allow the speedy removal of service vehicles, and to allow for safety measures to be rendered quickly.

9.13.3 The handbrakes of aircraft fuelling vehicles shall be engaged by the drivers before they leave their driving position.

9.13.4 For over-the-wing fuelling, fuel servicing vehicles should be positioned forward of the trailing edge of the aircraft main plane, so that fuel spillage will flow behind the vehicles.

9.13.5 The structure of the aircraft's main-plane trailing edge is such that it is not meant to support the weight of a heavy hose. Therefore, servicing (i.e. over-the-wing fuelling) shall only be over the leading edge.

9.14 Manning of Fuelling Equipment

9.14.1 Adequate manpower shall be constantly available to shut the flow of fuel quickly from the servicing equipment (i.e. vehicles, hydrants, pits or cabinets) in case of emergency.

9.14.2 Fuel nozzles used in over the wing fuelling hose assemblies shall be designed so that nozzles will close, and the flow of fuel will stop when the hand of the operator is removed. Blocking nozzles in an open position even if it is only momentarily prohibited. Only competent and qualified operators shall be permitted to operate the equipment.

9.14.3 It is recommended that other aircraft servicing personnel not engaged in fuelling operations be trained in the operation of emergency fuel shut off controls in the event of a spill or other hazardous conditions.

9.14.4 Kinks and short loops in fuelling hoses should be avoided. The kinked fuel hose shall not be allowed to drag along the ground. The hose should not be stretched with the complete weight of the hose off the ground as this place extra strain on the nozzle coupling.

9.15 Loose Objects

9.15.1 Persons involved in fuelling operations shall not carry in their breast pockets loose objects, e.g. tools, cigarettes, matches, cigarette lighters, etc, because there is the possibility of these items falling into the fuel tank. It is advisable to have the pockets on shirts and uniform sewn shut or removed completely.

9.15.2 Should there be an occasion of any object getting into the aircraft fuel tank, such object shall be removed before further flight. The supervisor in charge must be notified as soon as reasonably practicable.

9.16 Lightning Storms

9.16.1 Extreme caution should be taken during fuelling operations when lightning or electrical storm is imminent. Operations shall be suspended during severe disturbances and shall be determined by the ground handlers or refuellers.

9.17 Provision of Fire Extinguishers for aircraft fuel servicing and maintenance of aircraft fuel system

9.17.1 Adequate serviceable portable fire extinguishers [at least 2 x 9kgs ABC Dry Powder – with minimum 20-B:C rating (UL/FM) or 144B rating each] are available at both sides of the refuelling bowser.

9.17.2 Since the quick and effective use of fire extinguishers is of vital importance, fuelling crew shall be trained to use fire extinguishers correctly and effectively and training records shall be produced upon request by CAG or any other relevant agencies.

9.17.3 The ground engineer or the appointed ground handling agent shall ensure that during any aircraft servicing operation, including aircraft fuel servicing, there shall be at least one trolley extinguisher located at the aircraft bay (fixed or remote). The trolley extinguisher shall be positioned not more than 61 metres away from the refuelling site, reference to NFPA 410.

9.17.4 New replacement of trolley extinguisher shall have a minimum listed rating of 233B, or 80-B (UL/FM) located at the aircraft parking bay (fixed or remote).

9.18 Defueling Requirements

9.18.1 Defueling operations present greater fire hazards due to the more difficult procedures that are involved in the draining operations.

9.18.2 Therefore, electrostatic bonding and grounding should not be overlooked.

9.18.3 Variations between different types of aircraft preclude the establishment of standard procedures but the same principles should apply in any cases.

Chapter 10 – Airfield Vehicle Operations

10.1 GENERAL

10.1.1 Fire mishaps can result in disastrous consequences especially at the apron area as flammable aviation fuel fumes can be present. Thus, it is imperative that all Airfield Vehicle are to be maintained free of fire hazards. AES shall conduct 15 randoms Airfield Vehicle Inspection (AVI) monthly with proper records to ensure Airside vehicles driving in the apron are compliant to airside rules and regulations (See Appendix 2-2 – Fire Safety Requirements involving airfield vehicle operations). Reference should also be made to the latest edition of CAG By-Laws for the latest requirements on airfield vehicle operations.

10.2 Actions when vehicle catches fires:

10.2.1 Park the vehicle to the side as soon as reasonably practicable; away from aircrafts and buildings (Air-tug driver shall attempt to disconnect vehicle from aircraft and attempt to move it to a safe distance if safe to do so):

a) Turn off engine.
b) Get the passengers and yourself out of the vehicle.
c) Attempt to put out the fire with the fire extinguisher(s) onboard, without placing yourself in danger.
d) Inform AES Hotline (Changi via 6541 2525/ Seletar via 6481 3377); and
e) Stay away from the vehicle and assist to direct incoming traffic away.

10.3 AES recommends Airside Operators to prevent vehicle fires by

a) Conduct regular vehicle maintenance, especially for older vehicles, particular attention should be given to the electrical systems of the vehicle, e.g. wiring connection of battery compartment.
b) Ensuring that a fire extinguisher is available in the vehicle.
c) Turning off the engine before leaving the vehicle.
d) Ensuring a strict no smoking policy.
e) Checks for any leakage of fluid before starting the engine.
f) Ensuring that the coolant container is filled up.

10.4 Fire Extinguisher for Airside Vehicles

10.4.1 Airside vehicles (except for refueling vehicles and aircraft tow tugs) shall be equipped with at least one fire extinguisher with a capacity of not less than 1.0 kg and with a minimum rating of not less than 21B (UL/FM). The extinguishers must be securely mounted on a suitable bracket affixed to a readily accessible position. Refueling vehicle shall be equipped with sufficient extinguishers meeting requirements stated in Section C, Chapter 1, para 18.

Note: Respective vehicle owners are responsible to ensure that fire extinguishers placed in their airside vehicles remained serviceable.

10.5 Fire Extinguishers for Aircraft Tow Tugs

10.5.1 Tow tugs must have at least one fire extinguisher with minimum rating of not less than 21B and a minimum total capacity (extinguishing agent) of not less than 6.8kg. Fire extinguisher(s) must be easily accessible and free from any obstructions.

**Regardless of the number of extinguishers, each shall meet the rating of at least 21B)*

Note: *Respective Ground Handling Agents are responsible to ensure that fire extinguishers placed in their aircraft tow tugs remained serviceable.*

Chapter 11 – Precautions During Battery Charging

11.1 General

11.1.1. In view of the various hazards associated with the use of lead acid electric Light Transport Machine (LTM) and equipment in the passenger terminal buildings, only electric LTM and equipment using **sealed** lead acid batteries (commonly known as 'maintenance free', 'dry' or 'dry cell' batteries) shall be allowed to be used and charged in the passenger terminal buildings. Existing electric LTM and equipment using **flooded** or **non-sealed** lead acid batteries (commonly known as 'wet' or 'wet cell' batteries) will not be allowed to be used in the passenger terminal buildings and are to be replaced or converted.

11.1.2. Although the present system of charging wet batteries is considered safe, the release of hydrogen during the charging process may give rise to a fire outbreak.

11.1.3. Reference shall also be made to the latest SS563.

11.2 Electric Vehicles (EVs) Charging Station

11.2.1. Installations for charging stations for electrical LTM shall be regarded as electrical installations or components thereof. These installations must adhere to the Electricity Act, the Electricity (Electrical Installations) Regulations, and the most recent SS638 standards, and shall be approved by CAG IFM in accordance with their specifications.

11.2.2. The electrical LTM shall be connected to the electrical supply equipment so that in normal use conditions, the conductive energy transfer function operates safely.

11.2.3. Cord extension set shall not be used in addition to the cord preset for the connection to the electrical LTM supply equipment.

11.2.4. Adaptors between electrical LTM socket-outlet and plug shall only be used if specifically designated and approved by the vehicle manufacturer or by the electrical supply equipment manufacturer and in accordance with national requirements. (User information shall be provided by the manufacturer on the electrical supply equipment, charging station or in a user's manual. The user manual shall also include information about local usage restriction).

11.2.5. The electrical supply equipment deployed shall be suitable for electric LTM without the need for an external ventilating equipment.

11.2.6. A means of emergency switching complying with the latest SS638 shall be provided to isolate the electricity supply (mains) for the electric LTM charging station in a case of electric shock, fire or explosion. The device for emergency switching shall be provided with a means to prevent accidental operation and suitable for outdoor and other adverse

environmental conditions at site. The equipment shall be part of the electric LTM charging station.

11.2.7. Charging cable for connection between charging station and electric LTM should be flexible and possess the mechanical characteristics equivalent to those set up in SS638.

11.2.8. An emergency disconnection device shall be provided at the electric LTM charging station in case of risk of electric shock, fire or explosion.

11.3 Recommended Precautions

a) Charging room should be cool and well-ventilated (outdoors where practicable), away from manufacturing and service areas.
b) Batteries should stand on non-porous, non-combustible, non-conducting surface (e.g. slate, glazed tiles, etc.) which must be kept dry.
The design of battery room ventilation shall be in accordance with the BS standard
c) For mechanically ventilated battery rooms, the ventilation requirement shall be based on the above mentioned, or 6 air change per hour, whichever is higher.
d) Woodwork must be treated with acid resisting paint.
e) Batteries should be spaced at least 25 mm (one inch) apart.
f) Batteries shall not be charged at an excessive rate. Booster, if used, shall be switched off after completion. Do not leave charging unattended especially overnight.
g) Wiring connections must be properly and firmly made.
h) Terminals must be clean, highly greased and capped with insulating material.
i) Charging circuit shall be correctly fused.
j) Plant/equipment shall be switched off before making or breaking battery connections.
k) Bulk storage of electrolytes shall be in separate compartments.
l) Charging of lead acid and alkaline shall be carried out independently.
m) Finger-rings, wrist watches, waist chains, etc. should not be worn while working near battery terminals because a short circuit may cause an arc or result in severe burns.
n) Wrenches and other hand tools must be used carefully to avoid shorting.
o) Brushes used to clean batteries shall have neither a metal frame nor wire bristles.
p) Foreseeable potential fire hazards must be identified. No flammable or combustible materials, other than those which form parts of the vehicle and their associated chargers, should be stored within charging area.

11.4 Electric Vehicle (EV) Charging Station

11.4.1 Any request for EV charging station installation, the requestor shall seek necessary approvals from the following CAG Divisions.

11.4.2 The requester shall provide the necessary Fire Risk Assessment and presented to CAG Division as below and later in the Fire Safety Committees for review.

Areas	CAG Division In-charge
Airside	Airport Operations Control
Landside - Terminal	Airport Operations Planning
Landside - Cargo	Changi Business Division
Landside - Ancillary Buildings (e.g. AMC)	Engineering & Development

11.4.3 Compliance of the EV Charging Installation shall refer to the table below.

Authority	Relevant Acts and Requirement.
LTA	a) Electric Vehicle Charging Act (EVCA) b) SSS111025 Electric Vehicle Charging System, Technical Reference (TR 25) c) Guidelines for the Supply of Electric Vehicle Chargers
EMA	a) Latest SS 638 for Electrical System.
SCDF	a) SCDF Fire Safety (Installation of Electric Vehicle Charging Stations — Exemption) Order 2022

11.4.4 The responsible parties shall engage vendor for check and maintenance and safely keep the evidence of checks/ maintenance and to provide to authorities when requested.

11.5 Fire Safety Management

11.5.1 Development of an emergency action plan to protect life and property and ensure business continuity.

11.5.2 Risk Assessment (RA) for the area in which the charging process is to be carried out shall be satisfactorily completed. RA must also include the possibilities for deliberate fire setting.

11.5.3 Staff on site or any other personnel who may be called upon, during any emergency should be made aware of the location of the charging area, the means for isolating the power and actions to be taken during an emergency.

11.5.4 Relevant staff / EV drivers should be trained on the safe usage of the EV chargers.

11.5.5 No attempt should be made to use the charging point other than for charging batteries designed for its intended use.

11.5.6 No attempt should be made to modify the charging equipment for any other use or to charge a vehicle for which it is not designed or intended for.

11.5.7 Checks should be made to ensure that chargers and associated equipment have not been damaged and that associated instructions remain clearly legible. These checks should be recorded and maintained by the charging station owner.

11.5.8 When a charger is found to be faulty, operations should as soon as reasonably practicable until satisfactory repairs have been made by a competent engineer. Appropriate signages must be placed to inform users to prevent any further usage of the faulty charger.

11.5.9 Emergency numbers must be made available at the charging stations and visible to users.

11.6 Location

11.6.1 Advice and approval shall be sought and obtained from CAG on the location of battery charging rooms.

11.6.2 Tenants shall comply with the Fire safety requirements listed in the Fire Code and relevant Singapore Standards

Chapter 12 – Import, Transport, Storage and Dispense/Decant of Petroleum & Flammable Materials

12.1 Import, Transport, Storage and Dispense/Decant of Petroleum & Flammable Materials

12.1.1 Flammable liquids pose a serious fire hazard if they are improperly stored or handled. They can be easily ignited, with a spark for example, and can cause fire to spread quickly especially if the liquid is spilled or exposed to heat. Any storage of flammable/combustible liquids shall have the prior approval of SCDF. For fire safety requirements related to the storage of flammable liquids, reference can be made to the following documents:

a) Fire Safety Act - Fire Safety (Petroleum and Flammable Materials) Regulations
b) Fire Code and Latest SS532

Chapter 13 – Hot Works

13.1 General

13.1.1 The procedures in this appendix are for the protection of persons from injury and illness and the protection of property from damage by fire or from improper handling of equipment.

13.1.2 The requirements listed in this Part shall be in addition to the latest SS510 (and other operations involving the use of heat) and the Hot Work Permit Form sample in Appendix 1-5 – AES Fire Alarm Isolation and Hot Work Manual Permits

13.2 Welding and Cutting Operations

13.2.1 When portable cutting or welding equipment is used, the main danger is that combustible materials may be ignited by sparks, hot metal, heat conduction, the flame, or the electric arc itself. Other fire risks associated with the different types of equipment are flashback fires from gas equipment and the accidental arcs from stray current in electric arc-welding equipment.

13.2.2 Poor ventilation may cause build-up of toxic gases, fumes, and explosive mixtures of flammable gases.

13.2.3 Unsecured gas cylinders may be knocked over and there is risk of damage to the regulator causing a release of flammable gas.

13.2.4 No hot work which generates sparks such as welding, cutting and grinding shall be permitted within 3m from the safety net.

13.2.5 No hot work within 75m from any aircraft unless the aircraft parking bay(s) is/are closed. Aircraft Bay Closure Permit shall be obtained from Apron Control Management Service (ACMS) if the hot work within 75m.

13.3 Responsibilities

13.3.1 The "Owner" Division, as Management, and operator shall be responsible for planning and control as follows:

a) Recognise its responsibility for safe usage of cutting and welding equipment on its property.
b) Designate / establish approved area for cutting and welding works.
c) Designate an individual to be responsible for authorising cutting and welding operations. The individual must be aware of the hazards involved and be familiar with the standard required for cutting and welding processes.
d) Ensure that only approved apparatus, such as torches, manifolds, regulators or pressure reducing valves are used.
e) Ensure cutters, welders and supervisors are suitably trained in the safe operation of equipment and processes.
f) Select contractors who have suitably trained personnel to perform the hot work and who have an awareness of the magnitude of the risks involved.
g) Advise workers about flammable materials and hazardous conditions in the vicinity.
h) Authorise permit for such hot works to be carried out after obtained AES approval in the form of the Hot Work Permit and keep the AES informed. The hot work permit shall be valid for a certain period and be certified that:
    i. Area is safe before work commences.
    ii. Precautions are taken as hot work is in progress; and
    iii. Check for smouldering materials is done half-an-hour after completion.

13.3.2 The Supervisor of welding and/or cutting operations shall:

a) Responsible for the safe handling of welding and cutting equipment and ensure safety in welding and cutting processes.

b) Determine and remove any combustible materials and hazards in the work location.

c) Protect combustibles materials from ignition by:

   i. Having the welding or cutting works moved to a location free from dangerous combustibles; or having the combustibles moved to a safe distance from the work; or

   ii. Having the combustibles properly shielded against ignition e.g. protect floor impregnated with paint, grease or oil; and

   iii. Ensuring that welding or cutting works are so scheduled that operations which might expose combustibles to ignition, (e.g. doping, spray painting, battery charging), do not coincide with welding or cutting works.

d) Secure authorisation for cutting or welding operations from the designated management representative and assure themselves of the following:

   i. Cutting and welding equipment used is in satisfactory operating (mechanical and electrical) condition and in good repair.

   ii. The floor is swept clear of combustible waste. Combustible floors shall be kept wet, covered with damp sand, or protected by fire resistant shields or non-combustible sheets. Where floors have been wetted down, personnel shall be protected from electric shock.

   iii. Combustibles item shall be relocated at least 11m from the work site. Where relocation is impracticable, irremovable combustibles shall be protected with flameproof covers / non-combustible screen or shielded with metal or other appropriate guards or curtains. Edges of covers at the floor shall be tight to prevent sparks from getting under them. This is also important where several covers are used to protect a large pile.

iv. Wall or floor openings, gaps within 11m of the site shall be tightly covered with non-combustible materials to prevent passage of sparks to adjacent areas.

v. Ducts and conveyor systems that might carry spark to distant combustibles shall be suitably protected by a fire damper or other means or be shut down.

vi. Where cutting or welding is done near walls, partitions, ceilings or roofs of combustible construction, fire-resistant shields or guards shall be provided. If welding is to be done on a metal wall, partition, ceiling or roof, precautions shall be taken to prevent ignition of combustibles on the other side due to conduction or radiation of heat. If possible, combustibles shall be removed from the near side of the metal walls, partition, or work pieces. Where combustibles are not relocated, a fire watch on the opposite side from the work shall be provided.

vii. Cutting or welding on pipes or other metal in contact with combustible walls, partitions, ceiling, or roofs shall not be undertaken if the work is close enough to cause ignition by conduction.

viii. Cutting or welding of tanks, vessels, plant, or equipment which had previously contained flammable substances, vapours, liquids, or dusts, shall be cleaned, and purged properly prior to the cutting or welding works. These containers shall also not be refilled until the metal has cooled down.

ix. Portable fire extinguishers, appropriate for the classes of fires that may break out, shall be suitably placed at the work area. Where hose-lines are available, they shall be connected and ready for use.

x. Welders / cutters shall be fully trained and aware of the fire risks involved.

xi. Persons are suitably protected against heat, sparks, slags, etc.

xii. Ensure adequate ventilation to prevent flammable or toxic fumes build up.

xiii. Ensure non-combustible containers are available for placing hot tools after use. The container shall be made of electrically insulated material if arc electrical welding equipment is used.

e) Ensure that the cutter or welder secures his approval and that conditions are safe before starting operations.

f) Ensure that fire protection and extinguishing equipment e.g. hose reels, extinguishers, etc; are properly located at the site.

g) The Fire Patroller with portable fire extinguisher shall not be more than 15m from the welding or cutting works. If necessary, another Fire Patroller shall oversee the adjacent welding or cutting works, so that the required distance can be maintained.

h) Ensure that Fire Patrollers are present for every welding or cutting works. Hot works shall be stopped if a Fire Patroller is not present.

13.3.3 The Cutter or Welder shall:

a) Manage his equipment safely and use it so as not to endanger lives or property.
b) Have approval of his supervisor before he starts to cut or weld.
c) Not to cut or weld where conditions are not safe.
d) Continue to cut or weld only so long as conditions are unchanged from those under which approval was granted.
e) Watch for fire in exposed areas and together with the Fire Patroller, try to extinguish them first when within the capacity of the equipment available or otherwise sound the alarm.
f) Fire occurrences shall be reported to the AES Hotline (Changi via 6541 2525/ Seletar via 6481 3377)
g) Check for smouldering materials half-an-hour after completion of work.

13.4 General Fire Prevention

13.4.1 Cutting or welding shall not be permitted under the following situations:

a) The area is not authorised by CAG.
b) The hot work permit is not approved.
c) Sprinkler system is impaired in a sprinkler protected building.
d) Presence of explosive atmospheres (mixtures of flammable gases, vapours, liquids, or dusts with air), or uncleaned or improperly prepared tanks or equipment, which previously contained such gases or materials.
e) In areas near the storage of large quantities of exposed, readily ignitable materials.

13.4.2 The area shall be inspected by the individual responsible for authorising cutting and/or welding operations to ensure that it is fire safe before cutting or welding is permitted. He/ She shall:

a) Determine the precautions to be followed in granting authorisation to proceed with the works in the form of a written permit.
b) Be familiar with the standard for cutting and welding processes.

c) Have fire-extinguishing equipment readily available and be trained in its safe and proper use.
d) Familiar with facilities for sounding an alarm in the event of fire outbreak.
e) Look out for fires in exposed areas and try to extinguish them first when within the capacity of the equipment available or otherwise sound the alarm.
f) Remain on site for at least half-an-hour after completion of cutting or welding operations to detect and extinguish possible smouldering fires. Cylinders shall be returned to a safe store.

13.5 Safe Cutting and Welding Practices

13.5.1 With Gas Cutting and Welding

a) Cutting and welding equipment shall be check for any damage before use, any damage equipment shall be replaced before commencing of hot works.
b) Gas cylinders shall be clearly marked to indicate content, clamped or chained and supported to ensure they remain in an upright position.
c) Gas cylinder valves should not be lubricated and kept clean. Its protection caps (where the cylinder is designed to accept a cap) shall be in place, hand-tight except when cylinders are in use or connected for use.
d) Fuel and oxygen hoses must be fitted with non-return valves and at both ends of hoses with flash back arrestors.
e) Soapy water may be used to check for leakage. Replace leaking hose as soon as reasonably practicable.
f) Observe correct ignition procedure.
g) Open gas cylinder valves slowly.
h) When key-operated cylinders are being used, key should be left in position on the spindle. This will allow cylinders to shut quickly if necessary.
i) The cylinders must be stood as far as possible from hot work area.
j) Cutting and welding nozzles must be kept clean and free of blockage.

k) Never release oxygen in the air deliberately or inadvertently. Be aware that excess oxygen in confined space increases danger of fire and explosion.

13.5.2 With Electric Arc Cutting and Welding

a) Avoid exposed metals parts in equipment which may induce accidental arcs.
b) Damaged cable and equipment shall not be used and replace before work start.
c) Welding current shall be as low as possible.
d) Separate earth conductor shall be used to earth the metal work and welding set.
e) Welding earth shall be protected from mechanical heat damage or inadvertent disconnection
f) Easily accessible isolation switch shall be available.
g) Electrical components shall be regularly inspected and tested.

13.5.3 Fire-Fighting Arrangement

a) Qualified Fire Patrollers equipped with the appropriate fire extinguisher shall be available during the hot work process.
b) Fire involving electric arc welding equipment can be extinguished with dry chemical or carbon dioxide extinguishers
c) In case of leaking cylinders becoming ignited, turn off cylinder valves and try to extinguish the fire. ***DO NOT EXTINGUISH FIRE BEFORE SHUTTING THE VALVE.***
    i. Remove other cylinders to a safe place in the open and away from aircraft.
    ii. Heated cylinders shall be cooled by copious water spray from a safe distance.
    iii. Evacuate if flame is impinging on the cylinder.

13.6 Additional Safety Requirements for Hot Works on the Ramp / Apron

13.6.1 Hot works that are performed on the ramp or apron will poses an even greater fire hazards because it is where aircraft fuel servicing operations are normally carried out. Should a fire occur in this area, it will jeopardize the nearby aircraft and passengers alike. To safeguard lives and property, the following additional safety measures shall be implemented for hot works that are carried out in the ramp / apron area:

Type of Hot Work	**Additional Risk Control Measurements for Hot Work Located Near to Aircraft Parking Bay and or Operation Areas**
1. Acetylene welding 2. Shielded arc welding 3. Thermo-plastic painting using LPG 4. Thermo-plastic painting using non-gaseous fuel 5. Metal grinding	a. Observe a 75m separation[1] from aircraft. If the hot work is supervised by a qualified safety officer (Registered with Ministry of Manpower), the 75m can be reduced to 50m. b. Engage a certified fire patroller to standby at the hot work location, each fire patroller shall only be permitted to cover 15m radius of the hot work activities. Contractors shall engage additional fire patrollers if there are multiple hot work location at worksites. c. Contractors shall submit their Method Statement and Risk Assessment for their hot works to CAG project officer and AES to review the work processes. d. If the hot work is less than 75m from the aircraft, the applicant shall apply for aircraft bay closure prior to the commencement of the work. e. If (d) cannot be achieved, applicant shall. i. Only adopt cold cutting method.

	ii. The hot work shall be fully enclosed by non-combustible material ('fire box') to shield the hot work area. The firebox shall be constructed such that hydro-carbon vapours cannot permeate into the firebox. iii. Install area gas/ vapor detection system with warning around the hot work location[2]. The warning shall be activated when the gas / vapour is detected. iv. Engage an Emergency Response Services company accredited by the SCDF to provide firefighting and fire protection services throughout the duration of the hot works. v. Deploy 1 x 45-litres AFFF Premix Foam Trolley Fire Extinguisher at the hot work location. vi. The fire watcher shall always standby the charged line of the AFFF TFE during hot works such that the extinguishing agent can be discharged when there is a fire.

Note[1]: *Separation is the distance between the hot work location and the tip of the aircraft wing.*

Note [2]: *Hot work shall stop immediately when the area gas/ vapor detection system warning is activated.*

13.6.2 The specific location where the welding is being done shall be roped-off or otherwise segregated by physical barrier to prevent unintended entry into the welding area. A placard reading shall be prominently displayed.

"WELDING OPERATIONS IN PROGRESS"

13.6.3 Welding generating equipment shall be placard as follows.

"WARNING – KEEPS CLEAR OF AIRCRAFT ENGINES AND FUEL TANK AREA"

13.6.4 Welding equipment shall have no electrical components (other than flexible lead cables) within 45 cm (18 inches) from the floor. The ground leads should be as close to the area to be welded as possible and clamps used on such ground leads should be of the 'C' clamp type, not the clip type. Components, which could produce arcs, sparks, or hot metal, under any condition of operation, should be of the enclosed type or should have suitable guards or screens. The inert gas cylinder should be securely fastened to prevent tripping, and the regulator and gauge shall be in proper working condition.

13.7 Precautions for Aircraft

13.7.1 It is recommended that where welding is to be conducted on an aircraft in a hangar, the aircraft should be in towable condition, with its parking brakes off, the wheels chocked, and it is hooked on to a tow tug. Any equipment, which could obstruct prompt removal of the aircraft, should be cleared away. Where practicable, a qualified operator should be pre-designated to operate the tow tug and mechanics assigned to remove the wheel chocks and to operate controls in the cockpit. It is recognised that under many conditions, the aircraft being worked upon may not be mobile, and when

this is true it is of even greater importance to follow the other precautions given in this Chapter.

13.8 Supervision of Hot Works

13.8.1 A checklist shall be maintained to eliminate fire safety hazards and ignition sources when aircraft welding is to be conducted.

13.8.2 The supervisor shall be responsible for fire safety during hot works. He/she shall be thoroughly familiar with each aircraft to be welded and has proper knowledge of the flammable vapour sources and combustible materials on the aircraft.

13.8.3 Prior to starting of any welding operation, the supervisor in charge of the project shall inspect the area to ensure that the prescribed airline safety requirements have been complied with the airline risk assessment and necessary steps have been taken to ensure that welding works can be conducted safely under the jurisdiction of the airline safety officer.

PART FOUR: APPENDICES

Appendix 1-1 – Fire Safety Do's and Don'ts

1	**Do not** use cardboard boxes, wooden crates or other receptacles that are made of combustible material as makeshift rubbish bins at your workplace. **Do** provide and use proper rubbish bins, preferably those made of non-combustible material, like metal.
2	**Do not** accumulate unwanted items at your workplace. **Do** dispose of unwanted items at regular intervals to ensure good housekeeping at your workplace.
3	**Do not** use corridors, walkways or passageways that form parts of the emergency escape route at your workplace for storage. **Do** keep corridors, walkways and passageways free of obstructions.
4	**Do not** leave food or edibles accessible to wildlife. **Do** ensure food and other edibles are inaccessible to wildlife by using proper storage facilities.
5	**Do not** remove ceiling boards or use ceiling void (i.e. space above suspended ceiling) for storage. **Do** ensure ceiling boards are in place, not missing, or damaged and refrain from using ceiling voids for storage purpose.
6	**Do not** paint over smoke/heat detectors and sprinkler heads or hang objects on them. **Do** ensure the detectors and sprinkler heads are not painted over or obstructed with objects.
7	**Do not** stack up items to a height less than 0.5m (or 1 m for warehouse) from sprinkler heads. **Do** ensure that there is clear headroom of 0.5m (or 1 m for warehouse) between stacked goods and sprinkler heads
8	**Do not** use fragile containers to store flammable liquids or keep flammable substances in places where large amounts of heat will build up or near an ignition source. **Do** store flammable liquids in proper, unbreakable containers and keep flammable substances in well-ventilated places and away from any ignition source.
9	**Do not** seal up ventilation openings or leave a non-working/inoperable ventilation fan unrepaired. **Do** ensure ventilation openings are not sealed up and have defective ventilation fan repaired quickly.

10	**Do not** use candles or other naked flame for lighting purposes, especially during a power failure. **Do** make available battery-operated portable torches as a backup.
11	**Do not** smoke in "No-smoking" areas. **Do** observe "No-smoking" rule strictly in your premises.
12	**Do not** use or operate dirty or greasy equipment/machinery. **Do** have the equipment/machinery cleaned and serviced regularly.
13	**Do not** leave heavy machinery operating or running unattended. **Do** ensure that machines that are in use are always tended by qualified operators.
14	**Do not** leave electrical appliances or equipment continued to be energized when they are not in use, especially after office/working hours. **Do** switch off at the mains electrical appliances or equipment that are not in use, especially after office/working hours.
15	**Do not** put any liquid or thing that is flammable or combustible near an electrical switchboard or an enclosure containing electrical components. **Do** ensure that the electrical switchboards and the enclosures of electrical components are kept clear of flammable or combustible substances and liquids.
16	**Do not** dispose of oil-soaked rags in combustible receptacles. **Do** dispose of oil-soaked rags in self-closing metal bins.
17	**Do not** use electrical equipment that has poor wiring such as frayed cables and loose connections. **Do** ensure the wiring is in good condition and for any defect, get a licensed electrician to check and rectify it as soon as reasonably practicable.
18	**Do not** overload the electrical circuit by drawing current from one power outlet to multiple electrical appliances or equipment simultaneously. **Do** use one power outlet for one electrical appliance or equipment, wherever possible.
19	**Do not** allow electrical fitting works to be carried out by non-qualified or unauthorized personnel. **Do** engage licensed electricians for electrical fitting works.
20	**Do not** use electrical closets or compartments that house dry riser inlets/outlets, hose reels, telecom riser ducts etc., for storage. **Do** ensure that the closets and compartments are always clean and free of obstructions.

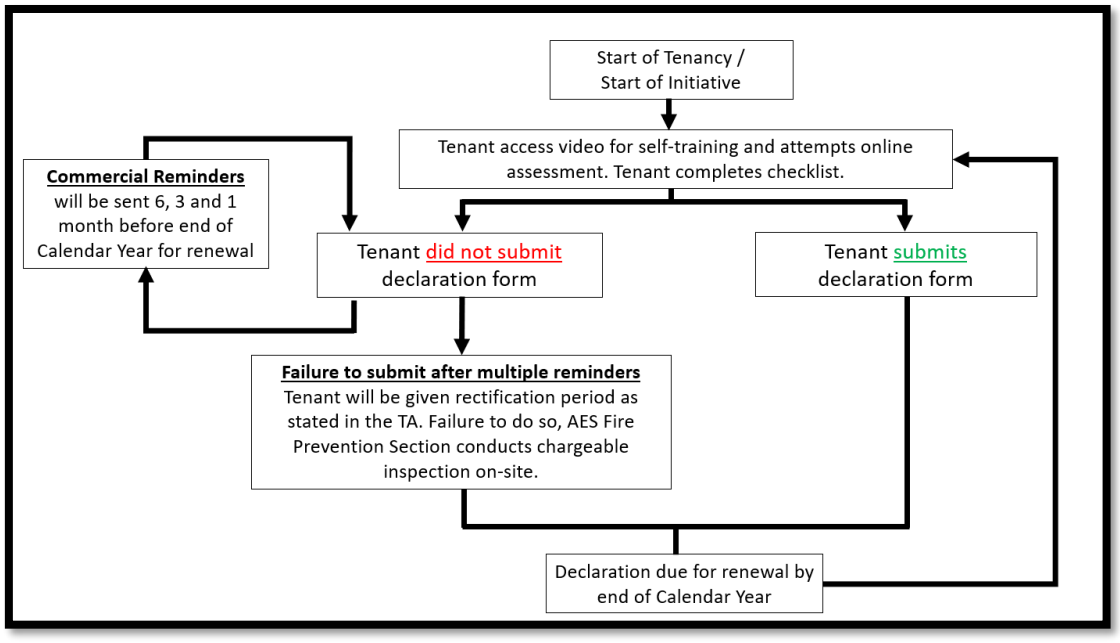
21	**Do not** use staircases as rest areas or storage space. **Do** keep staircases free of obstructions.
22	**Do not** burn joss stick, oil, incense paper and other offerings used in religious ceremonies in the premises. **Do** use joss sticks, lamps and candles that are electrical, or battery operated.
23	**Do not** cook in the premises using open-flame stove or electrical hot-plate except for areas that are allowed for cooking such as kitchens and food stalls. **Do** use microwave or electrical oven for heating up food only.
24	**Do not** pour water onto cooking oil fire. **Do** switch off the electrical/ gas supply and put off the fire with nearby fire extinguisher.
25	**Do not** wedge open any fire door. **Do** ensure fire doors are kept closed but unlocked.
26	**Do not** obstruct the access to a fire hosereel or a fire extinguisher. **Do** keep the hosereel cabinets and fire extinguishers free from any obstruction.

Appendix 1-2 – Consolidated Fire Safety Requirements for Compliance by CAG Tenants

1. Tenants are required to actively participate in the Annual Fire Safety Declaration Online Training. To obtain further details regarding the training procedure, tenants is required to contact their respective CAG Project Officer for additional information.

2 Participation in the online training, which includes a Fire Safety Training Video, an Assessment, and a Declaration Form, is limited to individuals at the manager/supervisor level and above. These eligible personnel are responsible for both completing the training and submitting the fire safety declaration for their respective units.

3 In accordance with Fire Prevention Circular 01.2024 Annual Fire Safety Declaration, failure to submit the required declaration by the end of the calendar year following the checklist implementation, may face suspension of operations as listed in the tenancy agreement (TA). Furthermore, AES will conduct a chargeable physical fire safety inspection at the premises as outlined in **Table 1**. For additional details, kindly refer to the flow chart below



CHANGI AIRPORT GROUP

AIRPORT EMERGENCY SERVICE

TENANT FIRE SAFETY DECLARATION
(Retail, Kiosk, Service, Counter, Office, Storeroom/Warehouse)

Tenant Information						
Tenant Name and Unit Number						
Date & Time of Checks						
Name of Conducting Staff						
Declaration of Fire Warden						
Type of occupancy (*Please circle where applicable)* Office / Shop / Lounge / F&B outlet / Warehouse / M&E Room *Others - Please specify:*						
Please Tick √: C: Compliance/ NC: Non-Compliant/ NA: Not Applicable						
S/N	**Description for items to check**	**C**	**NC**	**NA**	**Corrective Action(s)**	**Done**
1	Storage shelves and ceiling are maintained with a minimum of 50cm clearance from the sprinkler head. [1m for warehouse]				Goods to be removed.	
2	Detectors and Sprinkler are not covered / hung with objects, and not loosen / painted over.				Object / paint to be removed. Detector to be secured.	
3	Manual Call Point (MCP) are free from any physical and visual obstruction.				Objects to be removed.	
4	Fire exit doors and escape routes is not obstructed and not locked, except for Electromagnetic (EM) locks.				Objects to be removed.	
5	Emergency lighting [exit sign and UFO are lighted].				Emergency lighting to be lighted.	
6	Fire shutter/ smoke curtain is not obstructed. [if any]				Obstruction to be removed.	
7	Fire extinguisher, Hose reel and Landing Valve are free from any physical and visual obstruction. Its cabinet shall be labeled properly and not used as storage.				Object to be removed.	
8	Fire extinguisher and Hose reel are serviced within the servicing period [annually].				Fire extinguishers / hose reel to be replaced / serviced.	
9	No accumulation of combustible materials inside the premises and ensure all goods are stacked neatly in storage areas.				Combustible materials to be cleared and goods to be tidied in the store.	
10	Strictly no storage of Petroleum & Flammable Material (P&FM) [above exempted quantity] unless licensed by SCDF, No naked flame [incense oil lamp, candle, joss stick] within the tenanted space.				Remove P&FM. Remove or change the item(s) to electrical type.	
11	Electrical fixtures, switches and sockets are not defective or damaged, and wiring are not exposed [neatly secured in conduit / trunking].				Replace/ repair the defect electrical component and resecured the wiring.	
12	Distribution Board [DB] are labelled properly, not obstructed, and not used for illegal storage purposes.				Label the DB. Object to be removed.	
13	All electrical installations are to be endorsed by Licensed Electrical Worker (LEW) and submitted to CAG Engineering for approval – Annual Electrical License (AEL). Extension cords are not daisy chained.				AEL submitted via OneCalendar. Remove the daisy chain.	
14	All Fire Alarm Panels (FAPs) belonging to tenant are serviced annually. [if any]				Service the FAP.	
Remarks [if any]:						
I hereby certify that the above checklist is completed factually and true to the best of my knowledge: Signature: Date:						

*All tenant staff shall be aware of reporting the fire safety deficiencies to their immediate supervisor and management for rectification.
*All tenant staff shall be aware of reporting any fire incident/ includes those already extinguished to AES Hotline via 6541 2525.

Additional Fire Safety Requirements.

1. Tenants to take proper precautions to prevent fire in their demised premises. Tenants shall always adhere to the list of fire safety dos and don'ts in See Appendix 1-1.

2. Tenants to ensure no burning of candles, oil lamps, joss sticks, incense paper, etc. on the demised premises without prior written approval of the Landlord.

3. Except for approved eateries or restaurants, Tenants to ensure no open flame cooking is always allowed on the demised premises. The use of microwave ovens for warming of food is allowed.

4. Tenants to ensure no flammable liquids, gases or other hazardous substances (e.g. toxic, corrosives) are stored in the demised premises unless with the prior written approval of the Landlord and subject to strict compliance with conditions set by the Landlord and with the relevant codes of practice issued by Enterprise Singapore and requirements of the relevant authorities including but not limited to the Ministry of Environment & Water Resources and the SCDF. Tenants shall also provide to the Landlord the Safety Data Sheets (SDS) for the hazardous materials.

5. Tenants to participate in the fire evacuation drills organized by the Landlord and ensure their fire wardens attend the annual fire warden briefing organized by the Landlord.

6. Hot works that generate heat or sparks require the prior written approval of the Landlord. Tenants shall apply for online permit at the CAG website or alternatively apply manually using the prescribed application form available on the CAG website. The approval will be subject to such conditions as deemed fit by the Landlord.

7. Where due to renovation or A&A works, Tenants require the fire detection and/or protection systems in their demised premises to be temporarily isolated, written approval shall be sought from the Landlord, through AES. Tenants shall apply for the approval

using the prescribed application form available on the CAG website. The approval will be subject to such conditions as deemed fit by the Landlord.

8. Tenants shall ensure that all their staff are aware of the need for them to notify the AES Hotline (Changi via 6541 2525/ Seletar via 6481 3377) upon discovery of a fire outbreak on their demised premises. The fire emergency number shall be prominently displayed at the strategic locations on the demised premises. Any fires, however small, shall be reported to AES.

9. Tenants shall take reasonable measures to prevent false fire alarm in their demised premises. If the AES is activated by a false fire alarm activation that is not due to technical fault of the fire alarm system but due to the negligence or vandalism by the tenant, the tenant concerned shall pay the service charge levied by the Landlord as stipulated in the foreword.

Appendix 1-3 – Summary of Fire Safety Requirements for CAG Owned / Managed Properties

Date:

To: Head [Fire Prevention Section]

Through: OPC 'A', 'B', 'C' Coy*

CHANGI AIRPORT GROUP
AIRPORT EMERGENCY SERVICE
FIRE SAFETY INSPECTION CHECKLIST

Location of Inspection*: T1/ T2/ T3/ T4/ T4 Ramp Tower/ CAB C/ CAB D/ CAB E/ Megaplex 1/ ECC2/ Others: Please specify:	
Date & Time of Inspection:	
Inspecting Officer (Designation/ Name):	
Tenant and Unit No:	
Official Telephone No:	
E-Mail address:	
Inspection carried out in the presence of:	
Type of occupancy*: Office/ Shop/ Lounge/ F&B outlet/ Warehouse/ M&E Room/ Others: Please specify:	
Name of Manager/ Staff to contact in case of fire:	
Protection System*: Sprinkler/ Gas Flooding System / Smoke Detector/ Heat Detector/ Flame Detector/ Wet Chemical System/ Gas Detection System/ Kitchen Fire Suppression System Others: Please specify:	

Please circle where applicable

Please Tick √: C: Compliance/ NC: Non-Compliant/ NA: Not Applicable

1	Fire Detection and Protection Systems	C	NC	NA	Corrective Action(s) for non-compliance (if any)	Done
1.1	A clear space of 0.5m (Warehouse - 1m) is maintained between the top of storage goods and false ceiling or lowest M&E System.				Goods to be removed.	
1.2	Objects are not hung on the sprinkler heads.				Objects to be removed.	
1.3	Detectors/sprinklers are not covered.				Obstruction to be removed.	
1.4	Detectors are not loose from mounting or damaged.				To be rectified	
1.5	Detectors/sprinklers are not painted over.				Paint to be removed from detectors/sprinklers	
1.6	MCP shall be free from any physical and visual obstruction and intact with proper casing, the breakglass shall be aligned and not tampered				Objects to be removed.	

2	Passive Fire Safety Measures	C	NC	NA	Corrective Action(s) for non-compliance (if any)	Done
2.1	Access to EXIT doors and escape routes are not obstructed.				Objects to be removed.	
2.2	EXIT doors are not locked or latched. (Unless linked to fire alarm or a one-way lock mechanism door)				EXIT doors to be unlocked.	
2.3	EXIT signs are lighted. [unless self-luminous exit sign (affixed with a radioactive symbol)]				EXIT signs to be lighted	
2.4	Fire doors are kept closed (unless linked to fire alarm system)				Fire door to be closed.	
2.5	Fire Shutters are not obstructed				Obstruction to be removed.	

3	Fire extinguisher / Hosereel (Serviced Annually)	C	NC	NA	Corrective Action(s) for non-compliance (if any)	Done
3.1	Fire extinguishers are visible, unobstructed or clearly indicated when enclosed in a cabinet.				Extinguishers to be correctly installed	
3.2	Fire extinguishers are fully charged, within servicing period (annually) and labeled.				Extinguishers to be replaced / serviced.	
3.3	Adequate fire extinguishers are available in the premises.				To provide additional fire extinguishers as per recommended calculations.	
3.4	Hosereel, dry riser or their cabinets shall not be obstructed or used as storage place.				Obstructing or stored items to be removed.	
3.5	Hosereels are within servicing period (annually)				Hosereels to be serviced.	
3.6	Hosereel signage is installed on the cabinets.				To install hosereel signage.	
3.7	Fire extinguisher / Hosereel cabinets are in good condition.				Cabinet to be fixed.	
3.8	DR Landing valve cabinets to have at least one standby fire hose				Missing hose(s) to be replaced.	

4	Housekeeping of premises	C	NC	NA	Corrective Action(s) for non-compliance (if any)	Done
4.1	No accumulation of rubbish inside the premises, at the doorway, passageway and stairwells.				Rubbish to be cleared.	
4.2	Goods are not stacked haphazardly in the storeroom.				To tidy the goods in the store.	

5	Prohibited items in premises	C	NC	NA	Corrective Action(s) for non-compliance (if any)	Done
5.1	Flammable liquids are not stored in the premises. (Except with official AES approval)				To remove flammable liquids.	

5.2	LPG cylinders are not kept in the premises.				To remove LPG cylinders.	
5.3	No burning / naked flame (oil lamp, candle etc.)				To remove or change to electrical type	

6	Electrical fixture	C	NC	NA	Corrective Action(s) for non-compliance (if any)	Done
6.1	Electrical fixtures, switches and sockets and exposed wiring are not defective or damaged.				Defective / damaged electrical switches or sockets to be rectified.	
6.2	Access to Distribution Board (DB) is not obstructed and closet is not used for storage purposes.				To remove obstruction	
6.3	"DB Closet" signage posted.				To fix signage.	
6.4	Electrical cords / wires are to be secured in conduits / trunking.				Electrical wires to be covered by trunking.	

7	Mechanical & Electrical Room	C	NC	NA	Corrective Action(s) for non-compliance (if any)	Done
7.1	**Diesel Tank Room: -**					
	a) No presence of oil or leakage				To be cleaned.	
	b) Fueling inlet padlocked.				To be padlocked.	
	c) "No Smoking" signs are displayed.				To display “No Smoking" signs.	
	d) Ventilation system is functioning.				To rectify the fault.	
7.2	**Generator Room: -**					
	a) Battery bank terminals are protected by rubber covers.				To provide rubber covers for the terminals.	
	b) No accumulation of oil at fuel pump.				To be cleaned.	
7.3	**HT/LT Switch Room: -**					
	Insulation mat provided.				To provide insulation mat.	
7.4	**Battery Room: -**					

	a) Ventilation system is functioning.				To rectify the fault.	
	b) Battery & battery charging equipment in good condition.				To be serviced	

8	**Restaurant / Kitchen Cleaning of Cooker Hood / Ducts (Regular Basis)**	**C**	**NC**	**NA**	**Corrective Action(s) for non-compliance (if any)**	**Done**
8.1	Cooker hood is clean & free from grease				To be cleaned	
8.2	Cooker hood filters are clean & free from grease				To be cleaned	
8.3	Record of cleaning				To be produced for AES sighting	

9	**Restaurant / Kitchen Fire Suppression System (Serviced Annually)**	**C**	**NC**	**NA**	**Corrective Action(s) for non-compliance (if any)**	**Done**
9.1	Discharge nozzles with nozzle seal/cap				To replace the seal/ cap	
9.2	Discharge nozzles are free from grease				To be cleaned	
9.3	Regulated actuator assembly is visible and free from obstructions				To remove obstruction	
9.4	Service label is attached.				To attach service label	
9.5	Fusible links are free from grease				To be cleaned	
9.6	Combustible items are not to be placed near cooking area which may result in fire.				To remove combustible item.	
9.7	No obstructions (e.g., Shelves) located within the cooking area affecting the effectiveness of the KFSS.				To remove obstruction.	
9.8	Remote manual pull station (MPS) is not obstructed and tampered seal is intact.				To remove obstruction & replace seal.	
9.9	Supply lines / pipe fittings are visually connected.				To be inspected by maintenance contractor.	

9.10	Linkage to Fire Station & FMC.				To be tested by maintenance contractor.	
9.11	The KFSS last service date is within the limit				To service the KFSS	
9.12	Model / Type of Kitchen's Fire Suppression System:					
9.13	Name of Service & Maintenance Company:					
9.14	Date of Service:	Telephone No:				
9.15	Maintenance Staff Name:					

10	**Restaurant / Kitchen Piped Gas System (Serviced annually)**	**C**	**NC**	**NA**	**Corrective Action(s) for non-compliance (if any)**	**Done**
10.1	Bypass valve is padlocked				To padlock bypass valve	
10.2	Gas detectors are free from grease				To be cleaned	
10.3	Gas detectors are not damaged				To be checked by maintenance contractor	
10.4	Record of inspection by Licensed Gas Worker (LGW)				To be produced for AES sighting	
10.5	Piped Gas System is linked to FMC				To be checked by maintenance contractor	

11	**Restaurant / Kitchen Non-CAG Fire Alarm Panel (Serviced Annually)**	**C**	**NC**	**NA**	**Corrective Action(s) for non-compliance (if any)**	**Done**
11.1	Linkage to Fire Station & FMC				To be checked by maintenance contractor	
11.2	Name of Service & Maintenance Contractor Company:					

11.3	Date of service:	Telephone No:
11.4	Maintenance staff name (if any):	

12	**Restaurant / Kitchen Fire Warden -**
12.1	Appointed Fire Warden(s): Yes / No
12.2	Name of Fire Warden (s):
12.3	Number of Appointed Fire Warden (s) engaged:
12.4	Number of Staff(s) engaged:

13	**Fire Safety Awareness**
13.1	AES hotline (Changi 6541 2525/ Seletar 6481 3377) was displayed prominently: Yes / No
13.2	Staff was able to provide the AES emergency hotline (Changi 6541 2525/ Seletar 6481 3377) when questioned: Yes / No
13.4	Staff was able to demonstrate "PASS" method with a fire extinguisher correctly: Yes / No
13.5	Staff was able to identify the nearest MCP and explain its usage: Yes / No
13.6	Staff was able to explain on the Evacuation Procedures, Evacuation Route and the locations of the Emergency Assembly Area: Yes / No
13.7	Appointed Fire Warden(s) was able to explain his/her duties in an event of fire and evacuation: Yes / No

14	**Kitchen Fire Safety (Where Applicable) -**
14.1	Staff was able to identify the Kitchen Fire Suppression System Manual-Pull station(s): Yes / No
14.2	Staff was able to demonstrate the correct steps for KFSS Manual Operations: Yes / No
14.3	Staff was able to explain the hazards of unattended cooking: Yes /No
14.4	Staff was able to list out the step "turning off" gas valves for stall closing: Yes/ No

14.5	Staff is aware of the requirements on having a minimum of two (02) operators on duty - (One to manage the stall front and another to manage the cooking area.) when cooking is involved: Yes / No
14.6	Staff was able to explain the potential risks of fire when leaving the pilot light on standby. Yes/ No
14.7	Staff was able to demonstrate the required steps during an event of a kitchen fire (activating the KFSS using the Manual-pull): Yes / No
14.8	Staff was able to explain the hazards of pouring water onto cooking oil fire. Yes/ No

15	**Observations / Remarks (Include photo of findings)**	**Recommendations**

Appendix 1-4 a– Sample of AES Service Charge Form - Changi

PROVISION OF SPECIAL SERVICE **Service Charge No.**

CHANGI AIRPORT GROUP (SINGAPORE) PTE LTD
PO Box 168, Singapore Changi Airport, Singapore 918146
UEN / GST Registration No.: 200910817N

AIRPORT EMERGENCY SERVICE
Telephone No.: 66034953 / 65412535

Report No.

CHANGI airport group

(A) PARTICULARS OF COMPANY REQUIRING THE SERVICES

Name of Company / Section : _____
Address : _____
Tel : _____
Name of person : _____
Designation : _____
Airport Pass / Staff ID : _____
Contact No. : _____

(B) PARTICULARS OF CALL / ACTIVATION

Date	
Time of call / activation	
Name of caller	
Aircraft / Vehicle	
Location	
Time service started	
Time service ended	
Total service time	

(C) SERVICES TO BE PROVIDED

- ❑ Removal of Fuel Hazards
- ❑ Refuelling / Defuelling Standby
- ❑ First Aid Fire Appliances (FAFA) training
- ❑ False Fire Alarm Activation Turnout
- ❑ Domestic / Special Incident Turnout
- ❑ Others (Specify below)

_____
_____
_____

(D) DETAILS OF SERVICES & CHARGES

Item (1)	Type of Service (2)	Rate per hour or part thereof (3)	No. of Hours Service Required (4)	Units Required (5)	Amount ($) (6)
1	Fire Vehicle	$600			
2	Sea Rescue Craft	$1010			
3	Fire Officer (SAEO)	$100			
4	Firefighter (AEO)	$60			
5	Engineer and Technicians	$400 / $500		1 team	
6	Auxiliary Police	$400		1 team	
				Amount	
				GST @ 9%	
				Total Amount Payable	

(E) PAYMENT DETAILS

CAG Bank Details
Bank Name: DBS Bank Ltd
Bank Address: 12 Marina Boulevard @ MBFC Tower 3 Singapore 018982
Account No: 003-909004-8
Bank Code: 7171
Branch Code: 003
Swift Code: DBSSSGSG

Email address for remittance advice: changi.collection.office@changiairport.com
Note: Please provide clear description of payment by indicating service charge no.

Cash payment can be made at the below location:
Singapore Changi Airport
4th Storey, Terminal 2
Unit no. 046-038
Changi Airport Group (S) Pte Ltd
Finance Collection Office

I confirm that the service(s) stipulated above have been duly completed.

_____ _____
Name and Signature of Duty Airport Emergency Service Officer Date & Time

Appendix 1-4 b– Sample of AES Service Charge Form - Seletar

PROVISION OF SPECIAL SERVICE **Service Charge No.**

CHANGI AIRPORT GROUP (SINGAPORE) PTE LTD
PO Box 168, Singapore Changi Airport, Singapore 918146
UEN / GST Registration No.: 200910817N

AIRPORT EMERGENCY SERVICE
Telephone No.: 64811246 / 64812581

Report No.

SELETAR AIRPORT CHANGI airport group

(A) PARTICULARS OF COMPANY REQUIRING THE SERVICES

Name of Company / Section : _____
Address : _____
Tel : _____
Name of person : _____
Designation : _____
Airport Pass / Staff ID : _____
Contact No. : _____

(B) PARTICULARS OF CALL / ACTIVATION

Date	
Time of call / activation	
Name of caller	
Aircraft / Vehicle	
Location	
Time service started	
Time service ended	
Total service time	

(C) SERVICES TO BE PROVIDED

- ❑ Removal of Fuel Hazards
- ❑ Refuelling / Defuelling Standby
- ❑ First Aid Fire Appliances (FAFA) training
- ❑ False Fire Alarm Activation Turnout
- ❑ Domestic / Special Incident Turnout
- ❑ Others (Specify below)

_____
_____
_____

(D) DETAILS OF SERVICES & CHARGES

Item (1)	Type of Service (2)	Rate per hour or part thereof (3)	No. of Hours Service Required (4)	Units Required (5)	Amount ($) (6)
1	Fire Vehicle	$600			
2	Fire Officer (SAEO)	$100			
3	Firefighter (AEO)	$60			
4	Others				
				Amount	
				GST @ 9%	
				Total Amount Payable	

(E) PAYMENT DETAILS

CAG Bank Details
Bank Name: DBS Bank Ltd
Bank Address: 12 Marina Boulevard @ MBFC Tower 3 Singapore 018982
Account No: 003-909004-8
Bank Code: 7171
Branch Code: 003
Swift Code: DBSSSGSG

Email address for remittance advice: changi.collection.office@changiairport.com
Note: Please provide clear description of payment by indicating service charge no.

Cash payment can be made at the below location:
Singapore Changi Airport
4th Storey, Terminal 2
Unit no. 046-038
Changi Airport Group (S) Pte Ltd
Finance Collection Office

I confirm that the service(s) stipulated above have been duly completed.

_____ _____
Name and Signature of Duty Airport Emergency Service Officer Date & Time

Appendix 1-5 – AES Fire Alarm Isolation and Hot Work Manual Permits

FIRE ALARM ISOLATION PERMIT

Permit No:

(To be filled by AES Division)

This form may take you 5 minutes to fill in.

PART 1 : To be filled by Applicant

Full Name:	**Office Mobile Contact No:**
Designation:	**Email Address:**
Name & Address of Company:	
Type of System Isolation (Please Circle) Smoke Detector / Heat Detector / Beam - Type Smoke Detector / Fire Sprinkler / Total Gas Flooding System / Fire Hosereel / Manual Call Point / Kitchen Fire Suppression System / Fire Alarm Panel / Others - State system type:_____	
Isolation Area: (Please Circle) T1/ T2/ T3/ T4/ Ancillary Bldg/ Others - Please specify:	**AOM/ FM Work Permit No:**
Purpose for Isolation/ Scope and detail of work:	
Location (Unit No/ Grid Lines):	
Date of Isolation:	**Duration:** From hrs **To** hrs

a) To be submitted at least 3 working days before works.
b) No extension of isolation is allowed unless approval from CAAS/CAG project officer, and AES has been obtained.

PART 2: Compulsory

Project Officer (CAAS/CAG Project Only)	
Full Name/ Div/ Designation	**Office Mobile No:**
Signature and Date:	

Joint Site Inspection (Contractor and Building Maintenance Officer)	
Date & Time of Joint Site Inspection:	**Fire Alarm Panel:** **Affected Zone/ ACV:**
Name of Building Maintenance Contractor:	**Name of Contractor :** **Emergency Mobile Contact No :**
Signature & Date	*Signature & Date*

	CAG Fire Safety Requirement/ Rules and Regulations
1	**No concurrent Isolation of Fire Detection and Protection System within individual work area.**
2	**All application for isolation permit shall come with location layout plan and approved fire protection plan by QP, if applicable.**
3	**For hot work, no concurrent isolation of Fire Detection and Protection System within individual work area unless permission is granted by AES.**
4	**To contact Fire Station 1 (65412526) before commencement and after completion of work. Approved isolation permit shall be prominently displayed at the entrance of the work area.**
5	**No extension of isolation is allowed unless approval from CAAS/CAG project officer, and AES has been obtained.**
6	**Main contractor shall brief all sub-contractors on CAG fire safety requirements. Main contractor shall be held responsible for any non-compliance to the CAG fire safety requirement at the work area.**

Confirmation & Agreement:

This is to certify that:
1. The isolation is required by us and the location where the isolation of building protection system is to be carried out; and
2. The fire safety regulations, directions and requirements stipulated above are complied with and the isolation carried out in accordance with the current CAG Fire Safety Manual, Singapore Standard CP52, Code of Practice for Automatic Fire Sprinkler System and Singapore Standard SS 645, Code of Practice for Installation and Servicing of Electrical Fire Alarm System.

I/We accept any stop work order(s) and/or an AES service charge (as per schedule of rates in fire safety manual) which may be issued to us by AES for any violation, fire outbreak or false fire alarm activation due to negligence or ignorance to the above aerodrome fire safety requirements

Indemnity:

I/We hereby indemnify and hold harmless the Changi Airport Group (Singapore) Pte. Ltd., its employees or agents in respect of any liability, loss, claims or proceedings whatsoever arising under any statute or common law in respect of personal injury (including death) of any person or damage to any property movable or immovable, arising out of or in the course of or by reason of the services performed at my/our request as stated herein.

Full Name:	**Signature and Date:**

Signature of representative authorized to sign for and on behalf of the above named company

PART 3: Joint Approval

The above-mentioned work is: ☐ Approved ☐ Not Approved by AES Officer

Remarks: To comply with ALL AES Requirements, Rules and Regulations

AES Officer Name & Designation | *Signature and Date*

The above mentioned work is: ☐ Approved ☐ Not Approved by CAAS/CAG Engineer

Remarks:

CAAS/CAG Engineering Officer Name & Designation | *Signature and Date*

PART 4: To be filled by Requesting Contractor & Respective Building Maintenance Contractor

a) Requesting contractor shall submit the completed application form to respective Building Maintenance Contractor (BMC) at least one day before isolation date. It is mandatory to sign in and sign out with BMC before and after works to ensure no miscommunication during fire alarm isolation/ normalisation.
b) BMC shall also send photo evidence to the mobile phone of the duty FP officer at 9639 3843 before commencement and after completion of Isolation work.
c) Confirmed isolation/ draining of fire sprinkler has been carried out before commencement of work.

Requesting Contractor Name, Signature and Date	*Respective Building Maintenance Contractor Name, Signature and Date*

HOT WORK PERMIT

Permit No:
(To be filled by AES Division)

This form may take you 5 minutes to fill in.

PART 1: To be filled by Applicant

Full Name :	**Office Mobile Contact No:**
Designation:	**Email Address:**
Name & Address of Company:	
Hotwork site (Please Circle) T1 / T2 / T3 /T4 / Auxillary Bldg/ Others - Please Specify :	**AOM / FM Work Permit No:**
Type of work to be performed:	
Location (Unit No / Grid Line / Aircraft Parking Bay):	
Date of Hot Work:	**Duration From** hrs **To** hrs
CAG/ CAAS Project Officer Name :	**Signature and Date:**

a) To be submitted at least 3 working days before works.
b) No extension of Hot Work is allowed unless approval from CAAS/CAG project officer, and AES has been obtained.

PART 2: Required precaution and safeguard checklists (To be filled by Applicant) Please tick if in compliance with the fire safety regulations, directions and requirements. Please cross for non-compliances. Where items are not applicable, please indicate NA.

Fire Detection and Protection Systems	
☐	No concurrent isolation of Fire Detection and Protection System within individual work area unless permission is granted by AES.
Equipment	
☐	All equipment shall be in good mechanical and electrical conditions. Gas welding equipment shall have flashback arrestors at both ends of the hoses.The gas cylinders shall maintain upright & secured at all times.
☐	Flexible gas hoses, all joints and the main cylinder valve shall be thoroughly checked for any leakage.
Within 35 ft (11 m) of Hot Work	
☐	No combustible or flammable materials / substances.
☐	Floor shall be swept clean of all debris and combustibles materials. Combustible floors shall be wet down, covered with damp sand, sheet metal or other non-combustible material. All edges of covers shall be flushed or sealed tight to prevent any sparks from going underneath.
☐	All evacuation paths are to be remained clear and workers are to be familiarised with the Evacuation Route according to Evacuation Procedures
☐	All combustible walls / partitions shall be protected by fire-resistant shields and openings tightly covered. Combustible and flammable liquids shall be protected with covers, guards or metal shield and fire-resistant covers shall be suspended beneath work to collect sparks.
☐	All compressed gas cylinders shall be properly sited and secured.
Within 9 ft (3 m) of Hot Work	
☐	No Hot Work to be carried out within 3 meters radius of an air return duct unless special arrangements are made.
☐	No hotworks such as welding, cutting and grinding shall be permitted within 3m from the safety net
Hot Work on Wall or Ceiling	
☐	Walls or ceilings shall be covered with non-combustible materials. All combustibles beneath shall be removed to a safe location away from the hotworks.

Hot Work on Indoor Aircon Space	
☐	Indoor spaces shall be cleared of flammable and combustible materials. If combustibles cannot be removed, cover them with fire resistant blankets or shield. For hotworks in indoor spaces, the premises shall be ventilated so that fumes will not be circulated into the non-work spaces.
Hot Work on Enclosed Space [Tanks, Containers, Ducts, Dust Collectors, etc).	
☐	Enclosed space shall be clear of all combustibles and shall be purged of flammable liquids / vapours.
Hot Work on the Apron / Ramp	
☐	Distance between hot work location and aircraft parking bay is _____ meters.
☐	No hot work within 75 meters (50 meters if supervised by MOM registered Safety Officer) from any aircraft unless the aircraft parking bay(s) is/are closed (Permit to be obtained from Airside Operations at 6541-2257 (For Seletar Airport: 6481- 5077).
Others	
☐	Main contractors are to brief all sub-contractors on AES fire safety requirements and shall be held accountable / responsible for their actions.
☐	No extension of hotwork timing is allowed unless a joint approval from the CAAS/CAG project officer and AES has been sought.

Fire Patroller Information (SAA Trained)	
Full Name:	**Date of certificate issued:**

* To be present for monitoring of Hot Work during and 30 minutes after hot work is completed.
* Supplied with appropriate fire extinguisher(s), standing by within 15 meters from hot work site.
* Trained in use of fire fighting equipment and in raising fire alarm.
* To inform Fire Station 1 at 6541-2526 (For Seletar Airport: 6481-1246) before commencement and after completion of hot work.
* To send photo & video evidence to the mobile phone of the duty FP officer at 9639 3843 before commencement and after completion of hotwork
* To display hot work sign or warning sign boards.
* To ensure that hot work permit and fire patroller certificate is prominently displayed.

Remark(s) if any:

Confirmation & Agreement:

This is to confirm that:
1. The hot work is required by us and the location where the hot work is to be carried out; and
2. The fire safety regulations, directions and requirements stipulated above are complied with and the hot work carried out in accordance with the current CAG Fire Safety Manual and the Singapore Standard SS510, Code of Practice for Safety in Welding and Cutting.

I/We accept any stop work order(s) and/ or an AES service charge(s) (as per schedule of rates in fire safety manual) which may be issued to us by AES for any violation, fire outbreak or false fire alarm activation due to negligence or ignorance to the above aerodrome fire safety requirements

Indemnity:

I/We hereby indemnify and hold harmless the Changi Airport Group (Singapore) Pte Ltd, its employees or agents in respect of any liability, loss, claims or proceedings whatsoever arising under any statute or common law in respect of personal injury (including death) of any person or damage to any property movable or immovable, arising out of or in the course of or by reason of the services performed at my / our request as stated herein.

Full Name:	**Signature and Date:**

Signature of representative authorized to sign for and on behalf of the above named company

PART 3: To be filled by AES Division

The above-mentioned work is ☐ **Approved** ☐ **Not-Approved** by AES Officer

☐	Both smoke/heat detector and sprinkler system isolated
☐	To confirm with Airside Operations at 6541-2257 (For Seletar Airport: 6481-5077) for the closure of aircraft parking bay and its adjacent bays.

Remarks ***To comply with ALL AES Requirements, Rules and Regulation***

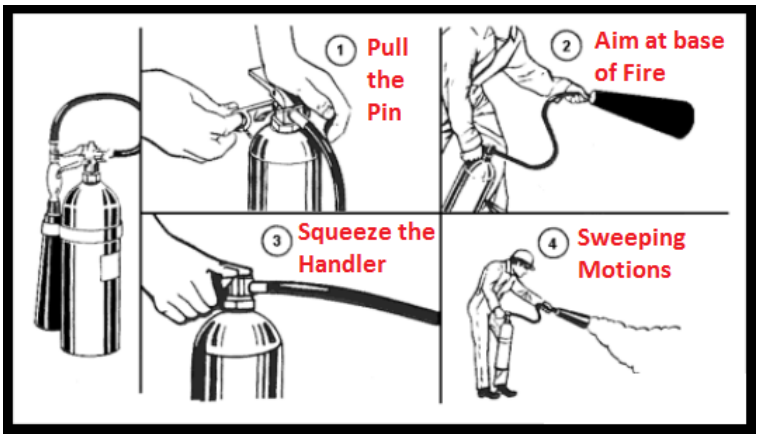
AES Officer Name & Designation:	**Signature & Date:**

Appendix 1-6 – Sample of Fire Alarm System Isolation/ Hot Work and Hot Work Enforcement Checklist

AIRPORT EMERGENCY SERVICE
FIRE PREVENTION SECTION

Contractor – Fire Alarm System Isolation - Checklist

Checklist Completed By (Site Supervisor):
Date of Isolation:

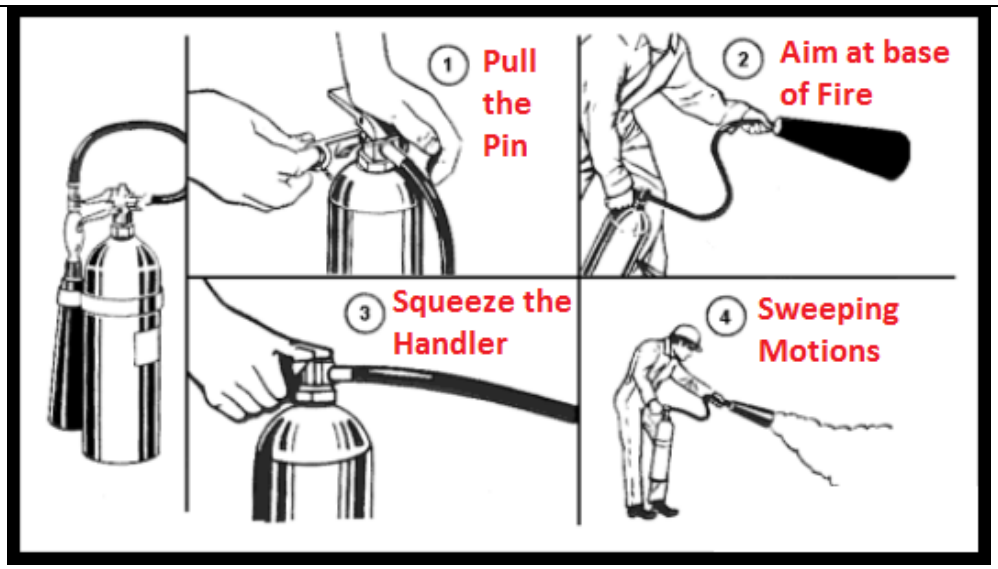
S/no	Remarks	Tick Box
1	Affected Fire Alarm Systems have been clearly identified?	
2	Familiarize yourself with the Emergency Evacuation Plan, exit route and alarm locations in the building where isolation activities are being performed	
3	Ensure that an appropriate fire extinguisher is readily available in the isolation area.	
4	Verify with the Building M&E contractor which Fire Alarm Panel they will be isolating and to inform Fault Management Centre (FMC) and Fire Station1 and Fire Station 2.	
5	Verbally communicate to employees that isolation activities are being conducted in the area.	
6	Ensure that there are no flammable liquids at the work area if the water sprinkler is being drained.	
7	Ensure Fire Protection System is appropriately isolated inside and outside of the hoarding area. Ensure that fire alarm devices around the area which possible resulted in false alarm activation are also being isolated prior to conducting work.	
8	DO NOT leave the isolation areas until the Fire Alarm Panel is normalized and remain in the work area for least 30 minutes after isolation is completed	
9	Ensure FMC, Fire Station 1 and Fire Station 2 are informed when the isolation activities are completed	
10	 **Understanding the Method for Operating a Fire Extinguisher - PASS**	

AIRPORT EMERGENCY SERVICE
FIRE PREVENTION SECTION

Contractor – Hot Work Checklist

Checklist Completed By (Site Supervisor/ Fire Patroller)
Name of Site Supervisor:
Date of Hot Work:

S/no	Remarks	Tick Box
1a	Site supervisor shall perform self-checking on hot work equipment/environment and provide video evidence to AES Duty Fire Prevention Officer at 96393843 prior to hot work commencement.	
1b	For hot work commenced at location below 75m radius from aircraft parking stand where bay closure is NOT permitted: Site supervisor shall perform self-checking on the hydro-carbon vapor every 4 hours. If there are shift changing or break during the hot work operation, the site supervisor shall perform a new hydro-carbon vapor check and refill this hot work checklist when the hot work resumed.	
2	Ensure no combustible material around the hot work site.	
3	Workers shall familiarize themselves with the Emergency Evacuation Plan, exit routes and locations in the building where hot work operations performed.	
4	Ensure that an appropriate fire extinguisher is readily available in the hot work area.	
5	Verify with the Hot Work Operator what type of hot work activity they will be conducting and take necessary precautions prior to the start of the work.	
6	Verbally communicate to employees that hot work activities are being conducted in the area.	
7	Ensure that there are no flammable materials near the work area. Flammable materials must be relocated at least 11m from the work area	
8	Ensure that there is no safety net near to the hot work area. safety net must be at least 3m away	
9	Assist the Hot Work Operator with identifying holes in the floor or walls where hot sparks and slag can enter. Ensure that these locations are covered prior to the hot work.	
10	Position in a manner that allows you to remain visible to the Hot Work Operator and other employees and personnel who may enter the work area.	
11	Monitor sparks and slag produced by the hot work and ensures that they do not land near to the flammable materials or other employees working in the area.	
12	Prevent anyone attempting to pass through the work area unless the hot work can be suspended temporarily.	
13	Alert the Hot Work Operator if employees enter the work area and suspend hot work activities until the area is clear again.	
14	DO NOT leave your post until you are relieved by another trained fire patroller. In the event of an emergency, hot work activities must be suspended immediately.	
15	Remain in the work area for at least 30 minutes after hot work is completed.	

16	 **Understanding the Method for Operating a Fire Extinguisher - PASS**	

AIRPORT EMERGENCY SERVICE

HOT WORK ENFORCEMENT CHECKLIST

Date of Inspection	**Time of Inspection**

***Location of Hot Work**	Aircraft/ Hangar/PTB/ Others Specific Location _____
***Type of Hot Work**	Aircraft Welding, Cutting/ Structural Welding/ Others Specific Types of Hot Work _____

* Please circle the right description

Please mark (✓) where applicable

S/No	Check Items	Yes	No	NA
1	**Permit Authorisation**			
1.1	Valid Hot Work Permit has been obtained and displayed at the worksite?			
	Approved Hot Work Permit Number:			

S/No	Check Items	Yes	No	NA
2	**Work Site**			
2.1	Availability of First Aid Fire Protection Equipment? i.e., Hosereel/ Fire Extinguisher			
2.2	Combustible materials within 11m of hot work areas have been placed at a safe distance from the work?			
2.3	Welding equipment are in good working condition and free from cracks and other defects.			
2.4	Flashback arrestors are securely fitted at both ends of the welding hoses.			
2.5	Qualified Fire Patroller(s) standby on site with a 9 KG ABC Dry Chemical fire extinguisher within 15m from the hot work site?			
	Name of Fire Patroller:			
	Date of Certificate Issuance:			

S/No	Check Items	Yes	No	NA
3	**For Structural Hot Work and Aircraft Welding on the Apron and Hangar**			
3.1	Is the hot work area 75m away from the tip of the adjacent aircraft wing?			
3.2	If hot work is less than 75m (50m if supervised by MOM registered Safety Officer) from tip of the adjacent aircraft wing, has a permit been obtained from Airside Operations showing			

	that the adjacent aircraft parking bay(s) is/are closed. (Permit to be obtained from Airside Operations at 6541-2257 (For Seletar Airport: 6481- 5077).			

Enforcement Result

Please mark (✓) where applicable

	Pass
	Failed, Suspension to Operation due to fire safety
Remarks:	

Name of Enforcement Officers:	**Signature and Date:**

Appendix 1-7 – Kitchen Fire Safety Assessment Form

Date:
To: Head [Fire Prevention Section]

CHANGI AIRPORT GROUP (SINGAPORE) PTE LTD

AIRPORT EMERGENCY SERVICE

KITCHEN FIRE SAFETY ASSESSMENT

Summary of Assessment		
Date		
Terminal		
Unit/ Stall Number		
Staff Name		
Assessor		
Assessment Outcome		/ 21%

Competency Elements	
CE1	Kitchen Fire Extinguishing System
CE2	Checks on Validity and Serviceability
CE3	Cleanliness of Kitchen Hood
CE4	Workplace Occurrence Prevention

Performance Criteria		Evidence		Score		Remarks
				1	-1	
1.1	Understanding the kitchen fire extinguishing system	In the assessment, the kitchen staff was able to:				
		a	Identify the location of the portable fire extinguisher.			
		b	Demonstrate the **P**ull, **A**im, **S**queeze, **S**weep (**PASS**) method.			
		c	Identify the location of **K**itchen **F**ire **S**uppression **S**ystem (**KFSS**) manual pull station.			
		d	Describe the purpose of the KFSS which is to activate extinguishing agent if the cooking space within the KFSS catches fire.			
		e	Demonstrate the activation of the KFSS by pulling the pin and pull the handlebar.			
		f	Identify the location of thenearest manual call point.			

Performance Criteria		Evidence		Score		Remarks
				1	-1	
2.1	Serviceability and validity of fire extinguishing system are current	In the assessment, the kitchen staff was able to:				
		a	Identify the date of last servicing for the fire extinguisher on the service label.			
		b	Identify the date of lastservicing for the fire extinguisher KFSS on the service label.			

Performance Criteria		Evidence		Score		Remarks
				1	-1	
3.1	Cleanliness of the kitchen hood	In the assessment, the kitchen staff was able to demonstrate:				
		a	The kitchen hood is clean and grease free.			
		b	The discharge nozzle with seal cap and grease free.			
		c	The KFSS fusible links are grease free.			
		d	The gas detectors are grease free.			
		e	The sprinkler pendant is clean.			

Performance Criteria		Evidence		Score		Remarks
				1	-1	
4.1	Protection against work occurrence	In the assessment, the kitchen staff was able to:				
		a	Explain the potential hazards of obstructed fire exits and passageway which may result in getting trapped and unable to evacuate.			
		b	Explain the hazards of unattended cooking which may result in fire.			
		c	Explain the hazards of leaving the pilot light / small fire for standby which may result in fire.			
		d	Explain the need to turn off gas valve before closing the stall to prevent gas leak and fire.			
		e	Explain the hazards for placement of oil tin near the fire area which may result in fire.			
		f	Explain the hazards of pouring water onto cooking oil fire.			
		g	Read off the AES (Changi 6541 2525/ Seletar 6481 3377)			
		h	Identify the nearest emergency assembly area.			

Appendix 1-8 – Kitchen Fire Suppression System Functional Test
(Only for AES Use on Emergency Testing)

Date:
To: Head [Fire Prevention Section]

CHANGI AIRPORT GROUP (SINGAPORE) PTE LTD

AIRPORT EMERGENCY SERVICE

KITCHEN FIRE SUPPRESSION SYSTEM FUNCTIONAL TEST

Date	
Terminal	
Outlet Name	
Unit Number/ Stall Number	
Conducted by	

1. Important Note:

a	To inform FMC before/after KFSS testing
b	Ensure that ALL systems are normalized after testing completed.
c	Valid isolation permit prior to testing

2. Functional Test

S/No	Performance Criteria & Evidence	Please √			Remarks
		Yes	No	NA	
a	To activate Fusible Link system				
b	To activate Manual Pull system				
c	Fresh Air Cut Off				
d	Exhaust Fan Cut Off				
e	Gas/Electric Cut Off				
f	Fire Alarm received by FCC				
g	Fire Alarm received by FMC				Name
h	Fire Alarm Received by Fire Station 1				Name
i	Fire Alarm Received by Fire Station 2				Name
j	Alarm reset and restore back to normal. System Running?				

Remarks:	
Serviced By (Contractor): *Name & Signature*	**Witnessed By (Tenant):** *Name & Signature*

Appendix 1-9 – AES Fire Prevention Circular

Please refer to.

Documents | Changi Airport Group - https://www.changiairport.com/corporate/e-services/documents.html

Appendix 2-1 – Fire Safety Requirements Involving Aircraft Fuel Servicing

Date:
To: Head [Fire Prevention Section]
Through: OPC 'A', 'B', 'C' Coy*

AIRCRAFT REFUELING INSPECTION

Date & Time of Inspection:	**Refueling Location - Aircraft Parking Bay No:**
Name of Refueling Company:	**Name of Refueling Operator:**
Refueler Vehicle Registration No:	**Airfield Driving Permit Number:**
Aircraft Type and Aircraft Registration No:	**Location of Nearest Emergency Fuel Shut Off Control:**

Please Tick (√) - C: Compliance, NC: Non-Compliant, NA: Not Applicable

S/No	**Item**	**Status**			**Remark**
		C	**NC**	**NA**	
1. Precautionary Measures - Aircraft Parking Bay					
1.1	The accessibility to the aircraft by fire vehicles is established during aircraft fuel servicing.				
1.2	Handheld communication devices used within 3m from the fuel vent shall be intrinsically safe.				
1.3	Availability of at least 01 x 45 litres serviceable trolley fire extinguisher standby at the aircraft parking bay.				*Expiry Date:*
2. Precautionary Measures - Fuel Brower / Dispenser					
2.1	Availability of at least 02 x 9kg serviceable ABC dry powder fire extinguishers at both sides of the refueling bowser / dispenser.				
3. Precautionary Measures - Nearby Environment					

3.1	No hot work activities within 50m/ 75m of aircraft refueling operations. (For 50m, a MOM approved Safety Officer shall be present).				
4. Knowledge of AES Hotline and Emergency Hotline Decal					
4.1	Prominent display of in-vehicle decal showing AES (Changi 6541 2525/ Seletar 6481 3377)				
4.2	The operator knows the AES Hotline (Changi 6541 2525/ Seletar 6481 3377) and that he must call AES if he sees a fire or after he put out a fire. **Qn1**: Who and what number do you call if you see a fire? **Ans 1**: AES, AES Hotline (Changi 6541 2525/ Seletar 6481 3377) **Qn2**: Do you need to call anyone after you have put out a fire? Who and what number do you call? **Ans2**: Yes. AES Hotline (Changi 6541 2525/ Seletar 6481 3377)				
4.3	The operator is able to identify the nearest Emergency Stop Button.				

Remarks and Other Observation:	
Rank and Name of Inspector:	**Signature and Date:**
Designation and Name of Duty Officer	**Signature and Date:**

Appendix 2-2 – Fire Safety Requirements Involving Airfield Vehicle Operations

Date:
To: Head [Fire Prevention Section]
Through: OPC 'A', 'B', 'C' Coy*

AIRFIELD VEHICLE INSPECTION

Date & Time of Inspection:	**Location:**
Name of Driver/ Operator:	**Name of Company:**
Airfield Driving Permit No:	**Contact No:**
Type of Vehicle/ Equipment:	**Vehicle/Equipment Registration No:**

Please Tick (√) - C: Compliance, NC: Non-Compliant, NA: Not Applicable

S/No	Item	Status			Remark
		C	NC	NA	
1. Engine					
1.1	No visible fuel leak observed during the inspection.				
2. Wiring					
2.1	No fray wire observed in driver cabin.				
3. Fire Extinguisher					
3.1	Availability of at least 1.0 kg serviceable fire extinguisher.				*Expiry Date:*
4. Knowledge of AES Hotline and Emergency Hotline Decal					
4.1	Prominent display of in-vehicle decal showing AES Hotline (Changi 6541 2525/ Seletar 6481 3377)				

4.2	The operator knows the AES Hotline (Changi 6541 2525/ Seletar 6481 3377) and that he must call AES if he sees a fire or after he put out a fire. **Qn1:** Who and what number do you call if you see a fire? **Ans1**: AES, AES Hotline (Changi 6541 2525/ Seletar 6481 3377) **Qn2**: Do you need to call anyone after you have put out a fire? Who and what number do you call? **Ans2**: Yes. AES Hotline (Changi 6541 2525/ Seletar 6481 3377)				

Remarks and Other Observation:	
Rank and Name of Inspector:	**Signature and Date:**
Designation and Name of Duty Officer	**Signature and Date:**