



CNT RECORDS

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Workflow Comments Log

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0		25-SEP-2023	8:08 AM	Riyaz Khan (sedra345@chec.bj.cn)	Submit			
1	ECEC-DC4-SED345	25-SEP-2023	8:21 AM	Mohammad Ramiz (mohammad.ramiz@ecec.com.sa)	UserDelegate		QA Check	
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Infrastructure Works for Riyadh SEDRA Project Phase-3, 4 and 5.

Fire Prevention Plan for PHASE-3

00103-CHE-PLN-HSE-000002

REV. 01

May-26-2024






فرع شركة شاينا هاربور إنجنيرنج كمبني ليتمد
BRANCH OF CHINA HARBOUR ENGINEERING CO., LTD.
中国港湾工程有限责任公司沙特分公司

Document No.	Fire Prevention Plan for PHASE-3	Revision	01
	00103-CHE-PLN-HSE-000002		

Infrastructure Works for Riyadh SEDRA Project Phase-3

Fire Prevention Plan for PHASE-3

00103-CHE-PLN-HSE-000002

01	23-May-2024	HSE M. Phase-3	HSE.M	HSE.D	Issued for Approval
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Rev No.	Date	Prepared By	Reviewed By	Approved By	Remarks



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1. INTRODUCTION

1.1 Purpose

This Plan sets the minimum requirements to prevent and protect against fires at work sites and facilities/premises, including among the others:

- Fire prevention measures, i.e. management of flammable and combustible materials, housekeeping, management of gas cylinders, hot work permits, etc.;
- Fire protection requirements, i.e. smoke/fire detection and alarm, firefighting equipment, etc.;
- Signage;
- Training requirements.

Design of permanent fire systems (detection, alarm, suppression) is not covered by this Document.

1.2 Scope/ Applicability

This procedure applies to all sites and premises (including those of Subcontractors) under the jurisdiction and control of CHEC, within the boundaries of the sedra Project. The requirements of this procedure are applicable to the construction phase of the Project to all the parties involved.

2. DEFINITIONS

For a comprehensive list of definitions for the terms and abbreviations used at ROSHN, see the List of Definitions and Abbreviations.

2.1 Terms and Definitions

Table 1: List of Terms and Definitions

Term	Definition
Project	Infrastructure works for Riyadh SEDRA Phase 3.
Client/Employer	ROSHN
Engineer/PMC	East Consulting Engineering Company
Principal Contractor	CHEC (China Harbor Engineering Company)
Chemical Hazards	Hazards that expose employees to chemical means (i.e., fumes, gases, etc.)
Combustible Material	Liquid, solid or gas that is relatively difficult to ignite and burns relatively slow
Emergency	Unplanned, usually unforeseen, event that causes, results in, or may cause or result in injury, fatality, damage to property, significant disruption to service or construction, reputational harm, or any combination thereof, and requires the immediate response
Fire	Any combustion, regardless of the presence of flame. This includes smoldering, Charring, smoking, scorching, carbonizing, or evidence that any of these occurred.
Flammable Material	Liquid, solid or gas capable of being easily ignited, burning intensely and having a rapid rate of spreading the flames
Fuel	Any materials as coal, oil, gas, wood, etc. that can be burned and used to supply heat and/or power

2.2 Abbreviations

Table 2: List of Abbreviations

Term	Definition
ERT	Emergency Response Team
FE	Fire Extinguisher
GDCCD	KSA General Directorate of Civil Defence
HIRARC	Hazard Identification, Risk Assessment and Risk Control
HSAS	Health and Safety Assurance Standards

Term	Definition
HSP	Health and Safety Plan

JSA	Job Safety Analysis
KSA	Kingdom of Saudi Arabia
NFPA	National Fire Protection Association
OSH	Occupational Safety and Health Discipline
OSHM	OSH Manager
OSHMS	Occupational Safety and Health Safety Management System
PMC	ECEC (the Engineer)
PPE	Personal Protective Equipment
PTW	Permit to Work (System)
SBCNC	Saudi Building Code National Committee
Sub Con – S/C	Subcontractor
TBT	Toolbox Talk

3. REFERENCES

3.1 ROSHN Documents

Table 3: List of Applicable ROSHN Documents

Document no.	Document title
RRE-HC-HC1-A00-NSP-RRE-HSE-PRO-00017	Fire Prevention & Protection Standard
RRE-HC-HC1-A00-NSP-RRE-HSE-MAN-00001	HSSE Requirements for Contractors
RRE-HC-HC1-A00-NSP-RRE-HSE-PRO-00028	Storage of Materials Standard.
RRE-HC-HC1-A00-NSP-RRE-HSE-PRO-00019	Hot Works
RRE-HC-HC1-A00-NSP-RRE-HSE-PRO-00014	Engineering & Vehicle Workshops

3.2 Other Documents

Table 4: List of Applicable National and International Standards and Regulations

Document no.	Document title
Royal decree N051 of 2005	Labor Law Part 8 – Protection against Occupational Hazards
Decision Rajab 1439AH	Saudi OHS Management Regulation (Highest)
Decree No.2833/2006	Requirements on occupational Injury Recording & Reporting
Civil Defense	General Construction Guidance
Decision No. 1982/2016	Labor Law implementing new regulations
Regulations Construction Sites 1989	GDCD Fire regulations for Construction Projects
Saudi Building Code 801	Fire Protection Requirements
NFPA 70E	Standard for Electrical Safety in the Workplace
ISO 45001:2018	OHS Management Systems – Requirements

4. ROLES AND RESPONSIBILITIES

4.1 Project Director

- Overall responsibility for the implementation of this Plan and for ensuring that the activities are carried out in a safe and controlled manner;
- Determination, approval and availability of the budget including provision of all necessary resources required for the implementation;

- Ultimate responsible to ensure that all (CHEC and its Subcontractors) are complying with the temporary electrical requirements.

4.2 Health and Safety Manager

- Ensuring that the Plan is regularly distributed to all key personnel involved;
- Ensuring that training material is current and of an appropriate quality;
- Developing internal strategies to ensure safety systems are up-to-date in relation to this Plan;
- Ensuring that the implementation of the Plan is monitored and recommend corrective actions;
- Supporting Line Managers and Site Management/Coordination/Supervisory Staff in the organization of training sessions (in house and external) for fire watchers and fire wardens;
- Ensuring the regular performance of mock drills at sites and premises, with the necessary coordination of such activities by the OSH Department;
- Reporting violations and/or non-compliances to the Project Director;
- Analyzing incident trends and reporting findings to the Project Director.

4.3 Construction Director

- Ensures the implementation of the measures set forth in the Plan in all sites and premises;
- Ensures the necessary training is delivered to a sufficient number of staff and workforce, to have an appropriate number of trained fire wardens and fire watchers;
- Ensures sites and premises are complying with the requirements set forth in this Plan;
- Guarantees that adequate storage areas are provided in order to properly stock all the flammable and combustible materials.

4.4 Construction Managers

- Shall ensure the enforcement of the present Plan in the areas under their responsibility;
- Shall ensure the compliance of the work areas with the requirements set forth in the Plan;
- Shall ensure the timely implementation of any corrective actions required.

4.5 Site Management/Coordination/Supervisory Staff

Site Managers, Supervisors, Plant and Machinery supervisory staff, etc. are responsible to ensure that working areas, premises and facilities and the performance of activities are complying with:

- The provisions of the applicable legislate
- ion they are made aware of;
- The requirements determined by applicable design and manufacturer's documentation;
- The requirements set forth in this Plan.

In general, the above include (but are not limited to) the following:

- Deployment of sufficient number of trained fire watchers and fire wardens in relation to the extent of sites, premises and/or activities and the fire risk rating assessed;

- Deployment of sufficient number of fire detection and firefighting equipment and their maintenance at sounding operational conditions;
- Organization of sites, premises and activities in accordance with fire prevention requirements;
- Organization of required training sessions and participation of the required workforce;
- Awareness of the contents of this Plan to all the personnel under their jurisdiction;
- Maintenance of housekeeping levels at required standards;
- Regular performance of mock drills with the participation of all workforce;
- Implementation of PTW requirements;
- Installation of signage;
- Enforcement of “no smoking” policies;
- Monitor the correct status of implementation of the applicable requirements;
- Timely implementation of corrective actions;
- Enforcement of disciplinary actions in case of violations.

4.6 Fire Coordinator

The role of Fire Coordinator will be given to Construction Managers. The main responsibilities are:

- Ensure the site fire plans are available, displayed and up to date;
- Ensuring the implementation of this Plan and applicable site fire plans;
- Ensure that all firefighting equipment is checked and serviced, and that fire exits and escape routes are marked and checked on a regular basis;
- Ensure that nominated fire personnel are adequately trained and details recorded;
- Arrange an establishment fire drill on a monthly basis;
- In the event of a fire or other emergency evacuation, assume overall control of the situation and ensure evacuation, with fire marshals reporting to them at the assembly point.

4.7 Fire Watchers

The primary job of a fire watch is prevention of fire. He has the responsibility and authority to immediately shut down the hot work if hazardous conditions arise and furthermore he shall:

- Be constantly on the watch for changing conditions, flammable and combustibles, spark containment and for any abnormal event;
- Be familiar with area and potential hazards and know how to get assistance in an emergency;
- Have equipment appropriate to hazards available and be trained in proper use and limitations;
- Observe for at least 30 minutes after completion of hot work operation, including breaks;
- If a fire (or unsafe situation) is noted, he should immediately stop the hot work, sound the alarm, and institute emergency response extinguishment.

4.8 Fire Wardens

- Be familiar with all fire emergency escape routes and exits from their designated area and the location of fire alarms and firefighting equipment in the workplace;
- Assist the Site Management/Coordination/Supervisory Staff in implementing and improving effective emergency arrangements within the workplace;
- Assist in preventing emergencies by monitoring the adequacy of the fire risk control measures;
- Raise awareness with other staff about the fire hazards that exist within the workplace;
- Instruct occupants in the action to be undertaken in response to a fire emergency;
- Assist in Fire Evacuation Drills to evaluate the effectiveness of emergency arrangements;
- Ensure all people from within the workplace are accounted for during an evacuation;
- Assist all people in the workplace should an emergency occur, including assisting people with special needs, e.g. helping someone in a wheelchair to evacuate;
- Assess the fire and, **within the limits of knowledge and training**, intervene if safe to do so;
- If the fire alarm is sounded, Fire Wardens shall assist in the safe evacuation of all workplace occupants including visitors and to ensure that their designated area has been cleared.
- During an Evacuation, Fire Wardens need to:
 - Direct everyone to leave the workplace/building using all appropriate routes and exits,;
 - Check all accessible spaces in their area, including bathrooms and toilets, to make sure everyone has evacuated – this should be undertaken whilst exiting the area so as not to expose themselves to un-necessary risks or delays;
 - Where applicable, close windows/doors behind them so as to isolate any spread of fire;
 - Guide everyone to the designated Fire Assembly Area and assist in confirming that everyone has arrived safely;
 - Liaise with the Emergency Services on arrival at the premise informing them of any relevant details relating to the fire incident and follow any instruction provided.

4.9 Site OSH Staff

- Monitor safe conditions by regularly inspecting his site, to ensure compliance with measures set forth in the Plan and the implementation of any remedial actions required;
- Ensure compliance with inspection schedule and reports submittal;
- Closely monitor activities to ensure they are performed in compliance with fire prevention and protection requirements;
- Carefully check the availability and conditions of fire protection and firefighting equipment (fire extinguishers, fire hose reels, fire water tanks, smoke detectors, alarms, etc.);
- Stop the work activities whenever serious violations of fire prevention and protection requirements are detected and/or there is an immediate risk for fire, reporting any offender to the OSH Manager.

4.10 All Personnel

- **Never fight any fire** – employees shall immediately report any potentially hazardous situation or any incidence of fire immediately to their line supervisors;
- Immediately report any fire incidents and unsafe condition/act with the potential to cause fire;
- Ensure to keep clear from dangerous areas in case of any evidence of immediate hazard (i.e. evidence of ongoing short circuits) and that all co-workers are made aware of;
- Follow all the instructions and requirements related to this Plan they are made aware of;
- Attend required training and awareness programs.

5. GENERAL REQUIREMENTS

The following general instructions will be followed:

- Materials and equipment will be maintained in an orderly manner in order to prevent or reduce the probability of fire spread
- Materials will not be stored in a manner that obstructs fire extinguisher, sprinkler heads, alarms, emergency exits, electrical panels and walkways;
- Consideration will be given to fire loading imposed in an area by the placement of materials.
- Doors provided for emergency escape will open outwards in the direction of escape routes;
- As soon as reasonably feasible and agreed with PMC Quality, permanent works protections made of flammable materials (i.e. plastic sheet covers) shall be removed;
- As far as reasonably practicable, temporary covers on stored or installed items should be of non-flammable or (preferably) of fire-retardant materials;
- When using flammable materials as covers (i.e. tarpaulins, plastic sheets, hessian cloth etc.), interruptions and distances must be ensured to prevent/limit fire continuity;
- Equipment will not be refueled while the engine is running;
- Smoking is prohibited whilst refueling activities are taking place;
- Hazardous materials will be stored in accordance with compatibility chart;
- Flammable materials will be stored far away from chemical storage areas and other potential sources of ignition;
- Prime consideration will be given to maintaining free access ways to the workplaces for firefighting vehicular equipment.
- “No Smoking” policy will be respected in all working areas (offices included); smoking will be allowed exclusively in dedicated smoking areas.
- Fire drills will be conducted on a monthly basis to educate site workers and staff on safe action in actual emergencies;
- A Civil Defense file will be maintained at each site, containing:
 - Copy of site-specific documentation (emergency layouts, fire risk assessment, etc.);
 - Copy of ROSHN applicable documentation (Emergency Preparedness and Response Plan, this Plan, etc.);

- Copy of previous Civil Defense inspections reports, if any;
- Fire drills reports.

Below fire precautions for temporary electrical connection will be implemented in offices:

- Loose and substandard connections are not allowed;
- The office layout map will be displayed in the offices;
- Fire extinguishers, smoke detectors, fire alarms and fire warden will be provided.
- In warehouses, installation of automated fire detection, alarm and suppression systems (i.e. Sprinklers) shall be considered and encouraged as far as reasonably practicable;
- Smoking arrangements:
 - Designated smoking areas will be separated from normal work areas;
 - Separated cigarette butts and waste bins will be provided in smoking areas;
 - At least 1 ABC 6 kg dry powder fire extinguishers will be provided. Preferably, fire point complete of extinguisher, fire bucket and blanket shall be deployed;
 - Fire wardens will inspect smoking areas and initiate corrective actions if needed.
- Fire prevention arrangement for welfare facilities (toilets, canteens, rest areas, etc.):
 - Welfare facilities area will be arranged in safe distance from general work location;
 - Standard electrical wire and lights will be installed in the welfare areas;
 - Combustible and flammable materials will be not stored in the welfare area;
 - Competent person will be assigned to inspect welfare area to ensure it is safe from any Fire risk;
 - Different fire extinguisher will provide as per fire type (DCP, Foam, CO2);
 - Safe exit routes and direction signage will provide in the welfare areas;
 - Smoke detector and fire alarm will be installed.
- Arrangement for chemicals and diesel storage:
 - Chemicals and diesel will store in approved storage area with required signage;
 - Less quantity will store as per site requirements;
 - Stored in 110% capacity bounded area;
 - Spill kit and drip tray will provide and use;
 - Segregation must be maintained;
 - Safe exit routes and direction signage will be provided;
 - Smoke detector and fire alarm will be installed;
 - Area will be restricted to authorized personnel only;
 - MSDS will be provided in the storage areas;
 - Competent responsible person will inspect storage area and FE effectiveness.

- Arrangement for vehicles and equipment:
 - Fuels will be stored in limited quantities for equipment and only in designated areas;
 - Fire extinguisher will be provided for the equipment as per fire type;
 - A competent person will inspect vehicles and equipment to ensure they are safe from
Fire risk;
 - Operators of the vehicles and equipment will be trained on fire prevention and firefighting system.

6. FIRE PREVENTION

6.1 Site Layout

The following principles of site layout and organization shall be used to minimize fire risks:

Congestion around machinery and equipment shall be avoided, especially where there is a high level of activity and traffic.

- Operations having a high fire risk, such as welding and open-flame activities, shall be isolated or specially protected from flammable and explosive materials.
- Adequate emergency access roads shall be provided with adequate signage. Fire department access roads shall not be less than 6 m in width with an unobstructed overhead clearance of not less than 5.5 m. Emergency access roads shall not be obstructed at any time.
- More than one access road shall be provided when emergency access by a single road could be impaired by vehicle congestion, condition of terrain, climatic conditions, or other factors.
- Storage of flammable and combustible materials shall be restricted to the minimum quantities necessary for an uninterrupted cycle of operations or construction activities. A larger, secondary storage site outside the plant/project area shall be used where possible.
- Work sites shall be provided with the numbers and types of fire extinguishers suitable for the hazards. Fire extinguishers and other firefighting equipment locations shall be clearly marked on site layout plans.

Site-specific layouts shall be prepared and maintained under the responsibility of the Site Manager. They shall address the above measures and furthermore provide information on the location of:

- Storage of fuel, flammables, combustible, and other fire hazardous materials;
- Entrance gates dedicated to Civil Defense;
- Fire extinguishers, fire hose reels and other firefighting equipment;
- Water tank(s);
- Functioning hydrants;
- Fire alarm call point / switch;
- Smoke/heat detectors;
- Emergency escape routes and exits;
- Muster points.
- Other emergency-related equipment/devices (i.e., communication devices, lights, etc.).

6.2 Hot Works

No hot works shall be allowed without having secured a “hot work permit” associated with the operation, in accordance with Permit to Work Procedure.

Performance of hot works shall meet the requirements as bellow:

- During cutting and welding operations an appropriate PTW must be emitted;
- Particular care will be taken when carrying out hot work operations in locations where combustibles may be present;
- This will include precautions such as inspection of the surrounding area, removal of any combustible materials, provision of fire extinguishers and fire blankets;
- Compressed Gas Cylinders will be always kept in upright position and handled with care;
- When not in use, compressed gas cylinders will be stored in a ventilated and dry place, protected from sunshine, hot source, and potential mechanical impact;
- Moreover, they will have their protective cap fitted when not in use;
- Compressed gas cylinders will be kept clear of electrical equipment and cabling where they may become part of an electrical circuit;
- Gas cylinders will not be taken into confined spaces, and feed hoses and nozzles when used in confined spaces will be removed when not in use;
- Gas cylinders will be kept free of oil and grease;
- Valve wrenches will be always left in position on the valve stem when the cylinder is in use;
- Fuel gas and oxygen hoses will be clearly distinguishable, in good condition and secured properly (wire is not permitted);
- All Cylinders will be equipped with flash back arrestors and are only moved on a proprietary trolley with a fire extinguisher nearby or moved with the cylinders;
- Fire extinguishers and persons trained watcher for their correct use will be available before hot work commences. Please note: follow-up checks are undertaken on completion; this check must take place at least 1 hour after the hot work has finished.

6.2.1 Welding and Cutting

The following shall apply to oxy-fuel operations:

- Oxygen cylinders, cylinder valves, couplings, regulators, hoses and apparatus shall be kept free from oily or greasy substances:
 - Oxygen cylinders or apparatus shall not be handled with oily hands or gloves;
 - Keep greasy hands, rags, and gloves away from any part of the cylinder and fittings;
 - Oxygen shall not strike oily surface, greasy clothing, or enter fuel or oil storage tanks;
 - All Cylinders will be equipped with flash back arrestors and are only moved on a proprietary trolley with a fire extinguisher nearby or moved with the cylinders;
 - Never oil or grease or allow oil/grease to come in contact with regulators or valves of cylinders, in particular oxygen;
 - Do not allow pure oxygen to come in contact with hydrocarbons in any form.
- Oxygen shall be used only for the purpose intended. Oxygen will not be used as a substitute for compressed air. Oxygen shall not be used in pneumatic tools, to start

internal combustion engines, to blow out pipelines, to dust clothing or work, or to create pressure for ventilation;

- Oxygen cylinders, equipment, pipelines, or apparatus shall not be used interchangeably with any other gas. Oxygen regulators should be tagged and used in oxygen service only;
- Torch connections shall be checked for gas tightness after assembly and before lighting. Use soapy water or equivalent, not flame. Before lighting the torch for the first time each day, hoses shall be purged individually by the employee. Hoses shall not be purged into confined spaces or near ignition sources;
- Friction lighters shall be used for ignition. Do not use matches or cigarette lighters for lighting torches or attempt to light a torch from hot metal. Point the torch away from persons or combustible materials;
- Manufacturer's recommendations shall be followed with respect to the sequence of operations in lighting, adjusting, and extinguishing torch flames;
- Fuel gas hoses shall be red in color, green for oxygen hoses, and black for inert-gas and air hoses. When parallel oxygen and fuel gas hoses are taped together to prevent tangling, not more than 4in/ft. will be covered in tape. Hoses showing leaks, burns, worn places, or other defects will be replaced.
- Hose connections for welding gas lines will not be compatible with connections for breathing air. Hose connections will be fabricated so that they will withstand, without leakage, twice the pressure to which they are normally subjected in service, but in no case less than 20 bar. Pressure reducing regulators will be used for gas and pressures for which they are labelled.
- Union nuts and connections on regulators shall be inspected before use to detect faulty seats which may cause leakage when regulators are attached to valves or hoses. Damaged nuts or connections shall be replaced. Gauges used for oxygen service will be marked "USE NO OIL OR GREASE".

The following requirements apply to arc welding and cutting:

- Persons in charge of and/or designated to operate equipment shall be properly instructed and authorized to maintain and/or operate it by their responsible supervisor. Manufacturer's instructions shall be read and adhered to by all operators. Rules and instructions covering operation and maintenance of arc welding and cutting equipment shall be readily available;
- Electric current ratings shall be adequate to handle the job. Welding machines shall not be operated above electric current ratings and corresponding rated duty cycles as specified by manufacturer and not be used for applications other than those specified by manufacturer;
- Welding cables shall be of the flexible type designed especially for welding service and of a size adequate for expected current and duty cycles;
- After assembling any connection to the machine, each shall be checked by operator. Coiled welding cable shall be spread before use to avoid overheating and damage to insulation;
- When not in use, electrodes shall be removed from holders;
- When welding is interrupted for appreciable time, electrode holder shall be de-energized turning off the machine. When not in use, they shall not make contact with persons, conducting objects, flammable liquids, or gas cylinders. Electrode holders shall not be cooled by water. Holders shall be insulated and kept in good repair; damaged ones shall be discarded;
- Arc welding equipment shall be always maintained in safe working order. Com

- mutators shall be kept clean to prevent excessive flashing. Welding cable shall be inspected for wear or damage before each use. Cables with damaged insulation or connectors shall be replaced;
- All fixed welding machines shall be grounded, all grounds to be verified;
- Welding cables shall be of a size suitable for the current rating of the welding machine;
- Leaks of cooling water, shielding gas, or engine fuel shall be immediately cleaned up and leak repaired before continuing work.

6.2.2 Wood Cuttings, Off Cuts, Sawdust

- Carpenter shop will be swept clean daily (or more frequently if needed);
- Cuttings, off-cuts, etc. will be placed immediately in an internal bin(s) adjacent to saws, planning machines, etc. prior to being removed to external collectors;
- Timbers and other wooden materials will be neatly stored outside the carpentry workshop in a covered and ventilated place, organized in racks by size;
- Safe access and egress to and from workplace must be always maintained clean and free.

6.3 Outdoor Storage

When planning for outdoor/open yard storage, the following requirements apply:

- Combustible materials shall be neatly stacked, taking into consideration the stability of the stack (pile) and shall in no case be higher than 6 m;
- Solid combustible materials shall be separated into stacks not larger than 140 m³;
- Access roads between and around combustible/flammable storage stacks/areas within an outdoor storage yard shall be at least 4.5m wide and shall be maintained free from accumulation of rubbish, equipment, or other material;
- Flammable materials shall be separated and stored in a designated flammable liquid storage area away from heat sources, electrical equipment and other ignition sources;
- Incompatible materials (e.g., flammables and oxidizers) shall not be stored together.
- Vegetation (e.g., weeds and grass) shall be kept down and a regular procedure provided for periodic clean-up of the entire area.
- Storage areas shall be graded to divert possible spills away from buildings and adjacent working areas and shall be surrounded by a curb at least 30 cm high.
- Provisions shall be made for draining off accumulations of ground/rainwater and spills of flammable/combustible liquids when curbs are used.

6.4 Indoor Storage

The following requirements apply to indoor storage:

- All materials shall be stored and handled according to their fire characteristics;

- Incompatible materials that may create a fire hazard shall be segregated by a barrier having a fire resistance of not less than 1 hour;
- Material shall be stacked to minimize the spread of fire and permit firefighting access. Aisle space shall be maintained to safely accommodate the widest vehicle that may be used within the building for firefighting purposes;
- For building areas/rooms without sprinklers, a minimum clearance of 0.5 m shall be maintained between the ceiling and the top level of any stacked material below;
- For building areas/rooms with sprinklers, a minimum clearance of 0.5 m shall be maintained between the top level of any stacked material and the sprinkler heads/deflectors;
- Adequate clearance shall be maintained around lights and heating units to prevent ignition of combustible materials;
- Combustible/flammable materials to be kept at least 0.5m from fire-rated doors;
- Materials shall not be stored where they obstruct access to exits or visibility of exit signs.

6.5 Flammable Liquids

Flammable liquids are those having a flashpoint at or below 199.4 °F (93 °C). Flammable liquids are divided into four categories as per below table.

Table 5: Flash and Boiling Points of Flammable Liquids

Flammable Liquid	Flash Point	Boiling Point
Category 1	< 73.4° F (23°C)	< 95° F (35°C)
Category 2	< 73.4° F (23°C)	> 95° F (35°C)
Category 3*	> 73.4° F (23°C) < 140° F (60°C)	
Category 4**	>140°F (60°C) ≤199.4°F (37.8°C)	
Notes/Remarks	<p>* When a Category 3 liquid with a flashpoint at/above 100 °F (37.8 °C) is heated for use within 30 °F (16.7 °C) of its flashpoint, it shall be handled in accordance with requirements for a Category 3 liquid with a flashpoint below 100 °F (37.8 °C).</p> <p>** When a Category 4 flammable liquid is heated for use to within 30 °F (16.7 °C) of its flashpoint, it shall be handled in accordance with the requirements for a Category 3 liquid with a flashpoint at or above 100 °F (37.8 °C).</p>	

Table 6: Flash and Boiling Points of Flammable Liquids

Flammable Liquid	Flammable Liquid			
	Category 1	Category 2	Category 3	Category 4
Glass or approved plastic	1 pint (0.5 litre)	1 quart (1 litre)	1 gallon (3.8 litres)	1 gallon (3.8 litres)
Metal (other than drums) or approved plastic	1 gallon (3.8 litres)	5 gallons (18.9 litres)	5 gallons (18.9 litres)	5 gallons (18.9 litres)

Safety cans	2 gallons (7.6 litres)	5 gallons (18.9 litres)	5 gallons (18.9 litres)	5 gallons (18.9 litres)
Metal drums (DOT specifications)	60 gallons (227 liters)	60 gallons (227 liters)	60 gallons (227 liters)	60 gallons (227 liters)
Approved metal portable tanks	660 gallons (2498 liters)	660 gallons (2498 liters)	660 gallons (2498 liters)	660 gallons (2498 liters)

The following requirements apply to the storage of flammable and combustible liquids and gases:

- Flammable liquids shall be kept in securely capped metal containers or steel drums upon which the contents are clearly marked/approved;
- Gasoline, acetone, and other volatile liquids with flash points below 32 °C (90 °F) shall be kept in strong metal lockers located in well-ventilated, non-combustible huts or sheds. Drums containing flammable liquids shall be provided with proper bung vents;
- Flammable materials shall not be stored in direct sunlight or in such a manner that they could be subject to heat above their self-ignition temperature. Flammable materials may be stored in an open shelter with a roof and walls, provided the walls do not confine heat, smoke, flammable vapors or restrict firefighting access;
- Flammable storage areas shall be secured and located at least 15 m away from nearest building/combustibles storage area. No other materials shall be stored with flammable;
- Appropriate warning signs (e.g., “Flammable Liquids,” “No Smoking,” “Flammable – Keep Fire Away”), inclusive an internationally-recognized hazard pictogram(s), shall be posted;
- Outdoor storage of flammable and combustible liquids shall be in containers that do not exceed 227 L (60 gal) each and they shall not be stored in excess of 4,160 L (1,100 gal) in any one stack pile or area. Stacks or groups of containers shall be separated by a 1.5 m clearance and shall be a distance of 6 m from any building or structure;
- There shall be a 3.6 m (12 ft) minimum width access way within 60 m (200 ft) of each outdoor flammable or combustible containers area to permit approach of firefighting apparatus;
- Outdoor storage of flammable and combustible materials shall not be within 3 m (10 ft) of a building or structure. Outdoor storage areas shall be kept free of combustible materials for a minimum distance of 9 m (30 ft) from stored flammable/combustible materials;
- Flammable or combustible liquids shall not be stored in areas used for exits, stairways;
- Indoor storage of flammable and combustible liquids in excess of 95 L (25 gal) shall be contained in flammable liquid storage cabinets or specially designed rooms/buildings. No more than 95 L (25 gal) of flammable/combustible liquids shall be stored in an enclosed room outside of an approved flammable storage cabinet;
- No more than 227 L (60 gal) of flammable liquids and no more than 454 L (120 gal) of combustible liquids shall be stored in a single storage cabinet. Not more than three cabinets shall be located in a single storage area. All cabinets shall be grounded;
- Flammable storage cabinets shall be properly labelled in noticeable lettering: “Flammable - Keep Fire Away” with internationally recognized hazard pictogram(s).

The following precautions shall be observed when handling flammable and combustible liquids:

- Flammable and combustible liquids shall always be transported in closed metal containers. Plastic containers are prohibited for the storage of flammable and combustible liquids;
- All containers of flammable and combustible liquids, whether at operational facilities, construction sites or inside buildings, shall be properly labelled;

- Portable gasoline containers shall be placed on the ground during filling and shall never be placed inside vehicle passenger compartments;
- Containers shall be recapped immediately after use.
- Gasoline shall not be used as a cleaning agent;
- Gasoline- and diesel-powered equipment shall only be refueled in well-ventilated areas. Exhaust pipes shall be kept away from combustible/flammable materials. Engines shall be stopped before refueling;
- Areas where flammable or combustible liquids are transferred from one tank or container to another tank or container in quantities greater than 19 L (5 gal) shall be separated from activities that are a source of ignition (e.g., welding, grinding) by a distance of 7.6 m (25 ft) or by a barrier having a fire resistance of at least 1 hour. There shall be no open flames within 15 m (50 ft.) of the transfer operation unless conditions warrant greater clearance;
- Adequate natural or mechanical ventilation shall be provided to maintain concentration of vapor being transferred/handled at or below 10% of the lower explosive limit (LEL);
- Containers shall be grounded and bonded during transfer of flammable or combustible liquids;
- Mobile phones and other electronic devices shall not be used when transferring flammable Liquids or refueling;
- Metallic parts (e.g., nozzles, fittings) of vacuum hoses, suction hoses, pumping equipment, inert gas hoses, etc., when used in the cleaning or ventilation of tanks and vessels that contain hazardous concentrations of flammable gases or vapors, shall be bonded to the tank or vessel shell. Bonding devices shall not be attached or detached in hazardous concentrations of flammable gases or vapors.

All storage of materials and debris must consider the potential for a fire and the control measures must reflect this. Protection measures for stores should include but must not be limited to covering with fire resistant materials, sprinklers, and smoke detectors.

6.6 Compressed Gas Cylinders

The following requirements apply to the handling of gas cylinders:

- Compressed gas cylinders shall be legibly marked with either the chemical or trade name of the gas. Such markings shall be by means of stenciling, stamping, or labelling, and shall not be readily removable. Do not use cylinders on which the labelling is missing or illegible;
- Cylinders shall be stored where they shall not be exposed to physical damage, tampering by unauthorized persons, or subject to temperatures above 54 degrees;
- Cylinders shall be stored away from stairs and in assigned places where they will not be knocked over or damaged by passing or falling objects;
- Cylinders shall be secured in storage to prevent falling;
- Cylinders in storage shall be separated from flammable and combustible liquids and materials such as wood, paper, packaging materials, oil, and grease by at least 6 meters;
- Oxygen cylinders in storage shall be separated from fuel gas cylinders by at least 6 meters;
- Cylinders shall not be dropped, struck, or permitted to strike objects violently in a manner which may damage the cylinder valve;

- Bars shall not be used under valves or valve protection caps to pry them open or loose;
- Cylinders shall never be used as rollers, or supports, whether full or empty;
- Safety devices shall not be tampered with;
- Cylinder valves shall be closed before moving cylinders. Cylinders shall also be secured;
- Valve protection caps shall always be in place and hand-tight (except when cylinders are in use or connected for use). Valve protection caps shall not be used for lifting cylinders;
- Acetylene will not be utilized at a pressure in excess of 2 bars;
- Acetylene cylinders shall always be stored valve end up;
- Before connecting a regulator to a cylinder valve, the valve outlet shall be wiped clean with a clean cloth free of oil and lint, and valve shall be opened momentarily and closed immediately (cracking). The valve shall be "cracked" while standing to one side of the outlet, never in front of it. Never "crack" a fuel gas cylinder valve near welding, sparks, flame, or ignition sources;
- A hammer, or other non-approved device, shall not be used to open cylinder valves that are fitted with hand wheels;
- Cylinders not having fixed hand wheels shall have keys, handles, or non-adjustable wrenches on valve stems while these are in service so that gas flow can be turned off quickly;
- When a high-pressure (non-liquefied) gas cylinder is in use, the valve shall be opened fully to prevent leakage around the valve stem;
- An acetylene cylinder valve shall not be opened more than three-fourths (3/4) of a turn. This is so that it may be closed quickly in case of emergency;
- Nothing will be placed on top of a cylinder when in use which may damage or interfere with the quick closing of the valve. Cylinder valves shall be closed when work is finished;
- Before a regulator is removed from a cylinder, the cylinder valve shall be closed, and the gas released from the regulator;
- A suitable cylinder truck, chain, or steadying device shall be used to keep cylinders from being knocked over while in use;
- Cylinders shall be kept far enough away from actual welding or cutting operations so that sparks, hot slag, or flame will not reach them;
- Cylinders shall not be placed where they might become part of an electrical circuit;
- The tapping of electrodes against a cylinder is prohibited. Do not strike an arc on cylinders;
- Compressed gas shall never be used from cylinders without reducing the pressure through a suitable regulator attached to the cylinder valve or manifold;
- Cylinders shall be kept away from metallic components that may be used for grounding electric circuits such as for arc welding machines;
- Flash-back protection will be provided on oxy-acetylene lines by a UL approved flame arrestor which will prevent burn-back into hoses and the regulator;
- Compressed gas cylinders must not be stored in direct sunlight, must have appropriate signage, be at least 4 meters from buildings and boundary fences and have fire control measures in place, which as a minimum must include a fire extinguisher.

6.6.1 Cylinders Emergency

If a leak is found around the valve stem of a fuel gas cylinder, the packing nut shall be tightened, or the cylinder valve closed by the operator. If tightening the packing nut does not stop a valve stem leak, or if a fuel gas valve is leaking at the seal and cannot be stopped by closing the valve firmly, or if a leak should develop at a cylinder fuse plug or other safety device, then the fuel gas cylinder shall be moved to a safe location outdoors, away from any source of ignition, marked properly and the supplier advised.

A signage shall be posted to warn employees not to approach the cylinder with open flames or other sources of ignition. The cylinder valve may be opened slightly to gradually discharge the contents.

Small fires at fuel gas cylinders, usually resulting from ignition of leaks, shall be extinguished by closing the cylinder valve, or using water or a fire extinguisher.

In case of a large fire at a fuel gas cylinder, such as from the functioning of a fuse plug or safety device, personnel shall be evacuated from the area, and the cylinder shall be wetted down with a heavy water stream to keep it cool. Or call to emergency service.

Allow a cylinder fire to burn out in place rather than attempt to move the cylinder. If the cylinder is located where the fire may cause severe injury or damage, attempts may be made to move it to a safer location, preferably outdoors.

Cylinders must be secured while connected to a portable welder to prevent them from being knocked over or thrown off in transit. Do not use oxygen or acetylene for testing purposes.

6.7 Control of Ignition Sources

Personnel shall take the precautions necessary to prevent ignition of materials, lubricants, fuels used in the job itself, etc., including as follows:

- Temporary wiring and GFCI/ELCB shall be installed according to the provisions of Saudi Building Code or, alternatively, NFPA 70;
- Electrical equipment shall be regularly checked for defects;
- Smoking is permitted only in designated areas. "NO SMOKING" signs shall be prominently displayed, particularly where flammable or combustible materials are stored;
- Welding equipment, asphalt kettles, heating appliances and other open flames or hot surfaces shall be segregated from flammable and combustible materials;
- Precautions shall be implemented as needed to control indirect sources of ignition (e.g., hot welding slag falling from a height or sparks from a fire under an asphalt kettle);
- Open fires and/or open burning of materials are strictly prohibited;
- Proper bonding and grounding techniques shall be used for any operation where static electricity could become an ignition source;
- Ignition sources shall be immediately removed (e.g., engines shut down) if there is a hydrocarbon liquid or gas leak;
- Non-combustible or flameproof welding screens shall be provided around/under cutting, welding, or burning operations;
- Cutting, welding, or burning operation requires an assigned trained fire watcher who shall remain (up to 1 hour) in the work area;
- Temporary enclosures constructed for the protection of operational components and equipment shall be of fire-retardant materials.

6.8 Housekeeping

The following housekeeping requirements apply:

- Regular housekeeping on site can eliminate most of the combustible materials that act as fuel for fire. It will be performed daily basis;
- Accumulation of flammables is prohibited, particularly inside stations and technical rooms;
- Waste shall be removed from the work site at regular intervals and at the end of each workday;
- Storage of combustible materials shall not be allowed underneath buildings or stairways;
- Metal bins with close-fitting lids shall be provided and used for disposal of oily rags, wood shavings and other highly combustible waste. Oily rags shall not be disposed of in the same container as other combustible waste;
- Contents of ash trays shall not be mixed with other combustible or flammable waste;
- Non-combustible absorbents shall be used to remove oil spills or leaks.

6.9 Temporary Buildings

No temporary building will be erected where it will adversely affect any means of exit. Clearance will be maintained around lights and heating units to prevent ignition of combustible materials.

Temporary buildings will be of either non-combustible construction or of combustible construction having a fire resistance of not less than 1 hour, when located within another building or structure or employed for the storage, handling, or use of flammable or combustible liquids, flammable gases, explosives, or blasting agents, or similar hazardous destination of use.

In any other cases, temporary buildings will be placed maintaining a minimum distance of 3 meters from other buildings or structures. Aggregated portable cabins used as offices are counted as a single temporary building.

6.10 Labor Camps and Kitchens

The requirements below apply to labor camps and kitchens:

- Smoking inside rooms and other indoor facilities will be strictly forbidden and subject to actions in accordance with Anti-Smoking Law. Smoking is allowed only in designated areas;
- Cooking and use of boilers and the likes inside rooms will be strictly forbidden and subject to disciplinary actions up to termination;
- Fire prevention equipment will be selected in compliance with the local laws and the nature of materials on the premises where they are located;
- In addition to main equipment (sprinklers, fire hose reels, hydrants, etc.), camp area will be provided with adequate fire extinguishers, properly maintained and readily available;
- Appropriate pressure will be guaranteed for fire hydrants;
- All fire escape routes and exit doors, alarm points and fire-fighting equipment will be always kept clear of obstructions and will be maintained on a regular basis;
- Fire drills will be performed, and emergency plans will be exposed in the notice boards;
- All electrical wiring will be in accordance with relevant codes and standards;
- Emergency plans with location of fire prevention devices will be exposed in the camp area;

- Gas cylinders (i.e. LPG) will be stored in accordance with local regulations;
- Smoke and/or heat detectors to be installed in the facilities and subject to regular inspections;
- Cooking appliances (including connections and the likes) must be checked periodically;
- Housekeeping in all camp areas must be maintained, including under barracks and facilities;
- Cleaning of rooms and facilities shall be performed to prevent accumulation of flammables;
- All porta-cabins shall be grounded in accordance with applicable codes and standards;
- Cooking appliances must be turned off when not in use and disconnected from electricity;
- Camp fire system shall be inspected and approved by Civil Defense, as required.

6.11 Offices

The requirements below apply to offices (main office and site offices):

- Smoking inside offices and other indoor areas will not be allowed and subject to actions in accordance with Anti-Smoking Law. Smoking is allowed only in approved, designated areas.
- Adequate numbers and kind of fire extinguishers will be provided in all office areas;
- All fire escape routes and exit doors, alarm points and fire-fighting equipment will be always kept clear of obstructions and will be maintenance on regular basis;
- Fire drills will be performed, and emergency plans will be exposed in the notice boards;
- All flammable liquids, such as photocopiers toners, cleaning solvents, draftsman's sprays will be stored away from sources of heat and ignition or naked flames, only quantities in direct use will be stored into the workplace;
- Porta-cabins shall be regularly grounded in accordance with applicable codes and standards;
- Appliances such as electric heating rings, electric kettles and coffee percolators are not permitted in normal office space but will be confined to designated cooking and resting areas;
- All electrical wiring will be in accordance with relevant codes and standards;
- Regular housekeeping around site office areas must be maintained, including under office porta-cabins and other facilities;
- Cleaning of offices shall be regularly performed to prevent accumulation of any flammables;
- Portable smoke detectors will be installed in the site offices;
- Automated fire systems, where installed, shall be regularly maintained in accordance with supplier requirements, to ensure their proper operational status;
- All firefighting equipment and fire alarm switches must be properly signaled and indicated in the emergency layout drawings;
- Periodically inspection will be carried out for all the equipment installed for fire detection.

6.12 Smoking

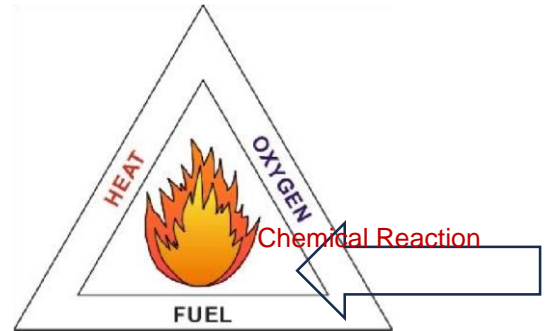
- “No Smoking” Policy will be maintained and designated smoking areas will be provided. The Policy shall be respected in all working areas and violations dealt with accordingly;
- Designated smoking areas will be separated from work areas and must be constructed of non-combustible materials, be provided with ashtray and trash bins and having fire extinguishers/fire points readily available. Adequate signage must be posted;
- The fire warden will be assigned to inspect the smoking area and take necessary action if needed (i.e. firefighting).

Passive smoking is a risk to the health of other personnel. There must not be any designated smoking areas in areas that could result in other personnel being subject to passive smoking.

7. FIRE PROTECTION AND FIREFIGHTING

The following factors are necessary for fires to burn:

- **Fuel or combustible material:** Any material or substance, which can be either liquid, solid or gas, which will burn given sufficient amounts of oxygen and heat.
- **Heat or ignition source:** Every fuel has an ignition temperature. All solids and liquids give off vapor when heated, and it is this vapor which ignites. Many liquids give off vapor at normal room temperature, whilst some will give off a flammable vapor at temperatures far below freezing;
- **Oxygen** is present in air and always there to sustain fire, given that other factors are present.
- **Chemical chain reaction:** sufficient reaction energy to produce ignition.



If any one of these factors is isolated or removed, the fire will be extinguished. There are three basic ways of achieving this:

- Removal of fuel or combustible so that there is nothing left to burn;
- Removal of the heat by application of water to cool the burning material;

Reels and Fire Water Tanks

Fire detection and firefighting equipment must be deployed commensurate to the risk of fire and the assets to be protected in accordance with work progress. CHEC will deploy the equipment detailed in the following sub-chapters.

7.1 Classes of Fire

Fires are classified (NFPA 10:2002) as Class A, B, C, D or Special, depending upon the types of materials involved. These classifications are defined as follows.

Table 7: Classes of Fires

Class	Definition
A	Fires involving wood, paper, cloth, trash, and other ordinary materials
B	Fires involving flammable liquids (i.e. gasoline, thinner, grease, oil-based paint) and gasses

- C** Fires involving energized electrical equipment
- D** Fires involving combustible metals as magnesium, sodium, potassium, titanium, and aluminum
- K** Fires involving commercial cooking appliances with oils or fats at high temperatures

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7.2 Equipment

7.2.1 Fire Extinguishers

Appropriate portable and mobile firefighting equipment shall be located at convenient, conspicuous locations and be easily accessible, as described below:

- For each 300 m² of a protected building and within 20 m of uninterrupted travel distance;
- Within 15 m of where more than 2 liters of flammable or combustible liquids or 2.3 kg of flammable gases are being used/stored;
- In open storage yards within 20 m of uninterrupted travel distance;
- At storage areas for flammable or combustible liquids;
- At any fuel dispensing or service area;
- On all motorized equipment.

Fire extinguishers shall be maintained in good working order and be protected from harsh environmental conditions as needed (e.g., cover wheeled fire extinguishers; provide fire extinguisher boxes with red mark, hang extinguishers on stands or wall-mounted hangers at least 500mm above the floor level) and marked 'FIRE Point'. The location where fire extinguishers are provided must be clearly marked and the area nearby shall be kept clear so that they are readily accessible in case of an emergency.

Fire extinguishers must be inspected, tested, and maintained in accordance with Saudi Building Codes and National Fire Protection Association (NFPA) standards. Each discharged fire extinguisher must be replaced immediately with another fire extinguisher that is fully charged and of the proper size and type.

Fire extinguishers will be provided on-site as per picture below, detailed in the table at following page.













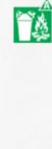










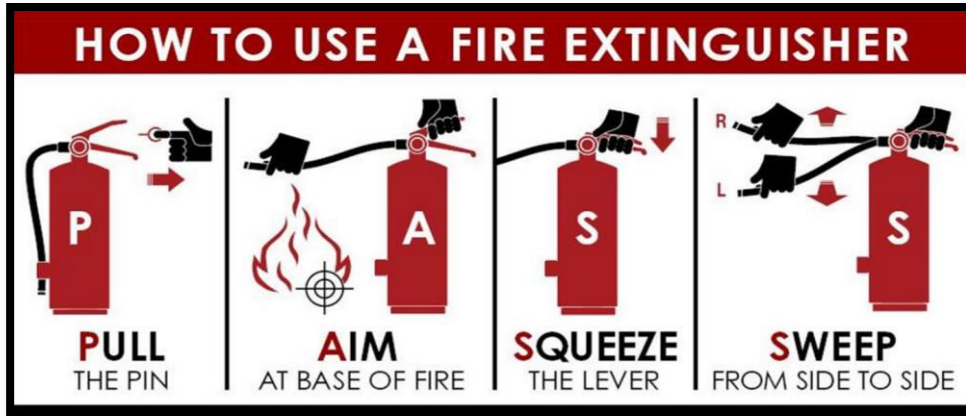
	ABC Dry Chemical	BC Dry Chemical	Clean Agent	Class K Wet Chemical	Water	Water Mist	Foam	Carbon Dioxide	Class D Dry Powder
TYPES OF EXTINGUISHERS									
SUITABLE FOR THESE CLASSES OF FIRES									



Table 8: Fire Extinguishers Selection

		FIRE CLASS						NOTES/REMARKS
		A	B (liquids)	B (gasses)	C	D	K	
								
EXTINGUISHING AGENT	Water	✓	✗	✗	✗	✗	✗	Strictly forbidden use on liquid or electric fires
	Water Mist	✓	✗	✗	✓	✗	✗	
	Foam	✓	✓	✗	✗	✗	✓	Not suitable for domestic use
	Dry Powder	✓	✓	✓	✓	✗	✗	Safely used on electrical equipment up to 1000 V
	M28/L2	✗	✗	✗	✗	✓	✗	Specific dry powder for use on metals only
	CO2	✗	✓	✗	✓	✗	✗	Safe on both high and low voltage. Do not use in confined spaces
	Wet Chemical	✓	✗	✗	✗	✗	✓	Use on extremely high temperatures

How to use a fire extinguisher and PASS method as illustrated in the figure below will be communicated to all the site workers through training, TBT, and signage



7.2.2 Fire Detection and Alarm

Detection devices (mainly, smoke detectors) will be deployed in sufficient numbers around sites and premises. Detectors shall be audible (at least 85 dB) and, where possible, preference will be given to temporary automatic systems integrating detection and alarm (visual and sound), if and where feasible.

The type of fire detection and alarm system must be considered in the Fire Risk Assessment with the level of control proportionate to risk and complexity of the working environment and as a minimum it must comply with the requirements of EN54 and NFPA 72.

The detection system to be used will be selected as per the following criteria:

- Type of occupancy.
- Nature of fire hazard.
- Quantum of hazard.
- Physical and environmental conditions.

7.2.3 Fire Hose Reels and Fire Water Tanks

Sites will have a reservoir water tank (painted red) dedicated to fire emergencies, particularly in case of intervention by Civil Defense to ensure additional availability of water. The water inside the tanks must be used for fire prevention and/or firefighting purposes only.

Deployment of fire hose reels with appropriate pressure granted by dedicated pump will be considered in areas where Class A fires may occur. A fire hose reel is a first attack piece of fire-fighting equipment. It is designed to be used as a quick-response method for fighting fires in their early stages. Hose reel must not be used on electrical fires, considering they use water. Access to fire hose reels shall not be obstructed and a minimum 1meter area of clearance from reels must be ensured, for the hose needs to be able to be pulled out and dragged to a fire without being obstructed, and you also need to ensure that you are able to see the fire hose reel location sign.

If the decision is made to use a fire hose reel:

- Warn everybody in the immediate vicinity;
- 00103_CHE_PLN_HSE_000002_240526_R01 Fire Prevention Plan for PHASE-3

- Call the designated Fire Warden or directly alert the Civil Defense;
- Do not use on electrical fires, water will conduct electricity;
- Whenever possible, two people should unroll a hose reel, that is, one to control the nozzle and one to ensure the hose runs off the reel freely and is not caught around doors or corners;
- Before using the fire hose reel, ensure that the water is TURNED ON before proceeding to the fire. There is a stopcock lever at the base of the hose reel;
- Check the water is capable of being turned on and off at the nozzle. Ensure the nozzle or jet is in the closed position;
- Pull on the hose, the reel should unwind as it feeds out the hose;
- Direct the stream of water at the base of the fire.

7.2.4 Fire Blankets

Fire points must be distributed in different zones at easily accessible locations, and shall provide:

- Fire extinguisher(s);
- Metal fire bucket painted red.
- Fire blanket.
- Emergency contact list.

Fire points must be solid enough to support the equipment hanging on them and must be made easily recognizable (i.e., painted red) and signage provided.

7.3 Fire Safety Coordinator and Wardens

Trained fire wardens and fire watchers will be deployed in all sites to ensure a 24/7 coverage throughout construction period. Employees at offices will be trained as fire wardens, too.

Fire watch will be deployed in particular during hot works, as per requirements set in the Hot Works Procedure and Permit-to-Work Procedure.

In general, fire wardens and fire watchers will be employees already working at the sites who will be appointed by the Site Manager for training and further deployment with these additional duties.

The main tasks of these employees, together with their duties as listed at paragraphs 4.6 and 4.8 of this Procedure, are to:

- Highlight any conditions not complying with fire prevention (i.e. housekeeping) and fire protection (i.e. fire extinguishers conditions) requirements;
- Put down small fires, if safe to do so.
- Lead personnel to safe haven during an evacuation.
- Facilitate the headcount following an evacuation.
- Provide their support to OSH staff and emergency services.

8. INSPECTIONS, MONITORING AND SURVEILLANCE

8.1 Inspections

8.1.1 Equipment Inspections

Firefighting equipment shall be maintained in good working order and protected from environmental conditions as needed. Recorded inspections for fire extinguishers and smoke detectors will be carried out as a minimum on a monthly basis. Checking of fire detection and protection devices/systems will be part of daily and weekly OSH inspections as well. Fire protection systems and equipment shall be subject to third party inspection, testing and maintenance in accordance with applicable standards such as NFPA and Saudi Building Code. Equipment found in not appropriate conditions will be immediately replaced and tagged out to prevent its use.

Fire extinguishers must have a durable tag securely attached to show the date of inspection and initials of the inspector. They furthermore shall report an up-to-date inspection sticker provided by third party who carried out relevant inspections, maintenance and/or recharging in accordance with applicable standards and regulations, when applicable.

Temporary smoke detectors must be color coded following their monthly inspection, in accordance with Project monthly color coding requirements. For those installed inside technical rooms, the inspection log sheet shall be maintained as per requirements set in the relevant Procedure.

8.1.2 Site Inspections

A Weekly Fire Prevention Inspection shall be implemented by the site teams, using the relevant checklist. These inspections shall be covering all construction and test & commissioning areas, storage/lay-down areas and fabrication areas. High activity and high-risk areas (i.e. fuel oil feed stock and storage facilities and power distribution areas), will be inspected daily or more frequent dependent on activity and risk.

Daily and weekly OSH inspections will cover among the others also aspects related to fire prevention, such as housekeeping, deployment/conditions of fire detectors and fire points, etc.

8.2 Periodical Assessments

Fire Risk Assessments and COSHH Assessments will be carried out by Site Manager together with site based OSH staff using the relevant checklist, on a quarterly basis and in case of significant changes (i.e. introduction of new hazardous materials, significant changes in site layout, etc.).

8.3 Audits

Internal audits on the implementation of this Procedure will be carried out by OSH Manager at least twice per year.

9. COMMUNICATION, TRAINING AND AWARENESS

9.1 Training

Basic fire safety notions, including the behaviors to undertake in case of emergency, must be included in the Safety Induction material delivered to all employees at employment.

In-house training will be delivered to the fire wardens and fire watchers, the content addressing:

- Duties and responsibilities.
- Fire watch requirements.
- Basic principles of fire.
- Classification of fires.
- Basic principles of heat transmission and fire spread.
- Common causes and consequences of fires in the workplace.
- Recognition of fire hazards.

- Control measures to eliminate or at least minimize fire hazards.
- Structural measures to prevent spread of fire and smoke.
- Fire detection, fire warning and firefighting equipment.
- Fire extinguishers, types, agents and classifications.
- Emergency evacuation procedures.

9.2 Awareness

Awareness on fire safety will be spread among the employees by sharing of lessons learnt, alerts, and bulletins during TBT and meetings. Furthermore, copies of these documents will be kept at notice boards. Additional information posters and signage will be maintained throughout the sites and premises, including warning and prohibition signs in dedicated locations. Posters with the picture, name, position, and contact details of the active fire emergency teams must be posted in all notice boards, at each premises and around sites.

9.3 Mock Drills

Fire mock drills must be conducted at following intervals at each site:

- Evacuation drills on a monthly basis;
- Practical drills (controlled fire with use of extinguishing equipment) on a quarterly basis and office premises at least twice in year.

Sites shall select the scenario and location of the drills, considering the activities carried out and eventual occurrences happened in the site. The frequency of drills may be increased in accordance with identified site needs and quantum of hazard.

APPENDICES

APPENDIX A

ROSHN

GUIDELINES

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RRE-HC-HC1-A00-NSP-RRE-HSE-PRO-00017 - Fire Prevention & Protection Standard

1. Definitions

1.1 **NFPA:** National (USA) Fire Protection Association

2. Planning

- 2.1 Contractor's Construction Phase OH&S Plan must contain the Company's general policy and procedure for fire prevention and protection measures which must contain as a minimum the requirements of this Standard.
- 2.2 Contractor is reminded that an Emergency Response Plan is a requirement which is the site-specific document required to address emergency procedures during the life of the Works, which will also include fire prevention and protection measures.
- 2.3 A key item of the policy and procedure is the "Actions to be taken on the outbreak of a fire". This document must be clearly displayed in prominent locations and communicated to all employees, Contractors, Sub-Contractors, Visitors and Suppliers during induction training and at regular intervals. It should also be translated into the main language of the workforce.


Means of Escape

- 2.4 All means of escape from a building or area are to be kept clear and free from obstruction.
- 2.5 All escape routes are to be clearly signed and indicate the most direct route to a place of safety.
- 2.6 Doors on designated escape routes shall not be locked with a key, or blocked so as to prevent escape, and open in the direction of (escape) travel.
- 2.7 Escape routes shall be adequately lit, with either natural light or domestic lighting, and if necessary, with emergency lighting.

3. Equipment

Fire Alarm/Detection Systems

- 3.1 An effective means of providing a warning to staff in the event of a fire is required for all locations. Types of alarm can include:
- Verbally (shouting "fire", "fire", "fire");

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- Hand-held bell, or hand-rotating bell;
- Electric break-glass call points;
- Visual alarm (flashing beacons normally used in noisy locations);
- Automatic fire detection (heat/smoke detectors) – **must** be used for all offices;
- Any other pre-arranged effective means of warning.

Fire-Fighting Equipment

3.2 An adequate and sufficient amount of relevant fire-fighting equipment shall be located throughout lay-down areas, offices and construction sites at designated, prominent "Fire Points" on the following principles:

- 1 per building (or **3000 square feet**);
- For every floor of a building;
- 1 within **50 feet (15.2m)** where more than 5 US Gallons (18.9 liters) of flammable or combustible liquids are being used;
- 1 within **50 feet (15.2m)** where more than 5 pounds (2.3kg) of flammable gases are being used;
- 1 every **75 feet (22.9m)** in open offices and storage yards;
- 1 every flammable or combustible liquids storage area;
- 1 every fuel dispensing or vehicle servicing area;
- For every motorized vehicle or equipment.

3.3 External Fire Points are to be easily identifiable and shaded against the sun to ensure fire extinguishers are not over-charged by the heat.


3.4 Each fire extinguisher shall be replaced immediately after discharge with a fully charged fire extinguisher of the same size and type.

4. Environment

Plants & Undergrowth

4.1 Plants & Undergrowth is to be kept short and removed for a distance of not less than **15m** from:

- Vehicle & Engineering Workshops;
- Bulk fuels, oils & lubricants;
- Fuel dispensing areas
- Gas cylinder storage areas (including LPG).

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Water Supplies

- 4.2 Contractor Project Site Manager or designate is to know the location of the nearest source of fire water mains to the office, lay-down or site areas, and ensure details are kept with security staff that control access to the area (so that in the event of a fire the information can be relayed to emergency services upon arrival).

Offices

- 4.3 There shall be a minimum of **5m** between all temporary buildings and structures.
- 4.4 All offices shall be fitted with smoke detectors and there shall be a “no smoking” policy in all offices.

Stores

- 4.5 All shipping (iso) storage containers that have electrical supplies (lighting, sockets and/or air-conditioning) must be grounded/earthed.
- 4.6 Storage areas shall be kept clean and housekeeping strictly maintained.
- 4.7 Materials shall not be stored in a manner so as to obstruct access to fire prevention/protection equipment (detectors/alarms/panels), fire-fighting equipment, control valves, doors, motors, aisles or hallways that serve as a means of escape.
- 4.8 Aisles and hallways shall be a minimum of **36 inches (91 cm)** wide.
- 4.9 There must be a minimum clearance of **18 inches (46cm)** between materials and sprinkler heads (where fitted).
- 4.10 Materials shall not be stored within **6 feet (1.8m)** of any doorway or opening.
- 4.11 Materials storage shall comply with the separate RRE-HC-HC1-A00-NSP-RRE-HSE-PRO-00028 Storage of Materials Standard.

Vehicles, Sheds, Garages & Workshops

- 4.12 The Standards on RRE-HC-HC1-A00-NSP-RRE-HSE-PRO-00019 Hot Works and RRE-HC-HC1-A00-NSP-RRE-HSE-PRO-00014 Engineering & Vehicle Workshops shall be complied with.
- 4.13 Tires shall not be stored in any location where any type of hot works is to be conducted.

5. Training

- 5.1 All Managers shall ensure on a regular basis that all staff including Contractors, Sub-Contractors, Visitors and Suppliers are made aware of the actions to be taken on the

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outbreak of fire, the method of raising the alarm, the location of assembly points, and the location of fire-fighting equipment.

- 5.2 Contractor shall ensure that on a quarterly basis, training is delivered to all staff on all principles of fire prevention and protection, including emergency escape arrangements.
- 5.3 Contractor shall ensure that an adequate amount of staff is competent to use the fire-fighting equipment provided, and these staff are to form an Initial Response Team for fighting fires.
- 5.4 All Supervisors are to be trained and practiced in emergency escape arrangements.
- 5.5 Staff not trained in the use of fire-fighting equipment are not to attempt to fight fires.

6. Operations

Housekeeping


- 6.1 Accumulation of rubbish and waste materials shall be kept to a minimum, and is to be cleared away at regular intervals, when required, or as a minimum, each day on the cessation of works.

Smoking & Naked Flames

- 6.2 Smoking shall be prohibited within **25m** of all refueling activities, and flammable/combustible stores.
- 6.3 No equipment shall be refueled whilst the engine is still running.
- 6.4 Those involved in refueling operations shall be trained in safe refueling activities and fire-fighting measures.
- 6.5 The use of cellular phones, pagers etc. shall not be permitted during any refueling activities.

Electricity

- 6.6 Electrical installation must be performed by a competent electrician and conform to Kingdom of Saudi Arabia electrical codes and standards for both temporary and permanent electrics. Alterations and additions to wiring or fittings are only to be carried out by a competent electrician.
- 6.7 All electrical equipment must be isolated after working hours or when not in use.
- 6.8 All defective electrical appliances are to be taken out of use until repaired by a competent person.

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- 6.9 All electrical wiring, flexible leads and plugs are to be maintained in a good condition.
- 6.10 All distribution panels and isolation switches are to be securable to prevent unauthorized access.
- 6.11 Mains electrical switches, distribution panels and boards are to be clearly marked, so that identification and traceability of electrical circuits and cables can be conducted.
- 6.12 The use of multi-plug adaptors and home-made extension leads on a construction site are forbidden.
- 6.13 Only plugs compatible with the electrical receptacles (sockets) are permitted.

Gas Appliances

- 6.14 Portable gas appliances shall not be home-made.
- 6.15 Portable gas rings shall be situated at table height on a fire resistant, non-heat conducting surface.
- 6.16 No gas appliances shall be left unattended.

Gas Cylinders

- 6.17 Compressed gas cylinder valves shall be closed whenever:
- Work is finished
 - Cylinders are empty
 - Cylinders are being moved
- 6.18 Gauges will be removed and valve protection caps in place before moving any cylinders, except when cylinders are secured in a carrier designed for such use.
- 6.19 Contractor shall provide cradles/cages for lifting cylinders, and ensure that cylinders being transported are secured in the upright position. Cylinders must never be lifted by rope, chain, slings or magnets. Cylinders must never be dropped when being unloaded or loaded from a vehicle.
- 6.20 Cylinders will not be rolled, dragged or slid. A suitable hand-truck/cylinder trolley shall be supplied suitable for the transportation of cylinders.
- 6.21 Cylinders shall not be placed where they may become part of an electrical circuit.
- 6.22 Cylinders shall not be taken into a confined space.
- 6.23 Cylinders shall be stored in a safe manner. Cylinders shall be segregated by type, full or empty.

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- 6.24 Cylinders are to be stored in a well-ventilated and shaded location, **25m** away from all other flammable stores.
- 6.25 LPG cylinders are to be kept in a separate storage area either **6.1m (20')** away from all other gas cylinders, or a physical barrier a minimum of **5'** high must separate the two.
- 6.26 All cylinders must be protected against shock, especially falling, and high temperature extremes.
- 6.27 All cylinders (unless manufacturer instructions state otherwise – e.g. special gases) must be stored and secured by means of a substantial chain or cable in the upright position, and fitted with valve protection caps.
- 6.28 All cylinder storage areas shall be properly signed, and a “no smoking” policy within **25m** enforced.
- 6.29 All welding and cutting operations shall conform to RRE-HC-HC1-A00-NSP-RRE-HSE-PRO-00019 Hot Works Standard.
- 6.30 A fire extinguisher with a **30lb (13.6 kg)** Class A, B, C rating (as applicable) shall be at the work location for all hot works.

Flammable Liquids

- 6.31 Combustible liquids, including oils & greases, shall be stored in original containers or in storage tanks, labeled with contents and capacity.
- 6.32 Flammable/combustible liquids and solvents are not to be used near ignition sources.
- 6.33 Only approved containers, safety cans and portable tanks shall be used for the storage and handling of flammable and combustible liquids.
- 6.34 Approved, properly labelled storage cabinets (or drums) shall be used to store flammable liquids in excess of **15 US Gallons (57 litres)**.
- 6.35 Permanent fuel storage tanks shall be maintained in a bunded area, with provisions made for the handling of spills and groundwater protection.
- 6.36 All fuel lines shall be equipped with valves capable of stopping the flow of fuel at source, and all piping valves and fittings shall be capable of withstanding working pressures compatible with the type of liquid being stored.
- 6.37 All permanent fuel storage tanks and dispensing units shall be protected against collision damage.

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Maintenance, Inspection & Records

- 6.38 All fire-fighting equipment (prevention and protection) shall be inspected, tested and maintained in accordance with Kingdom of Saudi Arabia legislative requirements, or as a minimum, to International Standards (e.g. NFPA etc.); records shall be kept and made available to Employer or its Representative upon request.

Fire Prevention Checks

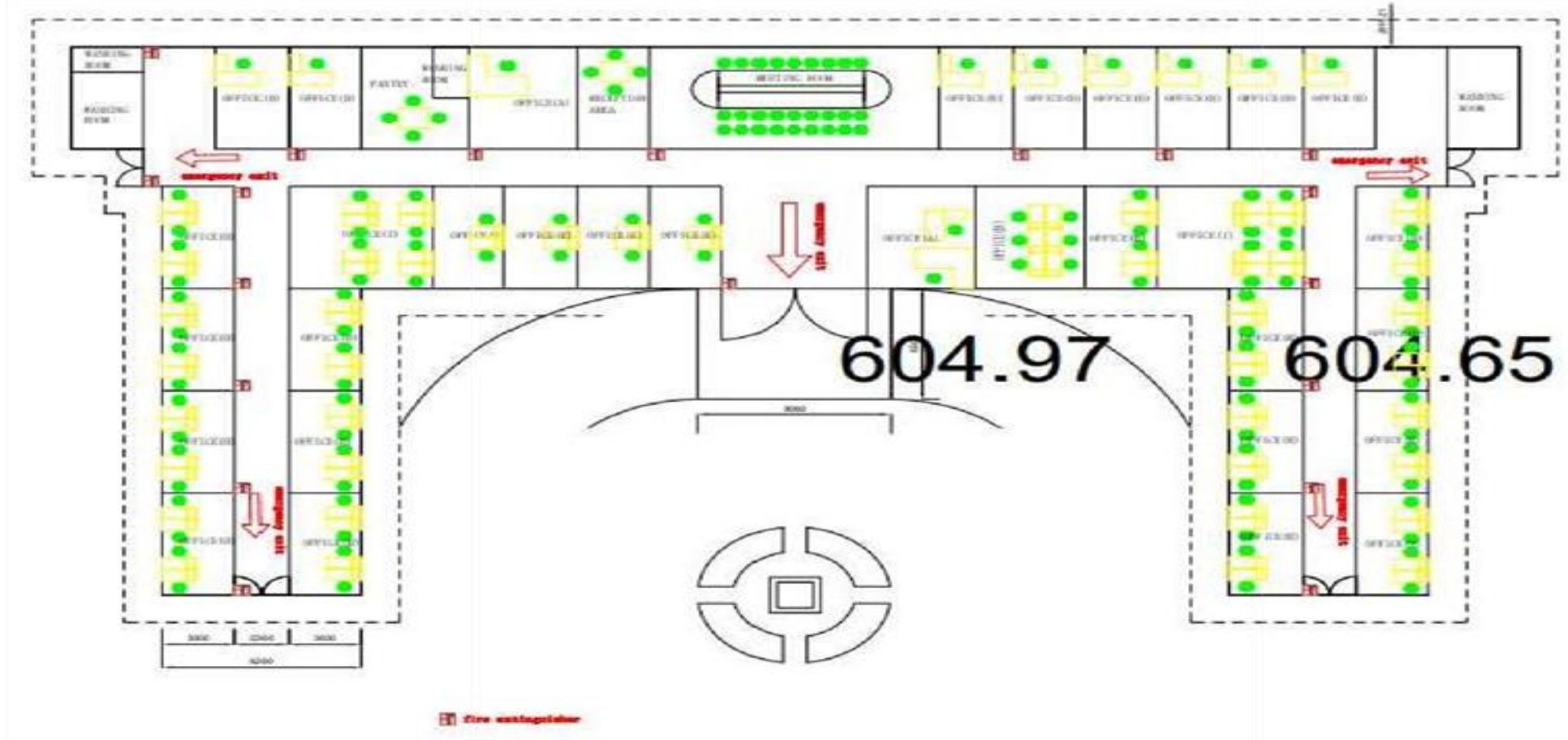
- 6.39 A fire prevention check shall be conducted at cease works on a daily basis, and, if Hot Works have been conducted, **1 hour** after the termination of hot work.

APPENDIX B






















LAYOUTS

PHASE 3-4 Main Office Layout:

CHEC Main Office:



FIRE RISK MAPPING

	Fire Extinguisher DCP		Fire Call Point		Electric Fire Water Pump		Windsock
	Fire Extinguisher CO ₂		Fire Hose Reel		Diesel Fire Water Pump		Smoking Shelter
	First Aid Kit		Fire Hydrant		Jockey Fire Water Pump		Assembly Point
	Fire Exit		Fire Department Connection		Wet Chemical Automatic System		Female Prayer Room
	Evacuation Route		Fire Foam Hose Reel				Male Prayer Room
	Diesel Storage Tank						
	LPG Storage Shelter						

PHASE 3 Site Office Layout:

