CAG

FIRE SAFETY MANUAL

FOR CHANGI & SELETAR AIRPORT

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Record of Amendments

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Distribution List

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
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
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
KFSS	-	Kitchen Fire Suppression System
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
OC	-	Officer Commanding
OIC	-	Officer-In-Charge
PA	-	Public Address
POI	-	Pre-Opening Inspection
PWD	-	Persons with Disabilities
QP	-	Qualified Person
RA	-	Risk Assessment
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
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

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
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
SSEN3	Code of practice for portable fire extinguishers

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
BS-EN1866	Mobile fire extinguishers Characteristics, performance and test methods

Foreword

Airport terminal buildings are generally 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, Enterprise Singapore, and National Fire Protection Association.

General Terms of Reference

This manual seeks to spell out: -

a. Fire safety precautions that need to be provided at key buildings of the Airports.
b. Responsible parties for the implementation and compliance of Fire Code.
c. Types of inspection and maintenance to be carried out by each concerned party.
d. General procedures to be complied with in the event of a fire outbreak; and
e. Other specific fire hazards.

AES Service Charge

All airlines, air carriers, ground handling agents, cargo agents, facilities managers, project/maintenance contractors, owners, tenants; or any contractors/sub-contractors engaged by them; and all parties operating or working in Changi Airport, the Changi Airfreight Centre or Seletar Airport shall comply with all 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.

Non-compliance to these procedures and guidelines 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 all airlines, air carriers, ground handling agents, cargo agents, facilities managers, project/maintenance contractors, owners, tenants; or any contractors/sub-contractors engaged by them; and all 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

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 distribution list for this Fire Safety Manual is listed on page 3 of this Manual. 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.

To facilitate this process, an amendment record sheet is provided in each controlled manual to track all updates.

This Fire Safety Manual shall be reviewed annually. When updated is required, an amendment circular will be sent to airport stakeholders. Amendments to this Fire Safety Manual are the responsibilities of the respective Heads of Division overseeing fire safety operations in CAG.

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.

Where amendments to the Fire Safety Manual relate to changes at the Changi and Seletar Airport that are planned, the AES shall be notified of such amendments to the Fire Safety Manual before effecting the change. Where amendments to the Fire Safety Manual arise out of unforeseen circumstances, the AES shall be notified of such amendments to the Fire Safety Manual before the changes. The relevant line CAG Divisions shall be responsible to ensure 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 responsible for maintaining these sections of the Fire Safety Manual shall engage the relevant stakeholders to ensure that the processes are current and accurate.

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 that fire safety measures are observed at each airport building shall be that of the owner. In the case of CAG owned / managed properties, the respective head of division in charge of the leasing or occupying premises shall be responsible as the "owner". He should also exercise surveillance over the tenants and staff occupying such premises. The AES, E&D, FM (T2) & iFM (T1, T3 & T4) shall be promptly notified of any suspected deficiencies.

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:

a. Airport Emergency Service

i. Appoint FSM for CAG buildings which satisfy SCDF FSM appointment conditions.

ii. Carry out FSM duties and responsibilities in accordance with Fire Safety (Fire Safety Managers) Regulations Part III.

b. Airport Operations, FM (T2) and iFM (T1, T3 & T4)

i. Conduct regular checks on fire extinguisher and ensure all portable fire extinguishers belonging to CAG are services annually in accordance with latest SS578.

ii. Conduct regular checks on the fire hose reel and ensure all fire hose reel belong to CAG are serviceable in accordance with latest SS575.

iii. Follow up on any observations and finding relating to the fire extinguishers and fire hose reels and ensure it could remain accessible during fire emergency.

iv. Ensure there are designated bin centre for bulk rubbish disposal in the airport, and no bulk disposal item obstruct the means of escape.

v. Ensure the designated smoking areas are included as part of the building cleaning regimes.

c. Cargo Business Division

i. Liaison all airport cargo operation and fire safety matters in CAC

ii. Assist AES in managing CAC occupants during fire emergency.

d. Commercial Division

i. Manage CAG tenants at the Terminal and CAC buildings to ensure that they comply with the fire safety precautions by obtaining FSC.

ii. Ensure that all CAG tenants following the fire preventive measures listed in CAG Tenancy Agreement (where applicable).

iii. Ensure that all renovations, alterations and additions by CAG tenants are authorised in accordance with Chapter 5 of this section.

iv. Ensure that all CAG tenants conduct checks on electrical wiring and systems as required in this manual and forward reports of these tests to the Engineering Division upon request.

v. Act against tenants who fail to proactively address and eliminate fire hazards within their premises.

e. Engineering & Development and iFM (T1, T3 & T4)

i. 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.

ii. Applicable for E&D at External, CAC and Seletar only –

- Ensure that no bulk disposal of rubbish obstructs the means of escape
- Conduct regular checks on fire extinguisher and ensure portable fire extinguishers belonging to CAG are services annually in accordance with latest SS578.

- Conduct regular checks on the fire hose reel and ensure fire hose reel belong to CAG are serviceable in accordance with latest SS575.
- Follow up on any observations and finding relating to the fire extinguishers and fire hose reels and ensure it could remain accessible during fire emergency.
- Ensure there are designated bin centre for bulk rubbish disposal and no bulk disposal of rubbish obstructs the means of escape.
- Ensure the designated smoking areas are included as part of the building cleaning regimes.

f. Others Divisions & Airport Staff

In addition to the above, Division shall:

i. Ensure his staff attending fire warden training and familiar with the emergency evacuation plan and observe the fire preventive measure listed in Chapter 2 of this section and its appendices together with CAG Tenancy Agreement, schedule 3 (where applicable).
ii. Ensure A&A works have been approved by SCDF.
iii. Exercise surveillance and act as appropriate on those occupants who do not comply and keep AES/E&D/iFM informed.
iv. Ensure good housekeeping and remove fire hazards as soon as reasonably practicable.
v. Ensure that electronic components within their premises are regularly maintained.
vi. Ensure that occupied premises are protected adequately by fire alarm and protection system in accordance with the Fire Code.

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 measures, housekeeping, electrical and wiring systems, and other fire hazards.

2.2 Training and Assessment of Fire Safety and Kitchen Fire Safety

2.2.1 Tenants operated with a kitchen facility, in particular with open flame cooking shall comply with the following:

Tenant manager and supervisor, or equivalent shall:

a. Ensure their staff do not leave cooking unattended.
b. Ensure there are no stowage racks or other forms of obstructions are permitted to be installed or mounted between the cooker hood and KFSS as such racks/obstructions may affect the activation of the system.
c. Attend the AES Kitchen Fire Safety Assessment Train the Trainer Session annually.
d. Train and assess their staff using the Kitchen Fire Safety Assessment Form on monthly basis. (See Appendix 1-7 – Kitchen Fire Safety Assessment Form)
e. Safe kept the Kitchen Fire Safety Assessment forms and provide to AES upon request.
f. Ensure their staff's particulars documented in the tenant's staff register.

2.3 Fire Alarm and Protection Systems

2.3.1 Fire alarm and protection systems shall be installed and maintained in accordance with Fire Code and the relevant Singapore Standards. The system shall have audible alarm bells or similar facilities to warn the building occupants in case of fire.

2.3.2 Fire alarm signal connection shall be made between the fire protection systems and the AES fire station as well as SCDF approved DECAM monitoring company.

2.3.3 Fire extinguishers and fire hose reel shall be serviceable.

2.4 Passive Measures

2.4.1 Means of egress and escape routes shall always be kept clear and free of obstruction so that the occupants can exit from the building or storey quickly without obstruction.

2.4.2 Exit signs and directional exit signs shall be provided, adequately illuminated and displayed.

2.4.3 Emergency exit doors shall not be locked, otherwise EDR shall be provided to release the lock when the fire alarm is activated.

2.5 Housekeeping

2.5.1 Cleanliness and housekeeping are basic factors of fire safety. Good housekeeping practices by disposal of unwanted item; limitation or segregation of combustibles material could reduce the danger of fire, and general housekeeping include the following:

a. Floors should be regularly swept clean.
b. Combustible waste should be kept in non-combustible containers with self-closing and close-fitting lids.

c. Smoking is only allowed at designated areas with suitable ashtrays or cigarette butt bins being provided. Cigarette butts shall be completely extinguished before being disposed in a proper manner.

d. No burning of oil lamps, candles, joss sticks or any forms of offerings, shall take place, especially within the buildings and on the airside. 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 or Hot Work is required, the prior approval of AES shall be obtained.

e. In the case of restaurant cooker hoods – these 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 AES.

f. No storage of flammable liquids shall be allowed. If required, the prior approval of AES shall be obtained. For storage of approved quantities of flammable liquids under SCDF shall comply with Part Three. Chapter 12. Where there is a possibility of a flammable liquid spill, tenant shall contact AES and exercise below:

   i. Ensure the spread of the spill is limited.

   ii. Non-flammable absorbent material is available for immediate use.

   iii. Ignition sources shall be quickly removed, and the area is well ventilated.

2.6 Electrical and Wiring Systems

2.6.1 General Requirement

a. Connections between wires and plugs should not be loosen.

b. Conduit and raceways are fastened into position and secured to outlets boxes.

c. Electrical boxes are closed to prevent contact with combustible material.

d. Fixtures, switches and sockets are well maintained and not frayed.

e. Electrical appliances are of an approved type and not left operation unattended.

2.6.2 Electrical equipment should be switched off and not left energised when not in use, especially after-working hours.

2.6.3 Do not overload the electrical circuit. If necessary, engage LEW to redesign the electrical system.

2.6.4 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.

2.6.5 LEW should be engaged for the installations and maintenance of the electrical installations as per EMA guidelines.

Chapter 3 – Maintenance of Fire Alarm and Protection Systems

3.1 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

3.2.1 E&D, iFM (T1, T3 & T4) are responsible for maintaining the fire alarm and protection systems in optimum working condition except for those equipment/systems installed and maintained by the tenants/lessees as per recognised local or international fire safety standards or manufacturer's recommendations.

3.2.2 FM (T2) and iFM (T1, T3 & T4), Seletar and External E&D are responsible for the maintenance of fire extinguishers and fire hose reels (up to the stop cocks).

3.2.3 E&D, FM (T2) and iFM (T1, T3 & T4) are responsible to notify AES of any defects (and their status of rectification) that affect the operations of the fire alarm and protection systems.

3.2.4 Records on initial system commissioning, subsequent modifications and annual test reports on the fire alarm and protection system maintenance shall be safe keep and submitted to CAG upon request.

3.3 Inspection Procedures

3.3.1 Fire alarm and protection systems

a. Regular inspections and maintenance should be conducted as per Fire Code and the relevant Singapore Standard guidelines:

i. If needed be, Fire detectors that are installed and maintained by tenants at their respective premises should be subject to random tests by E&D and iFM (T1, T3 & T4) and/or its engaged M&E BMC.

ii. Checks should be conducted for obstructions such as partitions, racks, piled stocks or detectors located near air-conditioning/exhaust vents, in such a way as not to interfere with the effectiveness of the fire alarm function.

3.3.2 Fire hydrants and dry rising mains

a. Regular inspections and maintenance should be conducted as per Fire Code and the relevant Singapore Standard guidelines.

3.3.3 Automatic fire sprinkler systems

a. Regular inspections and maintenance should be conducted as per Fire Code and the relevant Singapore Standard guidelines**.**

3.3.4 Gas Flooding Fire Protection Systems

a. Regular inspections and maintenance should be conducted as per Fire Code and the relevant Singapore Standard guidelines.

3.3.5 Fire Hosereels system

a. Regular inspections and maintenance should be conducted as per Fire Code and the relevant Singapore Standard guidelines.

3.3.6 Kitchen Fire Suppression System

a. F&B operator with open flame and/or deep-frying are responsible to maintain the KFSS installed in their premises and ensure it is links to the AES Fire Station through the building Fire Alarm Systems before the tenant POI.

b. There shall be no open flame cooking/deep frying activities if the KFSS not installed or available at the premises.

c. In addition to the fire extinguisher required for the F&B premises, kitchen with open flame and/or deep-frying activities shall install at least one 75F rated fire extinguisher within 7m from the open flame and/or deep-frying activities or as recommended by QP, reference to latest SS578.

d. F&B operators shall ensure that their KFSS serviced annually, the servicing record shall be safe keep and provided to AES when requested during AES Fire Safety Inspection.

e. AES will perform random assessments on staff who work in the kitchen as per Appendix 1-7-Kitchen Fire Safety Assessment Form**.** A random functional check on KFSS system would also be conducted if required during certain situation, see Appendix 1-8 Kitchen Fire Suppression System Function Test

3.3.7 Gas Pipes and Detection Systems

a. General interlinking test between gas solenoid valve, gas detection system and ventilation system shall be carried out by the tenant in accordance with Fire Code Requirement. The gas detector panel shall be interfaced with the existing IBMS, and the tenant shall ensure that gas detection systems (including link to FMC) are checked and serviced annually with records to be produced upon requested by CAG.

b. No LPG cylinder is allowed in the Changi and Seletar Airport unless prior approval of SCDF and AES are sought.

Chapter 4 – Provision and Usage of Fire Extinguishers

4.1 General

4.1.1 Provisions of portable fire extinguishers shall comply with the latest SS578 and SS-EN3 Specifications.

4.1.2 Trolley fire extinguisher shall also comply with the latest editions of NFPA 10 Standard and BS-EN 1866.

4.1.3 Fire extinguisher requirements in new and unoccupied buildings under constructions shall be in accordance with Fire Code.

a. Within the hoarded area(s), 50kg fire extinguisher(s) in trolley shall be provided near the hoarding exit access door.

b. Each fire extinguisher shall not cover more than 20m.

c. Use of multiple smaller fire extinguishers to achieve the 50kg requirement is not permitted.

4.2 Inspection and Maintenance of Fire Extinguishers

4.2.1 Fire extinguishers shall be maintained and serviced as per latest SS578.

4.2.2 Fire extinguishers shall be hydrostatically testes at intervals not exceeding those specified in the latest SS578.

4.2.3 FM (T2) and iFM (T1, T3 & T4), Seletar and External E&D shall conduct checks on the CAG owned fire extinguisher based on the followings:

a. Located in its designated locations.

b. No obstruction to access or visibility.

c. Operating instructions on the extinguisher label are legible and facing outward.

d. Seals and tamper indicators are not broken or missing.

e. Determine fullness by weighing or 'hefting"
f. Examine for obvious physical damages, corrosion, leakage or clogged nozzles.
g. Pressure gauge reading or indicative is in the operative range position

4.2.4 Each fire extinguisher shall be clearly marked with the following information:

a. Extinguishing medium contained in the extinguisher.
b. Type of extinguisher (e.g. gas cartridge or stored pressure).
c. Class of fire categories for which it is suitable.
d. Method of operation.
e. Test and working pressures.
f. Date of last service or expiry date.

4.3 Usage of Portable Fire Extinguisher

4.3.1 When a fire is discovered, airport staff or members of public shall raise the alarm by activating the nearest fire manual call point and as soon as reasonably practicable contact AES Hotline (Changi via 6541 2525/ Seletar via 6481 3377)

4.3.2 Within his/her means, take the nearest fire extinguisher in the area, check the fire extinguisher to ensure that it has the correct (green) pressure and suitability for the fire type.

4.3.3 Before attempting to put out the fire, user shall ensure that he/she has an unobstructed exit path behind them before approaching to the fire site.

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

4.3.5 For trolley fire extinguishers, the method of application is similar to that of the portable fire extinguisher; as below:

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 latest renovation requirement and CAG tenancy agreement (where applicable).

5.2 Fire Safety Requirements

5.2.1 For any renovation, alterations and additions work in buildings, QP shall be engaged and consulted for any changes made to the existing fire safety measures, access for fire vehicles, escape routes and other fire precautions.

5.2.2 Records on the fire safety consultations with other CAG divisions and other approvals from relevant authorities such as SCDF, BCA and URA, shall be kept by the CAG Project Officer. The coordinating division CAG Project Officer is responsible for ensuring compliance with the recommendations made by SCDF and AES.

5.2.3 Permission or clearance from the appropriate authorities must be obtained and submitted to AES. In cases where approval from SCDF is not necessary, a copy of the waiver records should be provided to CAG Project Officer for evaluation and submit to AES when necessary

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 AES for review when necessary.

5.2.5 Hoarding materials used shall be of non-combustible material [i.e. Gypsum Board] in accordance with Fire Code.

5.3 Fire Alarm Isolation & Hot Work

5.3.1 Isolation of fire alarm system / draining of sprinkler system and hot work are required a 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. if there are work required urgent approval, CAG Project Officer shall be notified, and AES approval shall be sought before commencement of works.

Changi Airport	9639 3843
Seletar Airport	6481 3377

5.3.3 Any non-compliance on the CAG AES permit requirement 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)

5.3.4 For Isolation - Incumbent Terminal BMC shall maintain constant supervision of fire alarm isolation work and forward photo evidence on work start and normalization of the fire alarm systems to AES Fire Prevention Duty Officer via 9639 3843

5.3.5 For Hot Work - CAG Project Officer shall ensure their appointed contractor submitted the photo evidence on work start and normalization of the hot work to AES Fire Prevention Duty Officer via 9639 3843. The appointed contractor shall also ensure 30 minutes post hot work standby to prevent any re-ignition on the hot work site.

5.4 Commencement of works

5.4.1 Any works commenced by contractor shall comply with all statutory requirements imposed by the relevant authorities.

5.4.2 CAG Project Officer shall ensure their contractor to submit the proposed plan and the written permit approval into the CAG permit to work system for CAG approval parties' review.

5.4.3 If there are serious shortcomings during work commencement, the co-ordinating division CAG Project Officer shall inform tenant that they will not be allowed to resume operations until rectification is completed. Contingency arrangements shall be made by the CAG Project Officer with AES if the operations are critical business for airport operation, such as restaurants.

5.4.4 If the shortcomings are minor, the co-ordinating division CAG Project Officer shall inform tenant that he will be given 7 days to rectify this shortcoming, failing which CAG would do so at the tenant's cost with an administrative charge (as set by CAG Finance Division), if tenant unable to rectify within the given 7 days, they shall write to AES for extension.

5.5 After completion of works

5.5.1 The coordination division CAG Project Officer is responsible for coordinating the renovation, alteration and/or addition works and shall upon completion of such works, notify AES.

5.5.2 POI shall be conducted before commencement of business. AES shall follow-up to inspect the premises to confirm that fire safety recommendation set out prior to commencement of works were fully complied with.

5.5.3 The coordinating division CAG Project Officer shall ensure that

a) Tenant follows all additional fire safety recommendation given by AES during POI and,

b) Tenant obtained FSC and FSC Advice Letter from SCDF and submit to AES before tenant official operation.

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

6.1 General

6.1.1 The fire alarm systems of Changi and Seletar Airport buildings are linked to the AES Fire Stations at Changi and Seletar Airport.

6.1.2 Any person discovering an outbreak of fire, however small it may be, must

a. Notify the AES Hotline (Changi via 6541 2525/ Seletar via 6481 3377).
b. Alerting the nearby occupants as soon as reasonably practicable by activate the nearest fire alarm (break-glass) manual call point.
c. Notify the AES Hotline again if the fire has been extinguished before the arrival of AES.

6.1.3 In case there are no manual call point available and or if the fire outbreaks at airport ramp and or remote aircraft parking areas where no fire alarm system is installed, the informant shall then inform AES Hotline (Changi via 6541 2525/ Seletar via 6481 3377) of the following information

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:

a. Establish roles and responsibilities for each organization / agency involved in handling the fire emergencies.
b. Establish a systematic and orderly evacuation plan for building occupants and members of the public present in the building to escape to the designated Assembly Areas for the purpose of reporting and accounting.
c. Ensure prompt raising of the fire alarm and marshalling of first aid fire-fighting efforts.
d. Control and prevent any further spread of fire, minimizing total property damage.
e. Safeguard of human lives in the event of fire outbreak.
f. Ensure that the airport operations and business can be resumed as quickly as possible.

6.3 Fire safety committee

6.3.1 The Fire Safety Committee duties will be administered by AES in assisting building owners in planning, organizing, and conduct of fire safety programs including fire evacuation drills in the premises, including the formulation of the premises ERP.

6.4 Fire Alarm

6.4.1 The fire alarm signal can be activated by building fire alarm system.

6.4.2 The evacuation concept is the “2 stage alarm” and total evacuation”. The sounding of the fire alarm (lasting not less than 1 minute) should be treated as an alert signal and occupants should standby for evacuation. Upon confirmation of a fire situation, the second continuous alarm will be sounded, and immediate evacuation should be initiated.

6.4.3 1st Fire Alarm Signal (Alert Signal) – Changi Airport Only

a. When the first fire alarm activated, the alarm bells on ALL floors within the affected fire alarm zone shall ring for not less than one minute before it is isolated. Simultaneously, an audio and visual signal will be registered at the fire alarm panel.

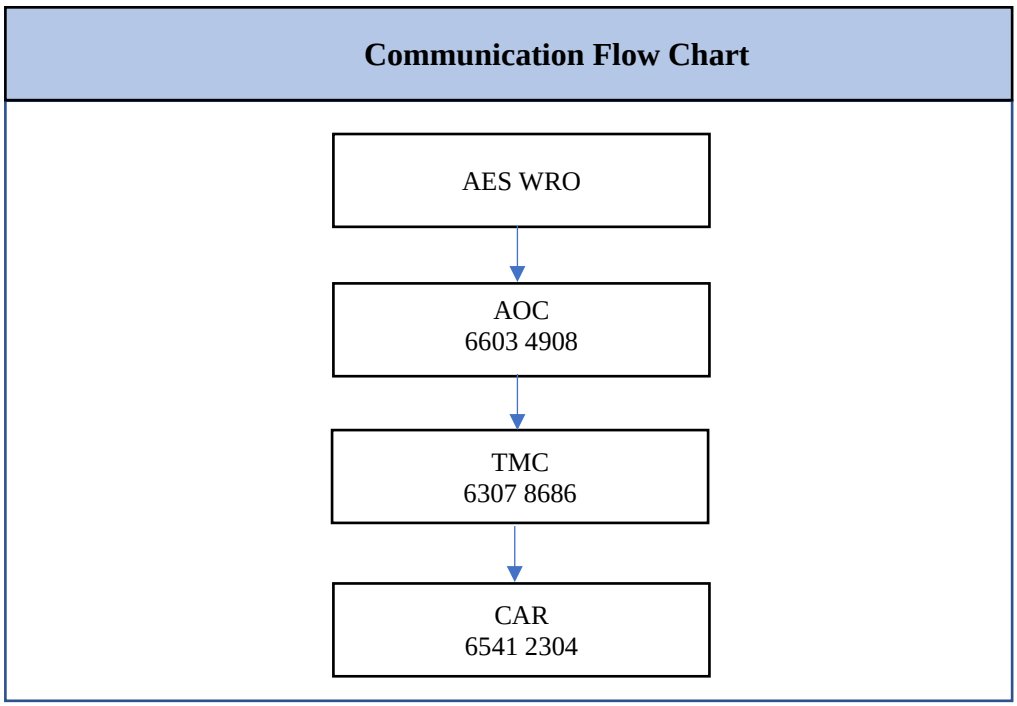
b. Main alarm panel located at the Fire Command Centre (FCC), or its affected panel will indicate the floor on which the alarm has been activated. The floor sub-panel will also indicate the floor zone at which the alarm has been activated.

c. Fire alarm panels located at AES Watchroom and FMC will also have indication on which Fire alarm panel has been activated.

d. AES Watchroom shall inform AOC via 6603 4908 and ensure that the following information are communicated to AOC:

   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)**.** Please note that this is applicable only for T1, T2 South and North Pier, T3, T2 Main Building (under T2E & Bus Gate), T4 and Seletar is using automated announcement system. Refer to communication flow chart below:



f. M&E BMC shall silence the fire alarm bell after it has rung for not less than one minute.

g. AES shall link up with the M&E BMC at the affected fire alarm panel.

h. 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). Please note that this is applicable only for T1, T2 South and North Pier, T3. T2 Main Building (under T2E & Bus Gate), T4 and Seletar is using automated announcement system.

6.4.4 2nd Fire Alarm Signal (Total Evacuation)

a. The alarm bells on ALL floors 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.

6.5 Action to be taken in event of an outbreak of fire

6.5.1 Informant

The person who discovers the fire shall as soon as reasonably practicable :

a. Notify the AES Hotline (Changi via 6541 2525/ Seletar via 6481 3377).

b. Alerting the nearby occupants as soon as reasonably possible by activate the nearest fire alarm (break-glass) manual call point.

c. Attempt to extinguish any incipient fire with the available fire extinguisher or fire hose reel without taking personal risk. Water shall not be used on fire involving energized electrical equipment. Electrical equipment shall be de-energized by turning off the main power supply.

d. Notify the AES Hotline again if the fire has been extinguished before the arrival of AES.

6.5.2 Fire Safety Manager or his representative (AES ER Crew)

In the event of an actual fire, the AES representative shall:

a. Ensure that the first fire alarm bell has been isolated after ringing for not less than one minute.
b. Ensure that evacuees are directed to the nearest assembly area if evacuation is required.
c. Ensure building evacuation status is monitored at the FCC using Floor Register. (See Annex 2)

6.5.3 Fire Warden / Assistant Fire Warden

On hearing the instructions to evacuate, the fire wardens shall: -

a. Alert staff to evacuate in an orderly manner using the nearest exit when the instruction to evacuate is given.
b. Check offices, stores, toilets etc. to ensure that no one is left behind. Closed doors after ensuring everyone have left the office. Ensure PWD, children, pregnant women etc. if present are given particular attention during evacuation.
c. When leaving the building, ascertaining that occupants of the floor are following his/her order in a calm manner.
d. Conduct roll call of their staff that evacuated out from the terminal building and report any missing persons to the officer in-charge at the assembly area who will in turn relay the information to FCC**.**

6.5.4 Other Tenants/ Staff

Upon hearing the instruction to evacuate:

a. Staff shall lock important files and cash, shut down machinery and evacuate as soon as reasonably practicable guided by their respective fire wardens and/or assistant fire wardens to the nearest designed assembly area.
    i. Do not panic but quickly walk down the staircase by the nearest exit and proceed to the designated assembly area.

ii. Do not use lifts. The assembly areas are located at both the landside and airside outside of the terminal building. (See Annex 2)

b. The fire escape tunnels at Terminal 2, 3 & 4 should also be used for quick and direct evacuation of occupants to the assembly areas outside the terminal buildings.

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 assembly area.

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.

e. Transit evacuees and passengers shall only be allowed to enter the restricted areas subject to Airport Police clearance and subjected to undergo security screening at the Arrival / Departure staff entrances prior to re-entering the restricted area. This will be managed by Airport Police Division and Immigration Checkpoint Authority.

6.5.5 Airport Police Division

In the event of fire outbreak, the roles of the Airport Police shall be as follows:

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 AES Ops Commander.

c. Establish liaison with the 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.

e. Direct SCDF OIC to the affected FCC or the affect zone on his arrival.

6.5.6 M&E BMC

a. Activated by FMC.

b. Response to the affected fire alarm panel

c. Direct AES to the affected area.

d. Assist AES 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.

6.5.7 Airport Emergency Service (AES Ops Commander)

AES Ops Commander 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 OIC upon SCDF arrival.
c. Ensure that evacuees are directed to the nearest assembly area if evacuation is required.

6.6 Fire evacuation drills

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

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

6.7 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	6541 2525
• For isolation, hot work and other matters	6541 2526
Airport Emergency Service, Fire Prevention	
• For fire safety consultation	9639 3843
• For urgent permit application	
Airport Police Division (APD)	6546 0000
Ambulance Services	
• For médical emergency	65432223
Airside Management Centre (AMC) - Changi	
• For airside accident & incident reporting	6541 2275
• For fuel spillage reporting	6541 2275
• For baggage incident	6541 2273
Airside Control Centre (ACC)	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</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

Designation & Name _____

Signature & Date _____

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 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 the Landlord. 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.

7.1.3 In addition, fire safety patrol will be conducted by AES at CAG owned/ managed properties. Any fire safety irregularities will be send to respective CAG division officer for follow-up actions.

7.1.4 Besides the CAG Fire Safety Committee meeting, fire safety irregularities CAG owned / managed properties would be managed at the various internal CAG meetings regularly. The co-operation of any concerns is sought to promote a high standard of fire safety standard at Changi Airport and Seletar Airport.

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 Besides CAG owned / managed properties (T1 to T4, MG1, CAB "C", "D" & "E" & ECC 2, Seletar Terminal), other's non - CAG owned / managed properties that located within the Changi and Seletar airport boundary which have a direct impact on airport operations are equally important, thus necessitating the maintenance of high fire safety standards of these buildings are crucial to ensure there are no disruption to airport operations.

8.1.2 Furthermore, some of the companies of these buildings are involved in airport ground servicing activities which also will impact airport operation should a fire arise in those building. Henceforth, those building appointed FSM would need to practice a high standard of fire safety to ensure the safety of their building as well.

8.2 Responsibilities

8.2.1 The owners and FSM of those building not CAG owned / managed, shall be responsible to:

a. Follow the guidelines in this manual and take reasonable measures to prevent false fire alarm activations in their demised premises.
b. Exercise surveillance over their staff and occupants to ensure that they are comply with Fire Code.
c. Maintain the fire alarm and protection systems installed in the buildings regularly in accordance with the Fire Code and the relevant Singapore Standards.
d. Perform duties and responsibilities of building owner and FSM as per Fire Safety Act.

e. 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:

a. Air Traffic Services Division (CAAS)

LORADS complex and the Control Tower Manager shall:

i. Ensure adequately fire alarm and protection system based on the SCDF approved building plans and Fire Code.

ii. Ensure that fire wardens are appointed.

iii. Ensure that the staff and occupants at observe the fire preventive measures listed in Section A of this manual and its appendices.

iv. Establish evacuation plans in accordance with the requirements prescribed by the SCDF.

v. Exercise surveillance over the staff and occupants to ensure that they comply with fire safety requirement.

vi. Take appropriate action on those who do not comply and keep AES informed.

vii. Ensure that electronic equipment installed, and airfield installations are checked and properly maintained and in working condition.

b. Singapore Aviation Academy (CAAS)

SAA Facilities Manager shall:

i. Ensure adequately fire alarm and protection system based on the SCDF approved building plans and Fire Code.

ii. Ensure that fire wardens are appointed.

iii. Ensure that the staff and occupants at observe the fire preventive measures listed in Section A of this manual and its appendices.

iv. Establish evacuation plans in accordance with the requirements prescribed by the SCDF.

v. Exercise surveillance over the staff and occupants to ensure that they comply with fire safety requirement.

vi. Take appropriate action on those who do not comply and keep AES informed.

vii. Ensure that electronic equipment installed, and airfield installations are checked and properly maintained and in working condition.

c. Other's non-CAG owned/ managed properties owner

In addition to the above, each non-CAG owned/ managed properties owner shall:

i. Ensure adequately fire alarm and protection system based on the SCDF approved building plans and Fire Code.

ii. Ensure that fire wardens are appointed.

iii. Ensure that the staff and occupants at observe the fire preventive measures listed in Section A of this manual and its appendices.

iv. Establish evacuation plans in accordance with the requirements prescribed by the SCDF.

v. Exercise surveillance over the staff and occupants to ensure that they comply with fire safety requirement.

vi. Take appropriate action on those who do not comply and keep AES informed.

vii. 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 shall observe 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.

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 not owned by CAG or lessees of CAG owned / managed properties to establish ERPs for their premises and conduct fire evacuation drill exercises in accordance with the SCDF requirement. It is recommended the building owner invite AES to witness the fire evacuation drill.

8.6 Other Fire Hazards

8.6.1 Building owners of major airport buildings not owned by CAG or lessees of CAG owned / managed properties shall prohibits and control other fire hazards within the airport 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 so as 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 the course of 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 in close proximity to 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 provided that 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 so as to allow the speedy removal of service vehicles, and also 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) on a monthly basis 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 vehicles and equipment in the passenger terminal buildings, only electric vehicles 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 vehicles 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. As such, the following precautions shall be observed whilst charging accumulators.

11.1.3 Reference shall also be made to the latest editions of NFPA 111 and the latest SS563.

11.2 Electric Vehicles (EVs) Charging Station

11.2.1 Any charging station installations for EVs, shall be treated as an electrical installation or a part of an electrical installation and shall comply with Fire Code, the Electricity Act (Cap. 89A), the Electricity (Electrical Installations) Regulations and the latest SS638.

11.2.2 The EV shall be connected to the EV 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 EV supply equipment.

11.2.4 Adaptors between EV socket-outlet and EV plug shall only be used if specifically designated and approved by the vehicle manufacturer or by the EV supply equipment

manufacturer and in accordance with national requirements. (User information shall be provided by the manufacturer on the EV supply equipment, charging station or in a user's manual. The user manual shall also include information about local usage restriction).

11.2.5 EV supply equipment deployed shall be suitable for EVs 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 EV 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 EV Charging Station.

11.2.7 Charging cable for connection between charging station and EV should be flexible and possess the mechanical characteristics equivalent to those of IEC 60245-6 cable type for harsh mechanical environments, exposure to oil, chemicals, UV, abrasion, crush, impact, fire, etc.

11.2.8 An emergency disconnection device shall be installed to isolate the a.c supply network (mains) from the d.c electric vehicle charging station in case of risk of electric shock, fire or explosion. The disconnection device shall be provided with a means to prevent accidental operation.

11.3 Recommended Precautions

a. Charging room should be cool and well-ventilated (outdoors where practicable), away from manufacturing and service areas.
b. 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. Batteries should stand on non-porous, non-combustible, non-conducting surface (e.g. slate, glazed tiles, etc.) which must be kept dry.
e. Woodwork must be treated with acid resisting paint.
f. Batteries should be spaced at least 25 mm (one inch) apart.
g. 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.
h. Wiring connections must be properly and firmly made.
i. Terminals must be clean, highly greased and capped with insulating material.
j. Charging circuit shall be correctly fused.
k. Plant/equipment shall be switched off before making or breaking battery connections.
l. Bulk storage of electrolytes shall be in separate compartments.
m. Charging of lead acid and alkaline shall be carried out independently.
n. 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.
o. Wrenches and other hand tools must be used carefully to avoid shorting.
p. Brushes used to clean batteries shall have neither a metal frame nor wire bristles.
q. 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 Fire Safety Management

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

11.4.2 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.

11.4.3 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.

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

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

11.4.6 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.

11.4.7 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.

11.4.8 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.

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

11.5 Location

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

11.5.2 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. Handle 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 standby the charged line of the AFFF TFE at all times 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 totally enclosed type or should have suitable guards or screens. The inert gas cylinder should be securely fastened to prevent tipping 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 carried out 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 in order to eliminate fire safety hazards and possible ignition sources when aircraft welding is to be carried out.

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 to ensure that the fire-fighting installations and/or equipment such as fire sprinklers, dry riser breeching inlets and outlets, hose reels, and fire extinguishers in their demised premises are always accessible (unobstructed). They are provided solely for the purpose of firefighting and shall not be misused or vandalized.

2 Tenants to ensure that the fire-fighting equipment like fire hose reels, fire extinguishers, kitchen fire suppression system (for food outlets and restaurants) in their demised premises are checked and serviced at least once a year by trained persons of approved organizations, authorized by the relevant authorities. A label certifying that the equipment is checked and serviced shall be attached to the same.

3 Tenants to ensure that staircases, passageways and exits, etc. that form parts of the emergency escape route in their demised premises are always unobstructed. Exit signs are always to be lit. Exit doors shall not be locked or obstructed in any way when the premises are occupied. Where exit doors are required to be locked in reasons of security, they shall be linked to the fire alarm system which, upon its activation, will automatically unlock the exit doors for immediate access.

4 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.

5 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.

6 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.

7 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.

8 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.

9 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.

11 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.

12 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.

13 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-**	**Done**

					compliance (if any)	
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 – Sample of AES Service Charge Form

AGREEMENT FOR THE 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
Telefax No.: 65457072

CHANGI airport group

(A) PARTICULARS OF COMPANY

Name of Company / Section : _____
Address : _____
Tel : _____
Name of authorised person : _____
Designation : _____
Employment Pass : _____
Contact No. : _____

(B) PARTICULARS OF CALL / ACTIVATION

Date	
Time of call / activation	
Name of caller	
Aircraft Registration No.	
Location	
Time service started	
Time service ended	
Total service time	

(C) SERVICES TO BE PROVIDED

- ❑ Removal of Fuel Hazards
- ❑ Refuelling / Defuelling Standby
- ❑ Explosives Escort
- ❑ Hot Work Standby
- ❑ First Aid Fire Appliances (FAFA) training
- ❑ False Fire Alarm Activation Turnout
- ❑ Vehicle Escort
- ❑ Fire Patroller Duties
- ❑ 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 @ 8%	
				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 Name: Changi Airport Group (Singapore) Pte Ltd
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

(F) CONFIRMATION & AGREEMENT

(1) We confirm that we have received the service(s) at (C) & (D)(2). Accordingly, we will pay the sum set out in D(6) to CAG for the completion of the service(s).

(2) We acknowledge that:-
(a) the services are to be provided or have been provided on the basis that the Changi Airport Group (Singapore) Pte Ltd shall not be liable for any death or injury to any person or damage to any property. Any death, injury or damage to property shall be borne by us.
(b) we shall 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 death, injury or damage to any property movable or immovable, arising out of or in the course of or by reason of the services performed as stated herein.

(G) AUTHORISATION OF SERVICE(S)

I hereby authorise the service(s) to be provided and to be charged according to the rate stipulated in (D)(3) above. I also certify that the service(s) 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:

This form may take you 5 minutes to fill in. *(To be filled by AES Division)*

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*

In case of fire, Please call Airport Emergency Service at 65412525

1

V13 - 10 Dec 2021

	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*

In case of fire, Please call Airport Emergency Service at 65412525

2

V13 - 10 Dec 2021

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 / Auxiliary 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 isolation 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.

In case of fire, Please call Airport Emergency Service at 65412525

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 hot
* 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:**

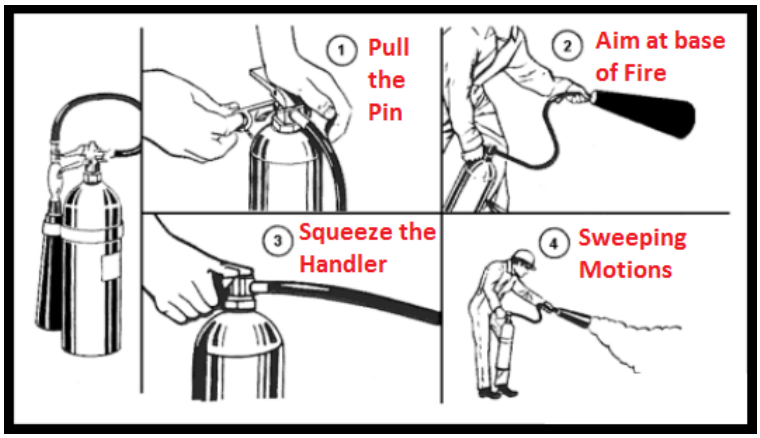
In case of fire, Please call Airport Emergency Service at 65412525

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:

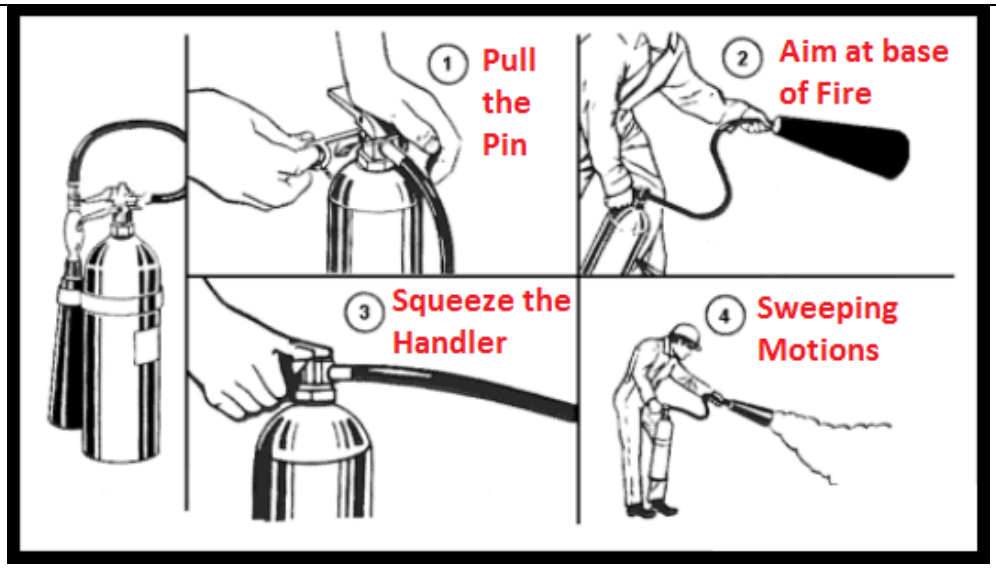
S/no	Remarks	Tick Box
1	Affected Fire Alarm Systems have been clearly identified?	
2	Familiarize yourself with the Emergency Evacuation Plan, exit route and alarm locations in the building where isolation activities are being performed	
3	Ensure that an appropriate fire extinguisher is readily available 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 Hot Work 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	Worker shall familiarize with the Emergency Evacuation Plan, exit route 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 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

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

1. Precautionary Measures - Aircraft Parking Bay					
S/No	**Item**	**Status**			**Remark**
		C	**NC**	**NA**	
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.				
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.				
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:**