Fire Protection, Fire Prevention & Fire / Emergency Control Regulations

2006 Edition

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FIRE PROTECTION, FIRE PREVENTION & FIRE/EMERGENCY CONTROL REGULATIONS

(Preamble)

A) These regulations supersede and repeal the ones embodied in Planning & Construction Regulations for Control of Commercial Developments in Jebel Ali Free Zone Building And General Civil Work Construction Regulations Third Edition – 2003 (Chapter 11). They are now published separately as part of Health, Safety and Fire Regulations; and hence shall be read in conjunction with all relevant provisions [concerning overall authority of EHS, sanctions & penalties and enforcement etc] of the latter.

B) These regulations provide fire protection planning, design, construction, sustainment, restoration and modernization criteria. They will be periodically reviewed, updated and made available to users as part of EHS-Fire Dept's responsibility for providing fire protection criteria & requirements to developers / lessees / licencees.

C) These regulations are distributed electronically through EHS website: www.ehss.ae

D) These regulations are effective from the date of issuance of their current electronic version.

E) Currency of hard/paper copies of these regulations shall be ensured by way of doing minute checks against their current electronic version.

Part 1 - Sections 1 to 21
(Scope)

1. The provisions of these regulations establish minimum fire protection requirements / prescriptive criteria for buildings, facilities or structures within PCFC jurisdiction. The requirements / criteria reflect the need for the protection of life and property while taking into account the assessed risks associated with the buildings, facilities or structures, their contents and *permitted activities. (***Refer to Appendix-1**) and quality assurance and safeguards before, during and after construction.
2. The provisions shall be applicable to all new and all types of existing buildings, facilities or structures and their contents and permitted activities whether considered permanent or temporary, mobile & stationary equipment, waterfront facilities and shore protection for ships within PCFC jurisdiction.
3. The provisions shall also be applicable to construction, alteration, repair, equipment, use and occupancy, maintenance, relocation & demolition of any building, facility or structure or any appurtenances connected or attached to such buildings, facilities or structures within PCFC jurisdiction.
4. The provisions primarily address those construction, protection and occupancy features necessary to minimize danger to life & property.
5. All provisions are based almost on functional requirements and do not encompass detailed dimensional and technical specifications.
6. The provisions are mandatory. Also, all requirements placed hereunder at every Guideline Notes and the ones contained in Appendices to these regulations are mandatory with relation to the principal matter to which they stand as requirements.

7. The provisions shall be used consistently as a mandatory reference document for the development of detailed documents (including scope, basis of design, technical requirements, plans, design drawings & specifications etc.) by the consulting services, including that of fire protection experts / specialists, hired by the developers /lessees / licencees. The provisions shall not be used in lieu of detailed documents that are required to be so developed.

8. Ports, Customs & Free Zone Corporation (PCFC) has adopted by reference National Fire Protection Association (NFPA) USA and its companion Codes, standards and publications including their official definitions, for application of their prescriptive design criteria / requirements within PCFC jurisdiction.

9. The term "Authority Having Jurisdiction (AHJ)" as used in NFPA codes, standards and publications referenced in these regulations indicates the office of responsibility i.e. EHS-Fire Department, as represented by its officers including Vice President/Chief Fire Officer and his deputy for enforcing (i) the requirements of NFPA and its companion codes, standards and publications (ii) provisions of these regulations (iii) requirements of EHS-Fire Department and (iv) applicable statutes and regulations of UAE / Dubai Governments; and Vice President / Chief Fire Office of EHS-Fire Dept is the person who is ultimately responsible to PCFC/EHS management for the enforcement of the foregoing requirements, statutes, rules & regulations and for the delivery of fire, non-fire and emergency medical services (i.e. ambulance services in accordance with DOH protocol).

10. Certain requirements and recommendations [that may not be covered in NFPA codes/publications/standards] that are necessarily recommended by the EHS - Fire Department on a case-by-case basis shall be complied with notwithstanding mere compliance with NFPA codes/publications/standards.

11. In the event of any conflict between the text of the references cited herein in regard to NFPA and its companion codes, standards and publications, the text of the relevant and applicable codes, standards and publications shall take precedence.

12. Omission of any specific references or cross references, in regard to any NFPA and its companion codes, standards and publications, shall not relieve the developers / lessees / licencees of their obligation to complying with such codes, standards and publications having regulatory jurisdiction effect and force.

13. Where the situation and the context warrants, the consultants including fire protection experts / specialists shall be obligated to gather the explicit interpretation of the words of any provisions of these regulations from EHS-Fire Dept / AHJ and not from what they profess it to be when they have translated their self-assumption or intention into requirements.

14. Where appropriate relevant and current statutes and regulations of UAE/Dubai Governments shall be applicable.

15. Equivalencies: (a) Equivalencies to any established prescriptive criteria of NFPA and its companion codes, standards and publications, the provisions of these regulations may be approved by the EHS-Fire Dept / AHJ, if the alternative fire protection engineering design provides an equivalent level of fire protection and life safety. Written requests for approval shall include justification, hazard analysis, criteria used and other pertinent data (b) Lack of funds and time deadlines of projects shall not be considered sufficient justification for deviation from the established criteria requirements and provisions & (c) Approved equivalencies and alternatives shall only apply to the specific building, facility or structure involved in extraordinary case where no technical alternatives exist; and shall not constitute blanket approval for similar cases.

16. Absence of Criteria: (a) When a specific application is not covered by the criteria or the provisions of NFPA codes, standards & publications; other international building codes, recognized industry standards and standard engineering practices shall be followed with prior and express approval of EHS-Fire Department / AHJ. (b) Where appropriate the provision of Section - 15 (Equivalencies) shall apply.

17. Waivers: (a) Written request for waiver to any established prescriptive criteria of NFPA and its companion codes, standards and publications or provisions of these regulations shall be submitted to EHS-Fire Dept/AHJ for determination prior to commencement of building constructions. The same shall demonstrate that the provisions, criteria or requirements cannot be technically executed, or their execution will increase a hazard or create a new hazard and no technical alternatives exist. Written request for waivers shall include justification, hazard analysis, alternatives considered and other pertinent data (b) Lack of funds and time deadlines of projects shall not be considered sufficient justification for deviation from the established criteria, requirements or provisions & (c) Waivers, if given expressly by EHS-Fire Dept / AHJ, shall only apply to the specific building, structure, facility or project involved and shall not constitute blanket approval for similar cases.

18. Insurance: Developers / lessees / licencees are required to have their lands and premises insured against Fire, Explosion and Perils.

19. Existing buildings, facilities or structures: (a) Existing buildings, facilities or structures that meet the requirements of NFPA 101 for existing occupancies do not have to be modified to comply with provisions of these regulations, (b) Buildings, facilities or structures that do not meet the requirements of NFPA 101 for existing facilities shall be brought up to, at least, the minimum requirements, including sprinkler retrofit, for

existing occupancies, (c) If the facility cannot be brought up to the minimum requirements for existing occupancies and a renovation, modernization or rehabilitation project is required, that project shall meet the requirements for new construction as stipulated in these regulations. & (d) any changes in occupancy shall require the building, facility or structure to meet the requirements for new construction for the new occupancy as stipulated in these regulations.

20. Sustainment and Restoration: (a) New work accomplished in existing buildings, facilities or structures as part of repair, restoration and sustainment actions / projects shall meet the requirements for new construction as stipulated in these regulations. Sustainment and restoration efforts shall look beyond the scope of work to ensure that the fire protection, including life safety, features are not being compromised or designed only for the portion of the building, facilities or structure that is being repaired & (b) The repair project, if possible, shall include a basis to support the entire building, facility or structure i.e. if considering providing a fire alarm extender panel to the existing antiquated fire alarm control panel, ensure the panel being provided has the capability to support the entire building facility or structure so that any additional projects can utilize the new panel without having to remove what was just installed.

21. Conversion of use / change of occupancy: (a) When any portion of a building, facility or structure is modified from its current use to that of an inhabited building, facility, structure for one year or more, the building, facility or structure shall meet the requirements for new construction as stipulated in these regulations. Examples would include a warehouse (uninhabited) being converted to administrative (inhabited) use; an inhabited administrative building being converted to uninhabited building, facility or structure; or inhabited building, facility or structure being altered, modernized, modified, rehabilitated or renovated and converted to uninhabited building, facility or structure or vice-versa & (b) When any portion of a building, facility or structure is modified from its current use to any other occupancy use for two years or more, the building, facility or structure shall meet the requirements of new construction as stipulated in these regulations. Changing groups of occupants within the occupancy classification does not constitute an occupancy change. An example of modifying from one occupancy to another would include an office building converted to mercantile. An example of changing groups of occupants would include an installation personnel function occupying the office space formally used by an installation contracting function.

Part 2 – Sections 1 to 4
(Consultancy Services including that of Fire Protection Experts / Specialists and Submittal Requirements For Obtaining Building Permit, Completion Certificate and approvals related thereto and shop drawing approvals & fit out works requirements)

1. The qualified, competent & authorized / approved consultants shall submit the documents and drawings as per **Appendix – 2. (**Refer to Civil Engineering Dept of PCFC for additional information / the current list of such consultants).

2. The Consultants (service providers) executing projects involving fire protection design, fire rated construction, fire detection, fire suppression or life safety systems including evacuation plans shall be required to provide / hire the services and review of a qualified fire protection expert/specialist. Such fire protection expert/specialist shall be an integral part of the design team and shall be involved in every aspect of fire protection design. This shall include, but not limited to, building code analysis, life safety code analysis, design of automatic detection and suppression systems, water supply analysis and a multi-discipline review of the entire project.

3. A qualified fire protection expert /specialist shall be fully conversant with all provisions of these regulations and also meet one of the following conditions: -

   Fire protection expert / specialist within the meaning & context of the provisions of these regulations shall be an engineer having a Bachelor of Science, Advanced Diploma or Master of Science Degree in Fire Protection Engineering from an accredited university engineering program or recognized Fire Engineering Institution of repute plus a minimum of 15 years of work experience dedicated to fire protection engineering including application of NFPA and its companion codes and standards that can be verified with documentation.

   OR

   A registered professional engineer (P.E) in a related engineering discipline who has passed the fire protection engineering written examination administered by an accredited university or recognized Fire Engineering Institutions of repute plus minimum of 10 years of work experience dedicated to fire protection engineering including application of NFPA and its companion codes and standards that can be verified with documentation.

4. EHS-Fire Dept / AHJ reserves the right to approve fire protection experts / specialists.

Guideline Notes: -

i. The consultants shall be solely subject to the laws of the UAE for losses or damages in terms of life and property stemming from design errors, implementation errors, deficiencies of inspections, failure to construct in compliance with the required standards, failure to comply with rules of Professional ethics, failure to use knowledge and experience to the contracting entity, and similar reasons; and successively (severally) liable with the contractors where the consultants have undertaken design control and inspection services on works. The consultants shall be caused to complete and compensate for any such losses or damages pursuant to the laws of the UAE.

ii. EHS-Fire Dept/AHJ, EHS Dept or any other departments of PCFC and their directors, officers & other concerned personnel shall not be held responsible or liable for any such losses or damages, errors, deficiencies and failures on the part of the consultants.

Part 3 – Sections 1 to 3
(Risk Assessment Study)

1. Risk Assessment study shall be mandatory normally for manufacturing & process industries, store places for flammable, combustible and other hazardous liquids, solids & gases, Tank Farms, Spheres, Bullets, Liquid & gas storage tanks, boilers & pressure vessels, gas distribution systems, Petrol, Oil & Chemical distribution systems / pipelines and other special structures.

2. Risk Assessment study shall be carried out and report to that effect shall be submitted to EHS Dept and EHS-Fire Dept by the qualified, competent & authorized / approved consultants (Refer to EHS Dept or EHS-Fire Dept for the current list of such consultants).

3. EHS approved Risk Assessment consultants shall include, but not limited to, the following points in their Risk Assessment/Analysis Report: -

   a) Fire hazard identification.
   b) Severity analysis/Fire & Explosion Index (F & EI) and Toxicity Index (TI). **(Refer to Appendix – 3)**
   c) Mapping areas of risk, risk contours and risk transect
   d) Direct comparison with actuarial data and other risk criteria.
   e) Criteria for assessing maximum release quantity and separation distances / Quantifying dispersion.
   f) Scenario development.
   g) Probability analysis / the chances of fire and explosion.
   h) Risk monitoring (if the risk is acceptable).
   i) Identification of environmental problems that are related to fire protection.
   j) Risk reduction analysis (if the risk is not acceptable) systems & methods and recommendations to prevent and/or reduce them to the acceptable level(s).
   k) Hazard and Operability Study (HAZOP)
   l) Event trees
   m) Case histories where appropriate
   n) Compliance with codes, procedures and regulations including manufacturing requirement & management under ASME code for boilers & pressure vessels.
   o) Toxicity relationships & dense gas dispersion model
   p) Damage from fire and radiant heat
   q) The TNT equivalence
   r) Primary and secondary blasts relationships
   s) Top event frequency estimation
   t) Design & construction procedures
   u) Maintenance Operations
   v) Education & Training of staff
   w) Emergency / Evacuation Plans (on site & off site plans including emergency actions, emergency reporting procedures, evacuation policy, exit maps, procedure for sheltering in place, procedure for people who remain in place, procedure for accounting for all personnel, Rescue and medical tasks and emergency communication plan.)

Guideline notes:

i The scale that measures severity such as death, injuries, property damage, and areas reached by flames shall be specified.

ii Calculations specifying the severity measure used for a particular fire shall be included.

iii Active and passive fire protection measures shall be included.

iv The consultants shall be solely subject to the laws of the UAE for losses or damages in terms of life and property stemming from design errors, implementation errors, deficiencies of inspections, failure to construct in compliance with the required standards, failure to comply with rules of Professional ethics, failure to use knowledge and experience to the contracting entity, and similar reasons; and successively (severally) liable with the contractors where the consultants have undertaken control and inspection services on works. The consultants shall be caused to complete and compensate for any such losses or damages pursuant to the laws of the UAE.

v EHS-Fire Dept/AHJ, EHS Dept or any other departments of PCFC and their directors, officers and other concerned personnel shall not be held responsible or liable for any such losses or damages, errors, deficiencies and failures on the part of the consultants.

Part 4 – Sections 1 to 2
(Plans/Fire Layout Drawings)

1. The plans/Fire Layout Drawings shall cover the following points/details: -
   To be clear and legible.
   a) Necessary/requisite details, point of compass, scale and date.
   b) Indicate limits of boundary wall.
   c) Indicate all buildings/structures/plants, door and window openings, and future expansion/extensions.
   d) Plans for storied buildings/structures/plants shall include plans of each storey and its sectional elevations. Also, the locations of staircases, landing valves/hydrants and fire access details shall be indicated.
   e) Layout of fixed fire fighting installations.
   f) Layout of fire detection & fire alarm systems.
   g) Locations of fire extinguishers, exits & emergency lights/escape lighting luminaries.
   h) Use of fire safety symbols as per NFPA 170.

2. Building plans for special structures and high rise buildings shall indicate the following additional details: -
   a) Access to fire & other emergency vehicles with details of vehicular turning circle and clear motorable access way around the building;
   b) Size (width) of main and alternate staircases along with balcony approach, corridor, ventilated lobby approach;
   c) Location size of fire lift and details of lift enclosures;
   d) Smoke stop lobby / door;
   e) Refuse chutes, refuse chamber, service duct etc;
   f) Vehicular Parking Space;
   g) Refuge area;
   h) Details of Building Services/ Utilities (air conditioning system, dampers, mechanical ventilation system electrical services, gas tanks & gas pipes etc).
   i) Details of exits including provision of ramps, etc for hospitals, advanced medical care facilities & other special risks;
   j) Location of generators, transformers, and switchgear rooms.
   k) Smoke Management System
   l) Location of centralized control connecting detection & fire alarm systems, built-in protection system and public address system including one-and-two way voice communication systems.
   m) Location and dimension of static water storage tank and pump room; and number and capacity of fire pumps.
   n) Location and details of fixed fire protection systems/ installations such as sprinklers, risers, hose reels and inert gas / clean agent fire suppression systems etc;

o) Location and details of first aid and fire fighting equipment.
p) Number of stairwells, Pressurized stairwells.
q) Extent of automatic sprinkler system and its location.
r) Number and location of standpipe system and zone control valves.
s) Contact information for building owners and managers.
t) Buildings height, numbers of stories & building address.
u) Classification of occupancy (i.e. use of building. Residential or mixed use and number of dwelling units.)
v) Passive Fire Protection, rating of door assemblies, partitions/compartmentation etc.
w) Building code analysis (i.e. type of construction, height and area limitations and building separation or exposure protection)
x) Specific compliance with NFPA codes, provisions of these regulations (Compliance & Method Statement) & EHS-Fire Dept. requirements.
y) Interior finish ratings
z) Co-ordination with Civil Engineering, EHS & Security departments.

Guideline notes:

i The site layout shall normally allow for a minimum setback of 5.5 Mtrs. from all boundaries so as to maintain/permit necessary and natural fire break.
ii The building/structure/plant shall be accessible to fire tenders and other emergency vehicles.
iii Unobstructed layout of building/structure/plant for easy fire fighting.
iv Emergency lights/escape lighting luminaries shall be sited near each exit door and at the points where it is necessary to emphasis the position of safety equipment, signs and potential hazards (i.e. near intersection of corridors, exit doors, staircase flights, change of direction, change of floor level, fire fighting equipment, fire alarm call points, outside final exits, lift cars and plant rooms).

Part 5 – Sections 1 to 8)
(Building Design and Life Safety)

1. Classification of Occupancy and Hazards of Contents and Special Operation:

Relevant provisions of NFPA 101, 2006 (Chapter – 6) and of NFPA 5000, 2006 (Chapter – 6) shall apply.

2. Special Structures & High Rise Buildings:-

Relevant Provisions of NFPA 101, 2006 (Chapter – 11) and of NFPA 5000, 2006 (Chapters 32 & 33)) shall apply. Towers, high-rise buildings; water cooling towers; television, microwave and radio transmitting towers; windowless and underground buildings; tunnels; highway and railroad bridges; tents; grandstands; amusement park structures; membrane structures; piers and water surrounded structures used for purposes other than vessel mooring or cargo handling; air-right structures; covered mall buildings and other special structures such as signs and open parking garages are examples of special structures.

Guideline notes:

Refer to **Appendix 4** for Fire Protection / Fire Safety Guidelines For Designing High Rise Buildings

3. Features of Fire Protection and Fire Resistive Materials and Construction: -

a) Every building, facility or structure shall be constructed, arranged, equipped, maintained, and operated to avoid undue danger to the occupants from fire, smoke, fumes, unsafe conditions or resulting panics.

b) Relevant provisions of NFPA 101, 2006 (chapter-8) and of NFPA 5000, 2006 (Chapter-8) shall apply.

Guideline notes:

i Use of fire-resistive barriers to slow spread of fire to large secondary items.
ii Use construction barriers to block fire spread between zones (wall assemblies, ceiling/floor assemblies, barriers between occupied and concealed places, fire-stopping in concealed spaces and exterior barriers to vertical spread between floors).
iii Design doors and windows to block fire spread between zones (Fire door assemblies and window restrictions

to block fire spread between buildings/structures/plants).

iv Separate buildings, facilities or structures enough to prevent fire spread between them.

v Regulate design and operation of systems for heating, venting, and air conditioning to prevent their serving as mechanism to transfer smoke and gases into uncontaminated occupied areas. (This shall also permit shut off of air movement in fires).

vi Plug vertical and horizontal utility openings (pipes, cable ducts, AC ducts and cables) and peep-through (at doors, columns & beams) by suitable fire resistive sealant.

vii Consider compartmentation to contain spread of fire/smoke/heat.

viii Fire retardant treated (FRT) plywood: - FRT plywood shall not be used in any part of the roof or roofing systems. Existing FRT plywood installations shall be regularly inspected for structural integrity. Replacement of damaged FRT plywood may require additional fire protection measures if FRT plywood is to be replaced with more combustible materials.

4. Interior Finish, including floor finish, Contents & Furnishings: -

a) Relevant provisions of NFPA 101, 2006 (Chapter – 10) and of NFPA 5000, 2006 (Chapter – 10) shall apply.

b) Restrict materials used in contents and furnishings to reduce heat release rate and smoke generation rate & to prevent unusual toxic hazard relative to quantity of smoke generated.

c) Add fire retardants to materials to slow growth of heat release rate.

d) Restrict total fuel load to limit contents based in total fuel potential.

e) Restrict linings of rooms to prevent rapid flame spread (Restrict wall coverings, ceiling coverings, and floor coverings).

f) Restrict materials in concealed spaces (Restrict concealed combustibles and concealed space linings).

g) Drop-out ceilings (foam-grid panels) shall not be used.

5. Lifts Fire Lifts / Elevators and Conveying Systems:-

a) New lifts shall be designed in accordance with ASME A 17.1 which includes provisions for a fire lift. Relevant provisions of NFPA 101 (Sections 8.6.8.3, 9.4.3.1, 9.4.2.1, 9.4.5, 9.4.6 & 9.4.7) and of NFPA 5000, 2006 (Chapter – 54) shall apply.

b) All the floors shall be accessible for 24 hours by the lifts. The lifts provided in the buildings shall not be considered as a means of escape in case of emergency.

c) The lift machine room shall be separated and no other machinery shall be installed therein.

d) Lifts designed in accordance with Dubai Municipality standards shall also be approved.

6. Buildings Service and Fire Protection Systems and Equipment:-

a) Relevant provisions of NFPA 101, 2006 (Chapter – 9) and of NFPA 5000, 2006 (Chapter – 55) shall apply.

b) Fire Detection & Fire Alarm Systems: Every building, facility or structure shall be provided with suitable fire detection / alarm systems capable of enabling early detection of fire and warning occupants of the existence of fire. These systems shall be electronically interfaced with PCFC Emergency Control Centre (ECC) monitoring system through a digital communicator.

c) Portable Fire Extinguishers: Every building, facility or structure shall be provided with portable fire extinguishers of types, capacities, numbers, and locations appropriate to the individual building or structure with due regard to the character of its occupancy. All the fire extinguishers shall conform to the standards currently approved by UAE/Civil Defence authorities.

d) Fixed Fire Fighting Installations/Systems: Every building, facility or structure shall be provided with fixed fire fighting installations/systems as required by relevant NFPA codes / EHS - Fire Dept. The fixed fire fighting installations/systems, so recommended, shall mostly include [but not limited to] the following:-

i) Hose Reel.
ii) Sprinkler including Early Suppression Fast Response (ESFR) sprinklers system
iii) Water Spray System
iv) Automatic Smoke/Heat/ Flame/Low Explosive Limit (LEL) Detectors.
v) Smoke and heat ventilation system.
vi) Deluge foam or water sprinkler & foam or water spray systems.
vii) Closed-Head foam water sprinkler system.
viii) Total flooding systems (of appropriate extinguishing agent (s).)

ix) Foam Pourer System.
x) Foam/Water monitors.
xi) Hydrants and Hose Boxes.
xii) Fire Pumps &
xiii) Fire Water Tanks.

Guideline notes:

i. Smoke & Heat Ventilation System: - Smoke & Heat vents shall be considered in buildings where a high rate of heat release is anticipated during a fire. In buildings without automatic sprinklers, smoke and heat vents shall be arranged to operate automatically in accordance with NFPA 204. In buildings with automatic sprinkler protection, smoke and heat vents shall be arranged to operate in the manual mode only. Skylights are the preferred method of providing manual smoke and heat vents. NFPA 92A, NFPA 92B and BS EN 12101 shall be applicable where appropriate.

ii. Water demands for sprinklered buildings, facilities or structures: The water demand required for sprinkler protection shall take into consideration occupancy, discharge density, design area and type of sprinkler system (wet or dry), type of construction and other building features.

iii. Water demands for hose streams: Hose streams shall be needed concurrently with sprinkler discharge in order to effect final extinguishment or to wet down adjacent areas / structures.

iv. Total water demand for sprinklered occupancies: The total water demand for sprinklered occupancies is equal to the sum of the domestic / industrial demand plus the sprinkler system(s) water demand and hose stream(s) demand. The total demand shall be available at the sprinkler system connection to the underground main and at the pressure necessary to produce the required sprinkler density over the required hydraulically most remote area of sprinkler operation.

   Water demand for special facilities, family housing, piled or rack storage, rubber tire storage, flammable & combustible liquid storage shall be determined on the basis of relevant NFPA codes.

v. Water supply pressure requirements: Pressure required for sprinklered buildings, facilities or structures shall be the most demanding pressure of the domestic / industrial demand, sprinkler demand or hose stream demand and shall be determined by hydraulic calculations.

vi. Quantities of water required: Requirements for fire protection water storage shall be based on the assumption that there will be only one fire at a time. The quantity of water required shall be equal to the product of the fire protection water demand and the required duration. This quantity represents fire protection requirements only and shall be available at all times. Water supply for domestic, industrial and other demands shall be added to these requirements to determine the total amount of water that is necessary at the building, facility or structure. The water storage shall be self replenishing. It shall reach required volume during normal consumption within 48 hours and within 24 hours curtailing normal consumption.

vii. The pumps: Pumps shall have adequate capacity with reliable power and water supply. They shall conform to the requirements of NFPA 20. Fire pumps, drivers and other equipment including automatic accessories shall be listed by UL, approved by FM or listed or classified by NRTL. Fire pumps shall be located in a detached, noncombustible pump house or located in a 2-hours fire rated room with direct access from the exterior. A secondary fire pump shall be provided when the water supply cannot support 25% of the sprinklers in the hydraulically most remote design area with the primary fire pump out-of-service.

viii. Fire Mains: Use of fire mains for the services like irrigation, process & domestic purposes shall not be permitted.

   Pressure-Regulating Valves (PRVs): PRVs are restricted in use on fire protection water systems. Where essential, PRVs shall be installed on individual service rather than on main piping. Where PRVs are provided in distribution mains supplying systems or portions of systems with fire hydrants, automatic sprinkler systems or other installed fire protection, the following features shall be provided to safeguard against failures and to facilitate maintenance:-

   a) Control valves on each side of the PRVs.
   b) Bypass around PRVs.

ix. Foam Systems: Foam installations shall be in accordance with NFPA 11 , NFPA 11A and NFPA 16. For more information refer to the NFPA Fire Protection Handbook and FM Global Data Sheets.

x. Dry Chemical Extinguishing Systems: Dry chemical extinguishing systems shall conform to NFPA 17. Dry chemical agents shall not be used protect sensitive electronics. Dry chemical extinguishing systems are no longer UL listed or FM approved for the protection of cooking equipment.

xi. Carbon Dioxide Systems: Carbon dioxide systems shall conform to NFPA 12.

xii. Wet Chemicals Extinguishing Systems: Wet Chemical Systems shall conform to NPFA 17 A.

xiii. Clean Agent Fire Extinguishing Systems: Clean agent fire extinguishing systems shall conform to NFPA 2001. Clean agent fire extinguishing systems shall not be installed as a substitute for required automatic sprinkler systems.

xiv. Water Mist Fire Protection Systems: Water mist fire protection systems shall conform to NFPA 750. Water mist fire protection systems shall not be installed as a substitute for required automatic sprinkler systems.

xv. Emergency Warning System shall include both: audible and visual alarms.

7. Means of Access / Accessibility: -

a) Relevant provisions of NFPA 5000, 2006 (Chapter-12) shall apply.
b) No building, facility or structure shall be erected so as to deprive any other building of the means of access.

c) The approach road to the building and open spaces on its all sides up to 6m width and the layout for the same shall be done in consultation with EHS-Fire Department and the same shall be of all-weather ground access hard surface capable of taking the weight of the heaviest fire vehicle available with Fire Dept. /Civil Defence Authority (Refer to EHS-Fire Dept. for the current information).

d) Main entrances to the premises shall be of adequate width to allow easy access to the fire vehicles and in no case it shall measure less than 5 meters. The entrance gate shall fold back against the compound wall of the premises, thus leaving the exterior access way within the plot free for movement of the Fire/ Civil Defence Vehicles. If archway is provided over the main entrance, the height of the archway shall not be at a height less that 4 m.

e) Any locking device controlling vehicle access shall be under control of 24 hour security personnel located at the specific facility.

f) Buildings, facilities or structures with fire department connections for sprinkler or standpipe systems shall be provided with suitable all-weather ground access surface for pumper apparatus within 45m of such fire department connections.

g) The provisions of Part 5 – Section 5 of these regulations shall be complied with.

8. Means of Egress:

a) Every building, facility or structure shall be provided with safest means of egress and other safeguards of kinds, numbers, locations and capacities appropriate to the individual building or structure with due regard to type of occupancy, the capabilities of the occupants, number of persons exposed, the fire protection available, the type of construction of the building or structure and other factors necessary to provide all occupants with a reasonable degree of safety. The requisite number and size of various exits shall be provided based on the population in each room, area and floor based on the occupant load, capacity of exits, travel distance and height of buildings. (Refer to **Appendix – 5**)

b) Adequate means of egress shall be provided in every building, facility or structure, where the size, area of occupancy and other arrangements [that are likely to endanger the occupants attempting to use a single means of egress] are blocked by fire or smoke. All such means of egress shall be so arranged to minimize the possibility of theirs being rendered impassable by the same emergency conditions.

c) Every exit stairway and other vertical openings between floors of a building, facility or structure shall be suitably enclosed or protected as necessary to afford reasonable safety to occupants while using the means of egress and to prevent the spread of fire, smoke or fumes through the vertical openings from floor to floor before the occupants have reached the nearest exit.

d) Exits shall be so arranged that they may be reached without passing through another occupied unit except in case of residential buildings.

e) Means of egress component shall comply with NFPA 101, 2006 (Chapter – 7) and of NFPA 5000, 2006 (Chapter – 11).

f) The population in rooms, areas of floors shall be calculated based on the occupant load factors given in the **Appendix-6** to these regulations.

g) Common path, Dead-End and Travel Distance limits etc. shall comply with **Appendix-7** to these regulations.

h) Illumination of means of Egress shall be provided in accordance with NFPA 101 (Section 7.8) for every building and structure where required in chapter 11 through chapter 42.

i) Emergency lighting facilities for means of egress shall be provided in accordance with NFPA 101 (Section 7.9) for the buildings and structures where required in chapter 11 through chapter 42.

j) Walking surfaces in means of egress shall comply with sections 11.7.6.2 through 11.1.6.4 of NFPA 5000, 2006.

k) Every ramp used as a component in means of egress shall conform to the general requirements of section 11.1 and to the requirements of 11.2.5 of NFPA 5000, 2006.

l) Areas of refuge shall conform to section 11.2.12 of NFPA 5000, 2006.

m) Slid Escapes shall be permitted as a component in a means of egress where permitted in chapter 16 through 30 of NFPA 5000, 2006.

n) Locks, latches, alarm devices, delayed egress locks, access controlled egress doors, Panic hardware, Fire exit hardware, Self closing devices, Powered doors, revolving doors, turnstiles, doors in folding partitions, balanced doors, horizontal sliding doors, stairs, curved stairs, spiral stairs, winders, landings, guards, handrails, bridges and balconies etc shall comply with relevant sections of NFPA 5000, 2006 & NPFA 101, 2006.

o) Corridors: Egress corridors shall not be used as a portion of a supply, return or exhaust air system serving adjoining areas. Air transfer opening(s) shall not be permitted in walls or in doors separating egress corridors from adjoining areas. Exception: Toilet rooms, bath rooms, shower rooms, sink closets and similar auxiliary spaces opening directly onto the egress corridor.

p) Stairways: Stairs shall be constructed of concrete, steel or a combination of two. Wood construction shall not be used. Treads shall be provided with nonskid nosings or an integral abrasive in eh tread surface. Stairways that are part of the egress pattern shall have widths, run lengths, landings, treads, risers, handrails, guardrails, headroom, door sizes, door swings, door ratings, interior finishes, windows and other openings in accordance with NFPA 101 and NFPA 80.

Guideline notes:

i Exit shall be either of horizontal or vertical type. An exit may be doorway, corridor and passageways to an internal staircase or external staircase, ramps or to verandah or terraces which have access to the street or to roof of a building. An exit leading to an adjoining building at the same level.

ii Doors of small individual rooms such as offices are not considered as exits unless they actually lead directly to the open air.

iii Doors of large rooms are considered to be exits.

iv An interior passageway does not become part of an exit until it is enclosed as a fire compartment with at least half an hour fire resistance.

v Where an external stairway exists it shall be ensured that the use of it at the time of fire is not prejudiced by smoke and flame issuing from openings (e.g. Windows, doors) in the external face of the building.

vi Internal stairways [as means of escape/egress] shall be suitably enclosed or protected as necessary to afford reasonable safety to occupants and to prevent spread of fire, smoke or fumes through the vertical stairway opening.

vii Lifts, escalators, and revolving doors not to be considered as “EXITS.”

viii Adequate capacity of all escapes route paths/passageways.

ix Protection for escape paths/passageways:-

a) Mark/signpost.
b) Mark exit paths/passageways clearly and light them.
c) Restrict fuel loads and finishes in exit paths/passageways.
d) Enclose stairways.

x Use construction barriers to keep fire out.

xi Use smoke control methods to protect atmosphere in exit paths.

xii Escape to outside or to protected place or adequate defense of places where occupants should remain.

xiii Avoidance of makeshift security arrangements.

xiv Escape routes shall be lighted in such a manner that they can be used in a fire when a failure of a local electrical circuit is probable.

xv Escape lighting shall be distinguished from the Emergency lighting which might be provided, on failure of a mains supply, by a standby generator. Such emergency lighting probably will not function in a fire due to local circuit failure and escape lighting shall be provided by self contained fittings which are capable of running for a set period of time. The provisions of NFPA 70 (Article 700) shall be complied with.

xvi Escape lightings shall be provided / sited at but not limited to the following: -

a) Each Exit Door.
b) Near Each Staircase So Each Flight Receives Direct Light.
c) Each Other Change of Floor.
d) Near Changes of Direction.
e) Near Each Intersection.
f) Near Each Fire Alarm Call Point.
g) Near Fire Fighting Equipment.
h) Outside Each Final Exit and Close to it.
i) Lift Cars.
j) Plant Rooms.

Escape lightings shall also be provided to illuminate exits and safety signs.

xvii Egress lights are fixtures connected to normal power supply systems and are to functions at all times when the building is occupied.

xviii Emergency lights or stand-by lights are normally battery-type emergency unit equipment that provide no illumination until failure of the egress lighting circuit. These units serve as a backup for egress lights.

xix The colour of the exit signs shall be green.

Part 6 – Sections 1 to 19 (Miscellaneous)

1. Criteria for storage configuration for JAFZA PBUs / LIUs. (Refer to Appendix -8)

2. Hazardous Area Protection concerning Assembly Occupancies, Hotels and Dormitories:-

Relevant provisions of NFPA 5000, 2006 (Sections 16.3.2.1.1 & 24.3.2.1) and NFPA 101 shall apply.

3. Building Rehabilitation

Relevant provision of NFPA 5000, 2006 (Chapter – 15) dealing with repair, renovation, modification, reconstruction, change of use and change of occupancy classification, addition, damaged or unsafe buildings, historic buildings & structures etc. shall apply.

4. Safeguards During Construction

a) Relevant provisions of NFPA 5000, 2006 (Chapter – 14) NFPA 241, NFPA 70 & NFPA 1 dealing with safeguarding construction, alteration, demolition operations, protection of utilities, temporary light & power and use of explosives etc. shall apply. **(Refer to Appendix-9)**

b) Stop work: The consultants and the main contractors shall be responsible for ensuring that the construction of buildings, facilities or structures is carried out in compliance with the required standards. They shall immediately stop the work when contrary is observed in order to (i) correct any deviation from the requirements of EHS-Fire Dept./ AHJ and (ii) correct or abate an unsafe condition posing significant risk of fire, explosion or accident.

c) The construction work that is not in conformance with the requirements of EHS-Fire Dept. / AHJ shall be subject to rectification which may include stoppage of the work and demolition.

d) Removal of Construction Debris: - The consultants, Contractors & Sub-contractors shall ensure that all hazardous, Combustible and flammable construction debris are removed regularly from construction site and disposed of in accordance with the requirement of EHS Dept.

5. Temporary buildings, facilities or structures at construction sites for the use of offices and labour accommodation:

a) Written request for approval of construction of temporary buildings, facilities or structures at construction sites shall be submitted to EHS-Fire Dept.

b) EHS-Fire Dept reserves the right to approve such buildings, facilities or structures.

(Refer to Appendix – 10).

6. Covered temporary structures – Enclosed tents normally used for events/activities such as stage shows, concerts, circus, exhibitions, trade fairs, sporting events & celebratory functions:

a) Written request for approval for construction of temporary structures shall be submitted to EHS-Fire Dept.

b) EHS-Fire Dept reserves the right to approve such structures.

(Refer to Appendix – 11)

7. Marinas and Boatyards:

Relevant provisions of NFPA 303 shall apply.

8. Marine Terminals, Piers and Wharves:

Relevant provisions of NFPA 307 shall apply.

9. Quality Assurance During Construction

Relevant provisions of NFPA 5000, 2006 (Chapter-40) shall apply.

Guideline Note:

Relevant chapters of NFPA 5000, 2006 dealing with energy efficiency, Elevators and conveying system, Plumbing system, Exterior wall construction, Interior Environment, High Hazard Contents, Structural Design; Soils, Foundations and Retaining Walls, Roof Assemblies and Roof Structures, Floor-Resistant Design & construction, Encroachments into the public Right-of-way, concrete, Aluminium, Masonry, Steel, Wood Glass and Glazing; Gypsum Board, Lath and Plaster and Plastics shall apply.

10. Performance Based Fire Safety Design:-

a) Relevant provisions of NFPA 101, 2006 (Chapter -5) and of NFPA 5000, 2006 (Chapter – 5) shall apply.

b) Performance-based fire safety design methods shall be applied to the renovation, restoration, remodeling or modernization of existing facilities to address the evaluation of a sub system, system or complete building when it is not possible to meet the provided prescriptive requirements for new construction.

c) New buildings, facilities or structures for which established prescriptive NFPA code criteria exist shall not be permitted to use performance-based fire and life safety design methods.

d) Performance-based fire safety design methods may be permitted by EHS-Fire Dept / AHJ for unique facilities where the user mandates requirements and objectives that are not addressed by established prescriptive requirements of NFPA codes or these regulations.

e) Performance-based fire safety design methods shall not be used to eliminate required exiting requirements nor shall it be used to eliminate automatic sprinkler systems required by relevant NFPA codes.

f) Performance-based fire safety design report shall be prepared by the concerned fire protection expert / specialist indicating that the building, facility or structure was designed using a performance-based fire safety design approach as may permitted by EHS-Fire Dept / AHJ. It shall convey the expected hazards, risks and system performance over the entire building life-cycle. It shall also include the project scope, design goals and objectives, performance criteria, design fire scenarios, critical design assumptions, critical design features, final design, design engineer's qualifications & capabilities and data and evaluation method references.

11. Standby Power

a) A stand-by emergency / electric generator shall be installed to provide power to staircase, emergency lighting systems fire lifts, fire pumps, pressurization fan and blowers, smoke extraction and damper system in case of failure of normal electrical supply. The generator shall be capable of taking starting current of all the machines and circuits stated above simultaneously.

b) Relevant provisions of NFPA 101, 110 & NFPA 111 shall apply.

12. Basements

a) Relevant provisions of NFPA 5000, 2006 (Section 7.4.2.2, 4.2, 3.3.50, 3.3.50.1, 39.2.2, 7.4.3.6.5, 7.4.3.6.6, 30.8.3.5.2 & 55.3.1.7) shall apply. Also, sections 42.7.4, 42.7.4.2, and 42.8 through 42.9 concerning underground spaces shall apply.

b) The basement shall not be normally used for residential purposes.

c) The access to the basement shall be separate from the main and alternate staircase providing access and exit from higher floors. Where the staircase is in continuous the same shall be of enclosed type serving as a fire separation from the basement floor and higher floors. Open ramps shall be permitted if they are constructed within the building line subject to the condition that adequate arrangements are made to prevent entry of surface drainage into the basement.

d) Each basement shall be separately ventilated. The standard of ventilation shall be the same as required by the particular occupancy or relevant NFPA codes. Any deficiency shall be met by providing adequate mechanical ventilation in the form of blowers, exhaust fans, air conditioning systems etc.

e) The basement shall not be partitioned.

13. Electrical Services / Systems:-

a) Relevant provisions of NFPA 5000, 2006 (Chapter – 52) shall apply.

b) The electrical distribution cables / wiring shall be laid in separate duct. The duct shall be sealed at every floor with non-combustible materials having the same fire resistance as that of the duct.

c) Water mains, telephone lines, gas pipes or any other service line shall not be laid in the duct for electrical cables.

d) Separate circuits for fire and other pumps, water pumps, lifts, staircases, and corridor lighting and pressurizing system shall be provided directly from the main switchgear panel.

e) All electrical services shall be subject to DEWA approval.

14. Mechanical System: -

Relevant provisions of NFPA 5000, 2006 (Chapter-50) shall apply.

15. Air Conditioning, Ventilation & Smoke Management Systems

a) Warm Air Heating and Air Conditioning systems shall comply with **NFPA – 90 B** for following occupancies :
   i) One - or two- family dwellings or
   ii) Serve spaces not exceeding 708 Cu. M.

b) Installation of Air Conditioning systems shall comply with **NFPA – 90 A** for following occupancies :
   i) Serve Buildings of Types III , IV and V construction of height over 3 stories
   ii) Serve spaces exceeding 708 Cu. M .

c) Smoke Extract Systems shall comply with **NFPA – 91.**

d) Smoke Control Systems shall comply with **NFPA – 92A**.

e) Smoke Management Systems shall comply with **NFPA – 92B.**
(**Refer to Appendix – 12**)

16. Transformers:

Indoor and outdoor transformers shall be installed and located in accordance with the requirements / standards of Dubai Electricity and Water Authority (DEWA)

17. Stationery Combustion Engines, Gas Turbines and Generators:

Engines, gas turbines and generators shall be installed in accordance with the requirement of NFPA 37.

18. Gas Service:

Gas service mains shall be installed in accordance with the requirements of NFPA 54 and NFPA 58 Gas Service mains shall not be permitted within the perimeter of foundation lines. Natural draft cross ventilation for building crawl spaces containing gas service piping shall be provided. Supply connections from the gas service mains above grade outside the foundation wall shall be raised and passed through a full swing joint or loop of metallic tubing before entering the building. This will avoid pipe rupture in the event of differential settlement or earthquake. Pressure regulators shall be located outside of buildings or vent to the outside.

19. Signboards and Nameplates for Company Premises:

a) Developers / lessess / licencees are required to erect suitable signboards on their premises for which they are responsible. The design, size, colouring and location of the signboard shall be approved by PCFC Civil Engg department.

b) Self-illuminated signs (e.g. Neon) are not normally permitted.

c) Written request for installation of self-illuminated signs, where justified, shall be submitted to EHS-Fire Dept.

d) EHS-Fire Dept reserves right to approve self-illuminated /neon signs.

e) Signboards are not required for Office Lessees. However, Office Lessees are required to have a Nameplate installed, manufactured from 3mm thick Basss and grad conforming to American standard ASTM B26.This shall be located externally, adjacent to the office entrance.

f) In the event of relocating / vacating premises, all sign boards and nameplates shall be transferred / removed by the developers / lessess / licencees.

Part 7 – Sections 1 to 17
(Fire Prevention)

1. All developers, lessees and licensees shall be responsible for implementation of appropriate/necessary fire preventive measures, including housekeeping, at work places to prevent the outbreak of fires or explosions that could result in loss of valuable lives and property. The fire preventive measures shall include but not limited to precautions against (i) sources of ignition including heat transfer (ii) lightning (iii) spontaneous combustion (iv) explosions (v) flammable/combustible dusts, gases and vapours and wastes (vi) hazardous processes viz. Welding, cutting, grinding, blasting, chipping, scrapping etc. (vii) naked lights and flames (viii) hazardous chemicals posing flammability risks and prevention of fire spreading.

2. Relevant provisions of NFPA Fire Prevention code & NFPA Fire Prevention code Handbook shall apply.

3. Relevant provisions of NFPA 303, Marinas and Boatyards, NFPA 307 Marina Terminals, Piers and Wharves and ISGOT (International Safety Guide for Oil Tankers & Terminals) shall apply where appropriate.

4. Cooking in the rooms of accommodation complexes in Free Zones & Economic Zones (other than the Senior Blocks where kitchen are provided) is prohibited.

5. Relevant provisions of DPA Oil & Chemical Pollution Plan shall apply.

6. Fire works displays and burning of fire crackers are prohibited; except for official events of PCFC subject to compliance with established protocols, SOPs and precautionary measures.

7. Setting of recreational fire is prohibited; except for setting of small fire related to religious ceremonies for which written permission shall be obtained from EHS-Fire Dept. EHS-Fire reserves the right to permit setting of such fire.

8. Setting of outdoor or indoor fire (including burning of wastes / rubbish) is prohibited; except for permitted fire places and fire training facilities.

9. The act of setting fire willfully (i.e. an arson/incendiarism crime) is punishable and subject to Articles 304, 305, 306, 307 and 308 of the Penal Code for UAE. Developers / lessees / lincences shall ensure compliance with but not limited to the following measures to prevent the crime of arson / incendiarism: -
   a) Keep doors and windows locked when a building is unoccupied.
   b) Store all flammable liquids such as paints, gasoline and mowers in an approved storage location: locked cabinets, locked storage units, and locked garages.
   c) Report suspicious activity to the Police (999) or PCFC Security (8832200)
   d) If an arson / incendiarism crime has been committed or suspected to have been committed or suspected to be committed; and the suspect or the perpetrator of the crime is known, report the matter to the police (999), EHS Fire Department (8833111) or PCFC Security (8832200)

10. Developers / lessees / licencees shall comply with relevant provisions of NFPA 51B Fire Prevention During Welding, Cutting and Other Hot Work for carrying out hot work. Hot work permit procedures established by EHS Dept shall also be complied with where applicable.

11. In preparation of a space for hot work and to determine the nature and the extent of the hot work shipyard/ship repair personnel shall comply with but not limited to the following requirements as per NFPA 306: -

a) Determine the nature and the extent of the hot work.
b) Determine the nature of other operations in or adjacent to the space that may affecting hot work (such as painting and cleaning).
c) Determine the cargo history, the last three cargos held in work space and adjacent spaces.
d) Secure pipelines and other equipment (heating coils, pumps, etc.) in the work space to prevent flammable or toxic materials from being discharged into the space.
e) Make space "Safe for Workers", including spaces for entry & work, installing appropriate illumination, means of access (such as ladders), staging, etc.
f) Post warning signs as appropriate.
g) Install appropriate hot work ventilation.
h) Before use, ensure that welding and burning equipment is properly grounded, inspected, and installed.
i) Ensure that adequate fire protection is available.
j) Ensure that flammable, combustible, or toxic coatings (preservative coatings or insulation) have been removed from hot work surfaces.
    i) A shipyard competent person shall perform testing on any surface of which the flammability is not known.
    ii) Soft and greasy coatings shall be adequately stripped back.
    iii) Toxic preservative coatings shall be stripped back at least 4 inches, otherwise airline respirators shall be used.
k) Ensure that flammable and/or combustible materials (such as trash, rags, open containers of solvents, etc) have been removed from the area.
l) Ensure that flammable, combustible, or toxic cargo residues have been removed or are adequately covered.
m) Ensure that all movable fire hazards including residues of combustible bulk cargoes in the vicinity have been removed from the hot work area.
n) Ensure ventilation is adequate to maintain a safe atmosphere during hot work.
o) Ensure that adjacent spaces have been inspected and meet requirements for hot work.
    i) In lieu of cleaning, adjacent spaces can be inerted.

12. Relevant provisions of NFPA 70 (dealing with electrical fire safety i.e. a zone hazardous area classification for reducing the risk of fire and electric shock hazards etc) shall apply. Fire risk prohibition safety signs to identify areas where smoking, naked flames, smouldering and glowing fires are prohibited shall be displayed in such classified areas conspicuously to avoid fire ignition or explosion.

13. No objection certificate (NOC) for building demolition may be issued by EHS-Fire Dept subject to compliance with but not limited to the following conditions: -
    a) Prior to commencement of demolition, removal of potentially hazardous building components (hazardous waste consisted of toxic, flammable & combustible materials) for disposal or recycling shall be done with express permission from EHS Dept.

    b) Demolition work/activities shall be done in such a manner that the hazards from fire and explosion are minimized.

    c) A fire watch shall be provided throughout to watch for fires, make use of portable fire extinguishers or fire hose and perform similar fire prevention & protection duties.

    d) Special precautions shall be taken when demolition work is being done in areas where floors are soaked with oil or other flammable liquid or where combustible insulation may be present in floors, walls or ceilings/roofs where hot work is being done.

    e) Access to utilities including fire hydrants shall be kept unobstructed during demolition.

    f) All utilities, including gas, electric, water, telephone and cable shall be properly disconnected prior to commencement of demolition.

    g) Except for the owner, no person shall enter the demolition site/premises unless authorized to perform inspections, repairs or to demolish and remove the building/structure.

    h) Demolition contractor and his personnel at the site shall have a direct method of notifying Fire Dept (8833111) in the event of an emergency.

i) Relevant provisions of NFPA 5000, 2006 (Chapter-14) NFPA 241, NFPA 70 & NFPA 1 shall apply where appropriate (Refer to section 4 of part 6 of these regulations).

14. Developers, lessees and licencees shall also ensure compliance with but not limited to the following DOs and Don'ts at work places: -

a) Do not smoke in forbidden areas or in the areas not designated for smoking.
b) Do not cook food in forbidden areas or in the areas not designated for cooking food.
c) Avoid careless disposal of burning cigarette butts.
d) Check ashtrays for smouldering cigarettes or other combustibles before closing down.
e) Do not let papers, rags or other rubbish accumulate at place of work.
f) Use proper containers for flammable liquids, and not open tins or buckets.
g) Handle flammable liquids at a safe distance from possible sources of ignition.
h) Check before and after using blow lamps welding/cutting equipment.
i) Do not overload electrical circuits.
j) Switch off from mains any electrical equipment when not in use.
k) Check electrical cables, plug sockets, for damage/fraying.
l) Wipe out spilled oil, grease or liquids.
m) Store tools safely when not in use.
n) Clear up turnings, chips or off-cuts.
o) Use metal containers for oily or greasy rags, scraps and waste
p) Do not leave rubbish lying out.
q) Do not hang clothing over or near heating element
r) Avoid welding near flammable materials.
s) When welding near flammable materials, beware of flying sparks and hot slag, keep fire extinguishers standby during welding/cutting work and check the area before leaving.
t) Keep compressed gas cylinders away from sun, artificial heating, flammable materials, corrosive chemicals and fumes.
u) Do not obstruct access to Fire Extinguishers.
v) Make sure that you know the escape routes in case of fire.
w) Keep fire escapes exits unobstructed.
x) Ensure that all fire protection facilities are inspected / maintained / serviced – Hose Reels (monthly), Fire Extinguishers and Fire Detector/Alarm System (quarterly).
y) Ensure that employees are trained in the use of Fire fighting equipment, Fire Action and Evacuation yearly basis.

15. All set-back areas, exits, exit access paths, staircases, fire routes and fire access paths shall be kept free of any obstructions, combustibles and flammables. Any objects or items, combustibles and flammables occupying set-back areas or obstructing exits, exit access paths, staircases, fire routes and fire access paths shall be removed without prior notice by EHS-Fire Dept at the expenses of the concerned developers, lessees and licencees.

16. EHS-Fire Dept officers including Vice President/Chief Fire Officer and his deputy are authorized to enter and inspect, at all reasonable times, land and premises for the purposes of assessing fire safety (i.e. safety from the risk that a fire, if started, would seriously endanger the health and safety of any person or the quality of the natural environment). They may (i) examine a document or other thing that is relevant to the inspection (ii) demand the production for inspection of a document or other thing that is relevant to the inspection (iii) remove anything that is relevant to the inspection for review and examination and remove any document that is relevant to the inspection for review and copying (iv) conduct tests, take and remove samples, take photographs and make videotapes and other images, electronic or otherwise, that are relevant to the inspection & (v) question a person or persons on matters relevant to inspection. If they demand that a document or other thing be produced for inspection, the person who has the custody of the document or thing shall produce it and, in the case of a document, shall on request provide any assistance that is reasonably necessary to interpret the document or to produce it in a readable form. A document or thing that has been removed from land or premises shall be made available to the person from whom it was removed on request and at a time and place that are convenient for the person and for the EHS-Fire Dept officers; and shall if it is possible, to return the document or thing to the person, be returned within a reasonable time.

17. Incident of Fire/explosion taking place in the premises of developers, lessees and licensees shall be reported in the prescribed format **(Refer to EHS Dept)**. Investigation into the cause thereof shall be carried out by EHS-Fire Dept with the objective of implementing and/or enforcing appropriate and necessary corrective and preventive measures.

Part 8 – Sections 1 to 21
(Fire/Emergency Control)

1. All developers, lessees and licencees shall implement appropriate fire control measures in accordance with relevant provisions of these regulations.

2. Fire Emergency/Evacuation plan shall be in place and it shall be rehearsed/drilled at least annually. The plan shall be co-ordinate with PCFC Emergency Management Procedures / DPA Marine Emergency Plan (where appropriate) and updated suitably as may be necessitated by the changed requirements. The defined scope of work for developing site specific evacuation plan shall include but not limited to the following aspects / points: -

a) Emergency Actions
b) Plan Description
c) Process
d) Emergency Reporting Procedures
e) Alarm-system Description
f) Evacuation Policy
g) Exit Maps or Diagrams
h) Emergency Plan Training
i) Procedure for Sheltering in place
j) Procedure People who remain in place
k) Procedure for Accounting for all personnel
l) Rescue and Medical Tasks
m) Emergency Communication Plan

3. It shall be ensured that employees are trained & certified in the use of Fire fighting equipment, Fire actions and Evacuation annually through approved fire training facility / institution. (**Refer to Appendix 13)**

4. Every vertical way of exit and other vertical opening between floors of a building shall be suitably enclosed or protected, as necessary, to afford reasonable safety to occupants while using exits and to prevent spread of fire, smoke or fumes through vertical openings from floor to floor before occupants have entered exits.

5. In every building, facility or structure, adequate and suitable portable fire extinguishers shall be provided to extinguish a minor fire. Also, every vehicle or mobile equipment such as forklift, crane and other similar ones shall be equipped with a fire extinguisher to extinguish a minor fire.

6. EHS-Fire Dept shall be notified in writing of temporary shutdown or disablement of any fire protection system or installation against which implementation of appropriate countermeasures is necessary. Such countermeasures shall be recommended by EHS-Fire Dept for implementation by the concerned lessee/licencee.

7. Action to be taken in case of fire.

a) Raise Alarm – By actuating Fire Alarm System or by shouting FIRE……FIRE…….FIRE…..
b) Attack the fire – By using available Fire Extinguishers, if possible.
c) Inform PCFC Fire Emergency Control Room (Tel : 8833111).
d) Evacuate building and assemble outside in case the fire is going out of control. (Senior officer present to take charge, direct the evacuation and account for all occupants of the building).
e) Do not re-enter the building until declared safe by EHS–Fire Department.

Note: Actions i to iii shall be taken to avoid delays

8. No parking of vehicles or trailers is permitted along fire routes / fire access paths / set-back areas. Vehicles or trailers parked or left along any of the fire routes / fire access paths / set-back areas shall be removed without any/prior notice by EHS-Fire Dept at the expenses of the owners of such vehicles or trailers.

9. All set-back areas shall be kept free from/of obstructions, combustibles and flammables to maintain necessary and natural fire break.

10. All buildings, facilities or structures shall be accessible to fire and other emergency vehicles.

11. Relevant provisions of PCFC Emergency Management Procedures and DPA Marine Emergency Plan shall apply.

12. All PCFC Security/DSS and Dubai Police personnel are authorized to aid/assist EHS-Fire Dept personnel (Fire Fighting & Ambulance staff and officers including Vice President/Chief Fire Officer and his deputy) in the

execution of their duties so that any measures that may appear to be expedient for the protection of life and property can be taken speedily. They may barricade the fire scene and also close any road/street in or near which the fire scene exists; and remove any persons [be they PCFC or non-PCFC employees/personnel] who, by their presence, behavior and actions, may interfere with the operations of EHS-Fire Department.

13. Licensees of custom-built premises shall ensure that effective Fire Protection Systems including automatic fire detection and alarm systems, complying with the requirements of EHS-Fire Dept / AHJ (refer to EHS-Fire Department for details), are installed and that the dedicated telephone connection is also made to the Central Fire & Security Monitoring Station at PCFC Emergency Control Centre (ECC). Such systems (i) shall be regularly maintained and kept in good repairs and satisfactory working conditions at all times and (ii) shall ensure avoidance of false alarms / calls. (**Refer to Appendix – 14 for guidance).**

14. **E**HS-Fire Dept personnel (fire fighting staff including officers, Vice President/Chief Fire Officer and his deputy) are authorized to take full control of fire & non-fire emergency situations in their operational jurisdiction/turnout areas. Where a Client's premises are unmanned / unguarded / closed / locked, the Fire Dept personnel are authorized to make forced entry where there is reasonable justification (including a subsequent false alarm discovery), and / or where failure to do so could result in significant losses.

15. **E**HS- Fire Dept personnel (fire fighting & ambulance staff and officers including Vice President/Chief Fire Officer and his deputy are authorized to enter on land or premises: -

a) that are adjacent to the lands or premises on which a fire or emergency has occurred or is occurring for the purpose of fighting the fire or for providing rescue or emergency services; or

b) that are adjacent to the lands or premises on which there is a serious threat to the personal safety of any person for the purpose of removing or reducing the threat.

16. EHS-Fire Dept personnel (fire fighting & ambulance staff and officers including Vice President/Chief Fire Officer and his deputy) are authorized to enter on land or premises on which a fire is occurring or that are adjacent to those lands or premises, for the purpose of pulling down or removing structures or things on or attached to the lands or premises on which a fire is occurring or that are adjacent to those lands or premises if, in the opinion of fire officer in charge, it is necessary to do so to prevent the spread of the fire.

17. EHS-Fire Dept personnel (fire fighting and ambulance staff and officers) may be authorized by the Vice President / Chief Fire Officer or his deputy to enter on lands or premises that are outside their operational jurisdiction / turnout areas for the purposes of fighting a fire or for providing rescue or emergency services on such lands or premises if: -

a) in the opinion of Vice President / Chief Fire Officer or of his deputy the fire or emergency threatens persons, property or the environment and

b) the emergency response capability of the fire department or civil Defense serving the area in which such lands or premises are situated is not immediately available or is reported to be deficient and assistance of EHS-Fire Dept has been requested by such fire department / civil defence or police.

18. EHS-Fire Dept personnel (fire fighting staff and officers including Vice President/Chief Fire Officer and his deputy) are authorized to enter on land or premises if: -

a) A fire has occurred on the land or premises or

b) They have reasons to believe that a substance or device that is likely to cause a fire may be situated on the land or premises

Upon entering on the land or premises EHS-Fire Dept officers, including Vice President/Chief Fire Officer and his deputy, may order to: -

a) close and prevent entry to the land or premises for the length of time necessary to complete the examination of the land or premises,

b) remove from the land or premises, retain and examine any article or material and take such samples or photographs, make videotapes and other images electronic or otherwise that in their opinion may be of assistance in determining the cause of the fire under investigation.

c) Make such evacuation on the land or premises as they consider necessary

d) Operate, use or set in motion any machinery, equipment or device

e) Make any reasonable inquiry of any person or persons orally or in writing.

19. EHS-Fire Dept personnel (fire fighting staff and officers including Vice President/Chief Fire Officer and his deputy) are authorized to enter on land or premises if the entry is necessary for the purpose of conducting an investigation into the cause of a fire or for determining whether a substance or device that is likely to cause fire is situated on the land or premises.

20. EHS-Fire Dept personnel (fire fighting & ambulance staff and officers including Vice President/Chief Fire Officer and his deputy) are authorized to enter waters or board ship, vessel or craft for the purpose of fighting a fire or for providing rescue or emergency services in compliance with the provisions of DPA Marine Emergency Plan.

21. Any accidental/incidental damage caused or occasioned by EHS-Fire Dept staff (Fire Fighting & Ambulance personnel) in the due execution of their duties shall be deemed/construed to be the damage caused by fire and/or accident. No claim shall lie against EHS-Fire Dept / AHJ, EHS Dept or any other departments of PCFC and their directors, officers and other concerned personnel for compensation for any damage so and necessarily caused. (Refer to section 21 of Part 1 of these regulations.).

Part 9 – Sections 1 to 2

(Certification and Approval)

1. All fire extinguishers and fixed fire fighting installations/systems, fire protection equipment & products shall conform to relevant NFPA and its companion codes, standards & publications and EHS-Fire Dept. requirements. They shall be of the types, make(s) and brand(s) having valid test certifications from accredited & approved test certification bodies. (Refer to EHS-Fire Dept. for more details).

2. Certification of completion pertaining to fire extinguishers and any fire protection installations / systems [including fire detection & fire alarm systems] shall be made in the prescribed formats (refer to EHS - Fire Dept. for more details) and submitted prior to building completion.

Part 10 – Section 1
(Definitions)

1. Refer to Section-8 of Part 1 of these regulations & Appendix – 31

APPENDIX-1

a) List of activities that have been already / currently permitted to be carried out in zoned / sectored areas of PCFC/JAFZ/EZ

Abrasives
Adhesives and Binding Tapes
Agricultural Equipment
Agricultural Products
Air Conditioners/Equipment
Air Filtration Products
Aluminium Products
Animal Feed
Appliances
Asphalt
Audio/Video Equipment
Auto Parts & Accessories
Automobiles
Baby Care Products
Bakers Equipment
Batteries
Bedlinen
Boilers
Building Materials
Cables
Can Manufacturer
Candy & Confectionery
Carpets
Carton Boxes/sheets
Chemicals
Cigarettes
Communication Equipment/Systems
Computers
Concrete and Allied Products
Concrete Products
Cosmetics & Toiletries
Cotton
Cranes
Crystalware
Detergents
Drilling Equipment
Earthmoving Equipment
Electrical Equipment/Systems
Electronic Equipment
Fast Moving Consumer Goods
Fasterners – Industrial
Fencing Industry
Ferrous & non-Ferrous Industry
Fertilizers
FibreGlass
Fire Fighting & Safety Equipment
Food Products
Footwear Products
Furniture
Garments/Cashmere Wood Products
General Trading
Generators
Gifts & Novelties
Glass
Gold & Silver Jewellery
Hardware
Harnessess for Car Industry
Heat Exchange Radiators
High Pressure Gas Cylinder
Home & House Hold Products/Appliances
Hospitals & Clinics
Hydraulic Seals
Industrial Gases
Industrial Plant Machinery
Industrial Seals
Instrumentation
Jewelry
Leather Products (Excluding tanneries)
Lubricants Oil
Machine Tools
Marbles & Tiles
Meat Products
Mechanical Seals
Medical & Health care
Metal & Alloys
Minerals
Nylon Bags
Office Supplies/Equipment
Oil & Gas Equipmetn/Services
Oilfield Equipment
Opthalmic/Opticals
Packaging Material
Paints & Coatings
Paper & Paper Products
Perfumes
Pesticides
Petrochemical Products
Petroleum Products
Pharmaceutical Products
Photographic Equipment
Pipes & Fittings
Plastic & Plastic Products
Power Generation
Power Tools
Precision Dies & Tools
Pumps
Re-treaded Tyres & Rubber
Safety Equipment
Sanitary Fittings
Soaps
Stationery Items
Steel & Steel Products
Sugar
Telecommunication
Textile machinery
Textiles
Tobacco Products
Utensils & Household items
Valves
Watches & Clocks
Water & wastewater Treatment
Weighing Equipment
Welding Electrodes
Wire Products
Writing Instruments

Guideline Notes:

- (a) The activities described herein mostly connote, in general, broader descriptions of the activities pertaining to manufacturing, trading & storage; and as such can also include their ancillary or analogous activities.
- (b) The activities are subject to strict compliances (including monitoring & control) with current Federal / UAE laws, local statutes and PCFC rules & regulations pertaining to Environment, Health, Safety & Fire so that the degrees & magnitudes of risks, hazards & other related problems associated with them are maintained at an acceptable level(s) at all times.

b) List of activities that may not be existing in PCFC/JAFZ areas, but can be permitted to be carried out in zoned / sectored areas of PCFC / JAFZ/EZ in future

Abrasive Manufacturing Premises
Aerated Water Factories
Agarbatti Manufacturing
Aircraft Hangers
Aluminium / Magnesium Powder Plants
Aluminium Zinc and Copper Factories-B
Analytical and /or Quality Control Laboratories
Battery Charging/Service Station
Biscuit Factories
Blending, Mixing and Granulating Only Oxygen Plants
Bobbin Factories
Book-hinders, Envelope & paperbag Manufactures
Brick Works
Cable Manufacturing
Candle Works
Canning Factories
Carbon Paper/Typewriter Ribbon Manufacturing
Cashewnut Factories
Celluliod Goods Manufacturing
Ceramic Factories and Crokery and Stoneware Pipe
Chemical Manufacturing
Cinema Film Production Studios
Clay Works
Clock & Watch Manufacturing
Clubs
Coffee Curing, Roasting & Grinding Premises
Coir, Carpets, Rugs and Tobacco
Coir Factories
Condensed Milk Factories, Milk Pasteurising
Confectionery Manufacturing
Cork Product Manufacturing
Solar Energy / Energy Efficient Industries
Cotton Seed Cleaning Factories
Electric Generating Houses (Hydel)
Electric Sub-Station/ Distribution Station
Fruit Products and condiment Factories
Fruits and Vegetables Dehydrating/Drying Factories
Ghee Factories(other than vegetables)
Glass & Glass Fibre Manufacturing
Grain and/or seeds Disintegrating/Crushing Factories
Grease Manufacturing
Hoisery, Lace, Embroidery & Thread Factories
Incandescent Gas Mantle Manufactures
Ink (excluding Printing Ink) Factories
Jute Mills and Jute Presses
Libraries
Man made Yarn/Fibre Manufacture
Mattress & Pillow making
Mica Products Manufacturing
Mineral Oil Blending
Museums
Paper & Cardboard Mill (except raw material storage yard)
Plant and Dairies
Pottery Woks
Printing Press Premises
Pulverizing and Crushing Mills
Rice Mills
Rope works
Rubber Goods Manufacturing
Salt Crushing Factories and refineries
Starch Factories
Stencil Paper Manufacture
Umbrella Assembling Factories

Guideline Notes:

- (a) The activities described herein mostly connote, in general, broader descriptions of the activities pertaining to manufacturing, trading & storage; and as such can also include their ancillary or analogous activities.
- (b) The activities, so permitted, will be subject to strict compliances (including monitoring & control) with current Federal / UAE laws, local statutes and PCFC rules & regulations pertaining to Environment, Health, Safety & Fire so that the degrees & magnitudes of risks, hazards & other related problems associated with them are maintained at an acceptable level(s) at all times.

c) List of activities that cannot be permitted to be carried out in PCFC / JAFZ/EZ areas

1. **Companies storing/manufacturing/processing:**
   a) **Toluene Di-iso cyanate**
   b) **Asbestos**
   c) **Explosives (Class I) & Fireworks activities**
   d) **Ministry of Health, Agriculture & Fisheries, Dubai Municipality Prohibited Chemicals**
   e) **CFC gases (Montreal protocol)**
   f) **Waste/Scrap (basel Convention/DM)**
2. **Tanneries**
3. **Distilleries**
4. **Companies with high waste disposal problems**
5. **Cement Factories**
6. **Stables**
7. **Poultry Farms**
8. **Coal/Coke/Charcoal Manufacturing**
9. **Grass, Hay, Fodder (Labour Intensive) Processing**
10. **Match Factories**
11. **Mercury cell Chlor-alkali production**
12. **Chlorine bleaching industries**
13. **Cyanide Industries**
14. **Electroplating Industries**
15. **Toxic cloud gases (i.e. Phosgene & Methyl Iso-cyanate)**
16. **Dyes using Benzidine and beta-naphthylamine**
17. **Vinyl Chloride Monomers (VCM) production**
18. **Incineration Plants**
19. **Polychlorinated Bi-phenyls (PCBs)/Poly Aromatic Hydrocarbons (PAHs) industries**
20. **Pesticides Manufacture (specific pesticides i.e. DDT ect.)**
21. **Nuclear Power Plants**
22. **Narcotics**

Guideline Notes:

- (a) The activities described herein mostly connote, in general, broader descriptions of the activities pertaining to manufacturing, trading & storage; and as such can also include their ancillary or analogous activities.

- (b) The activities cannot be permitted and /or discouraged – prima facie – for being set-up owing to their inherent and potentially unacceptable degree(s) / magnitudes of risks, hazards & perennial problems that can pose threat to or can be detrimental to the proprietary business interests of PCFC. Such risks, hazards & problems have been identified in the terms as outlined below: -

(Risks/hazards: Explosive, fire & radioactive Problems: Siting, Legal/Penal consequences, Environmental viz. waste disposal, Occupational health, odour nuisance & noise nuisance and Customer complaints)

1. Activities utilizing Toxic, carcinogenic or poisonous substances in their process
2. Activities that generate chemical odours – Mercaptons, Volatile Organics, Chlorine, Hydrogen Sulphide, Ammonia etc.
3. Client's with large potential for waste (solid, liquid, airborne) generation and no established plan for Recycle-Reuse-Recovery and Treatment of the same.
4. Activities that require high manpower requirements
5. Activities that require discharge of Colling water to harbour
6. Dirty Industries – aesthetics, smoke emissions, housekeeping problems
7. Industries with visible emissions and / or chemical odours, dioxin emissions
8. Industries using radioactive materials/sources.
9. Industries with potential for toxic gas release/Occupational health diseases.
10. Industries with High Noise and Vibration.

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APPENDIX – 2

1.0 Submittal Requirements (design drawings & other details) for Obtaining Building Permit, Completion Certificate.

1.1 For obtaining a Building Permit for development in a leased plot within PCFC jurisdiction.

The consultant shall submit the following drawings (both soft + hard copies):

a) Site setting out plan shall clearly identify the location of Fire pumps, access for emergency services, fire water tanks and other utilities services – 1 Set.
b) Architectural drawings – 1 Set
c) Fire layout drawings – 2 Sets
d) Proposed usage of building – 1Set
e) Process details, Pipeline & Instrumentation (P&I) diagram – 1 Set
(Only for Manufacturing & process industries, tank farms, spheres, bullets, liquid & gas storage tanks, boilers & pressure vessels, gas distribution systems, petrol, oil & chemical distribution systems / pipelines)

Refer Appendix-13 and fill in relevant information and submit with application.

1.2 For obtaining a Building Permit for minor modifications on a Leased Plot within PCFC jurisdiction

The consultant shall submit the following drawings (both soft + hard copies) of Fire layout drawings – 2 Sets, consisting of:

a) Setting out plan shall clearly identify any additional services.
b) Complete existing floor plans with the proposal identified clearly shall be submitted.
c) Detailed plan, elevation, and section for the proposed modification shall be submitted
d) Fire fighting layout drawing shall clearly show smoke detectors, hydrant/Fire hose reels, Fire extinguishers, fire alarm bells, break glass units, Fire exit doors/Fire rated doors & Emergency lights location/relocation.

Refer Appendix-13 and fill in relevant information and submit with application.

1.3 For obtaining a NOC for Modification in JAFZA's Pre-Built Warehouse Units.

The consultant shall submit the following drawings (both soft + hard copies) of Fire layout drawings – 2 Sets, consisting of:

a) Brief write-up of the usage of area, Process detail, Project brief.
b) Floor plan shall clearly show existing & proposed additional offices with all dimensions. Proposed partitions shall be clearly identified.
c) Detailed plan, elevation, and section for the proposed partitions with clear details of windows, air ventilation, etc shall be submitted.
d) Fire fighting layout drawing shall clearly show smoke detectors, fire extinguishers, hydrant/hose reels, fire alarm bells, break glass units, Fire Exit doors/Fire rated doors & Emergency lights location/relocation.

Refer Appendix-13 and fill in relevant information and submit with application.

1.4 For obtaining a NOC for Modification in JAFZA's Lease Office Buildings (LOBs)

The consultant shall submit the following drawings (both soft + hard copies) of Fire Layout Drawings – 2 Sets, consisting of:

a) Complete existing floor plans with proposed partitions identified clearly.
b) Detailed plan, elevation, and section for the proposed partitions with clear details of windows, air ventilation, etc.
c) Fire fighting layout drawings shall clearly show smoke detectors, Bells, break glass units, fire extinguishers, Fire Exit Doors / Fire rated doors & Emergency lighting etc location/relocation.

Refer Appendix-13 and fill in relevant information and submit with application.

1.5 For obtaining Building Completion Certificate for development on a leased plot within PCFC jurisdiction.

The consultant shall submit the following As Built drawings (both Soft + Hard copies):

a) Site layout – 1 Set
b) Fire Protection layout – 1 Sets
c) Completion Certificate for installation, Commissioning & testing of Fire alarm & protection. (Refer to EHS website: www.ehss.ae for format) – 1Set

Refer Appendix-13 and fill in relevant information and submit with application.

1.6 For obtaining Building Completion Certificate for modification in JAFZA's Pre-built warehouse units.

The consultant shall submit the following As Built drawings (both Soft + Hard Copies):

a) Fire Protection layout – 1 Sets
b) Completion Certificate for installation, Commissioning & testing of Fire alarm & protection. (Refer to EHS website: www.ehss.ae for format) – 1Set

Note: (i) The term Design drawings means Basic Design drawings meeting NFPA/JAFZA requirements approved during the process of obtaining NOC for Building Permit.
(ii) The consultants shall secure all unknown information from EHS-Fire Dept prior to submittal of plans / drawing.
(iii) Any information not submitted initially will cause delay in the review time of submitted plans and may lead to disapproval of a plan/drawing.

2.0 For approval of Shop Drawings.

2.1 The term Shop Drawings means drawings and technical data concerning any fire protection system or equipment that are required to be submitted to EHS-FIRE DEPT for approval, by the *authorized Contractor or subcontractor showing in detail (1) the proposed fabrication and assembly of the system components and (2) the installation (e.g., form, fit, and attachment details) of materials and equipment. It includes drawings, diagrams, layouts, schematics, descriptive literature, catalog cuts, illustrations, schedules, operations and maintenance manuals, performance and test data, and similar materials furnished by the Contractor or subcontractor to explain in detail, specific portions of the work required by the contract.

2.2 The Contractor or subcontractor shall submit Shop Drawings as detailed below.

a) Two (2) reproducible sets and four (4) copies of all drawings (such as fabrication and installation drawings, layouts, schematics) and six (6) copies of all technical data

b) The Shop Drawings shall be complete and detailed, including the original equipment manufacturer's names and part numbers, and shall contain all information required for checking without reference to material contained in other Shop Drawing transmittals. Partial submittals will not be accepted unless specifically approved by the consultant. Any partial submittals shall be so indicated and any outstanding submittal required to complete the package shall be identified.

c) Shop Drawings shall be submitted in a logical sequence that is duly coordinated with long lead time procurements and with fabrication and construction schedules.

d) Shop Drawings shall be of a type suitable for microfilming and reproduction and shall be of a quality to produce clear, distinct lines and letters. All drawings shall have dark lines on a white background.

e) Shop Drawings shall be uniform in A0 size and folded to A4 in Size.

f) Shop Drawings shall be numbered in logical sequence. The Contractor or subcontractor may use his own numbering system. Each drawing shall bear the number of the submittal (e.g. Submittal #1, Submittal #2, etc.) in a uniform location adjacent to the title block. Any re-submittals shall retain the same submittal number with the revision designated (e.g. Submittal #1, Rev. A).

g) A blank space, no smaller than 4 by 5 inches shall be reserved on the right hand half of each sheet for the EHS-FIRE DEPT disposition stamp.

h) Along with shop drawings, Equipment submittals related to Fire Alarm, Communication, Emergency lighting & Fire Suppression Systems shall be submitted for approval based on which materials shall be procured.

2.3 Review and approval notation will be as follows:

a) Shop drawings marked "approved" authorize the Contractor or subcontractor to proceed with work covered by such drawings.

b) Shop drawings marked "approved as noted" authorize the Contractor or subcontractor to proceed with the work covered, provided he takes no exception to the notations. The notes shall be incorporated on the Shop Drawings prior to submission of the final Shop Drawings.

c) Shop drawings marked "returned for corrections" require the Contractor or subcontractor to make necessary corrections and revisions on the drawings and to re-submit them for approval in the same route as before, prior to proceeding with any of the work depicted on the drawings.

d) Shop drawings marked "not approved" or "disapproved" indicate noncompliance with the contract requirements and the Shop Drawings shall be re-submitted with appropriate changes. No item of work requiring a Shop Drawing shall be accomplished until the drawings are approved or approved as noted.

e) The Contractor or subcontractor shall make any corrections required by the consultant. Approval of the Shop Drawings by EHS FIRE DEPT Engineering shall not be construed as a complete check, but will

indicate only that the general method of construction and detailing is satisfactory. The Contractor or subcontractor shall be responsible for the dimensions and design of adequate connection details and satisfactory construction of all work.

f) Whenever the Contractor or subcontractor's Shop Drawings contain any changes or deviations from technical requirements of the applicable contract drawings, maps and specifications, they shall be clearly identified on the Shop Drawings concerned. All Shop Drawings containing deviations shall be accompanied by a Deviation note.

g) If changes are necessary to approved Shop Drawings whether as a result of a contract change or for any other reasons, the Contractor or subcontractor shall make such revisions and submission of the Shop Drawings. No item of work requiring a Shop Drawings change shall be accomplished until the changed Shop Drawings are approved.

3.0 Fitout Works Requirements:

Fire Protection / Safety Systems fitout works shall include adjustment of the base building fire protection / safety systems to suit specific floor and room layouts as below:-

3.1 Fire Detection & Fire Alarm System:

a) Smoke detectors that need to be installed additionally should preferably be of conventional photoelectric type or smoke detector of the type(s) compatible either with the existing system(s) or with the legitimate ambient environmental conditions shall be installed.

b) Additional smoke detectors shall be programmed to the existing main fire alarm panel.

c) Ceiling voids exceeding 800mm. shall be installed with smoke detectors.

d) LIU'S (Light Industrial Units) - **Office extension - floor area 50% and above**: Existing fire alarm/detection installation in the warehouse area shall be discontinued [as it likely that the proposed office extension could either impede/obstruct maintenance/testing of the (ceiling) smoke detectors or render the detectors ineffective or both] and "Beam" type detectors shall be installed in replacement thereof.

e) Fire escape door with **push bar to open** outward is recommended.

3.2 Sprinkler System:

All Extended sprinkler piping network shall be subjected to Hydraulic/pressure testing and certificates to that effect needs to be furnished for Fire Dept approval and records.

3.3 Life Safety:

The occupant load/number of persons permitted inside the area allotted/leased out to the prospective clients shall be compliant to the NFPA 101. Refer Appendix - 6

4.0 Guideline Notes:

4.1 The term "Authorized contractor or subcontractor" means the contractor or subcontractor expressly authorized by the consultant to prepare and submit shop drawings directly to EHS Fire Dept for approval.

4.2 The approved stamped set of plans / drawings shall remain on the job site until final inspection is performed by EHS-Fire Department. All plans / drawings shall be readily available for inspection by EHS-Fire Dept.

4.3 Drawing Review fees: Refer to EHS Department

4.4 Re-inspection fees: No fee shall be charged by EHS-Fire Dept for initial [first & second] inspections for BCC/OFC. Fees shall be charged for each subsequent inspection for BCC/OFC (Refer to EHS Dept for details concerning fees).

4.5 Refer to EHS website www.ehss.ae

APPENDIX -3

FIRE & EXPLOSION INDEX (F&EI) SYSTEM

MATERIAL FACTOR (MF)

The Material Factor (MF) is derived from the following table:-

	$N_r = 0$	$N_r = 1$	$N_r = 2$	$N_r – 3$	$N_r = 4$
$N_f = 0$	1	14	24	29	40
$N_f = 1$	4	14	24	29	40
$N_f = 2$	10	14	24	29	40
$N_f = 3$	16	16	24	29	40
$N_f = 4$	21	21	24	29	40

(i) The MF for Combustible Dusts; Combustible Solids; Warehousing/Storage of Goods; Manufacturing, Construction and Other Occupancies are derived from separate tables.
(ii) Nf - NFPA ranking for flammability
(iii) Nr – NFPA ranking for reactivity

GENERAL HAZARDS (GH)

General process Hazards are factors that play a primary role in determining the magnitude of a loss incident. The items viz. (i) Chemical Processes (ii) Storage, Handling, Transfer and Manufacturing (iii) Confinement (iv) Access (v) Drainage (vi) Total General Hazards Factor are investigated as contributing hazards.

SPECIFIC HAZARDS (SH)

The items viz. (i) Quantities of Materials Involved (ii) Pressure Conditions (iii) Toxic Materials Involved (iv) Explosion Potential/ Flammable Range & (v) Total Specific Hazards Factor that indicate existence of specific conditions as a major contributing factor in fire and explosion incidents are investigated.

FIRE AND EXPLOSION INDEX (F&EI)

The F&EI calculation is calculated by giving credit for both general and specific hazards to the materials involved. The formula used is:

$$F\&EI = MF \times (1 + GH) \times (1 + SH)$$

The resulting F&EI values are ranked into four categories:

1 - 45 Light Hazard

46 - 60 Moderate Hazard

61 - 95 High Hazard

96 - up Severe Hazard

FIRE & EXPLOSION INDEX SYSTEM

TOXICITY INDEX (TI)

TOXICITY NUMBER: The toxicity number (Th) is derived from the NFPA health factor Nh (NFPA 704, 325M or 49). Nh is an integer number ranging from 0 to 4. The five degrees of hazards are related to the protective equipment normally available to fire fighters.

Nh	Th
0	0
1	50
2	125
3	250
4	325

PENALTY FACTOR: The Penalty Factor (Ts) is the second toxicity parameter used to determine the TI. The Ts value is derived from the 'Threshold Limit Values (TLV)'.
The TLV-values are drawn up by the American Conference of Governmental Industrial Hygienists. TLV represents a time weighted average (TWA) air concentration to which workers can be exposed during a normal working week without ill effects. TLV is often indicated as a TWA-value, both are the same.
The penalty factor is determined from the table below:

Threshold Limit Values (TLVs)	Penalty Factor (Ts)
< 5	125
5-50	75
> 50	50

TOXICITY INDEX (TI)

The Toxicity Index is then calculated from Th and Ts plus the hazard factors of Fire & Explosion Index (F&EI). The TI is found from the following formula:

$$TI: \frac{Th + Ts}{100}(1 + GH + SH)$$

The resulting TI values are ranked into three categories :

1-5	Light
6-9	Moderate
10-up	High

APPENDIX-4

FIRE PROTECTION / FIRE SAFETY GUIDELINES FOR DESIGNING HIGH RISE BUILDINGS

MAJOR FIRE PROTECTION FACTORS IN HIGH RISE BUILDINGS

1. Accessibility a major issue

1.1 Limit of available ladders to reach upper floors
1.2 Height of the fire and high logistical demand
1.3 Inherent delays in deploying equipment and fire fighters affecting fire growth indirectly.
1.4 Fire Dept's inability to approach the origin of the fire from more advantageous directions (resulting in large or unacceptable losses).

2. Unique people movement & egress systems

2.1 Limited means of egress
2.2 Conventional exit system / stair towers cannot handle the accumulated effect of floor-upon-floor evacuation of occupants into the same exit system at the same time exceeding evacuation time.
2.3 To mitigate evacuation issues the concepts such as areas of refuge, defend-in-place, pressurized exits, enclosed/pressurized elevators, increased fire ratings, communication systems and life support systems shall apply.

3. Increased Occupant, equipment material and fuel load(s)

3.1 Higher density of occupant & fuel load is the result of stacking many floors on the same building foot print.
3.1 Fire has a natural tendency to move upward, where additional occupants and fuel are stacked.

4. Combination of occupancies in a single high-rise building

4.1 Combination occupancies range from residential to business, offices, stores, restaurants and places of assembly including underground parking located below the high-rise structure.
4.2 Many designs include within-the-structure atriums, building inter-connections and public transportation systems such as trains & sub-way service
4.3 These (mixed) occupancies & structures complicate the requirement for fire protection necessitating a sophisticated & complex approach to fire safety.

5. Natural forces affecting fire and smoke movement

5.1 Stack effect and the impact of winds can be very significant / different
5.2 No manual fire fighting techniques are available / known to counter stack effect that may vary with climatic condition.
5.3 The following design features are recommended [but not limited to] to minimize the stack effect: -
(a) Air tight compartmentation from wall to wall. This would involve sealing penetration and exterior building tightness.
(b) Limiting continuous shaft heights. Construction of air-lock vestibules on stairs, elevators and other vertical shafts.
(c) Use of vestibules and gasketing on exterior doors at both the bottom and top of a building.
(d) Eliminating naturally ventilated shafts and floors that could contribute to stack effect during a fire. One of the most commonly encountered situation is elevator shafts with normally open vents. These designs should be active so that the venting will terminate during a fire, thus reducing the impact of shack effect.
(e) Zone compartmentation and control of mechanical systems, which could contribute to, or be affected by stack effect.

Note: (i) Ability to overcome the wind/stack effect is based upon many variables including system design, system power, tightness of the building, wind velocity and wind direction. Wind direction can complicate the accessibility and preferred direction of fire attack and can increase fire and smoke impingement upon areas of refuge, possibly exceeding their design criteria.

6. Internal Utility Services

6.1 Equipment or mechanical levels servicing every ten or so floors

6.2 Multiple levels of fire pumps, addition pressure reducing devices or sprinkler and standpipe systems.

6.3 Zoned & compartmented HVAC systems sharing common exhaust shafts and fresh air intake shafts. These shafts and duct runs often penetrate multiple fire zones and require special attention regarding design and protection. Many high-rise buildings integrate smoke management systems into their conventional HVAC systems. Although this is acceptable; and in many cases preferred, it requires special design considerations, including safe and adequate controls, acceptance testing and on-going maintenance.

Note: Refer to Fire Protection Handbook of NFPA for additional information. NFPA 101, 2006 (Life Safety Code) and NFPA 5000, 2006 (Building Construction and Safety Code) includes specific requirements for high-rise buildings, including automatic sprinkler protection, detection, alarm, communications, emergency power systems and command stations. Other special features such as atriums and mixed occupancies are also addressed in these codes.

APPENDIX -5

Dimensional Criteria Concerning Fire Escape Stairs, Exit Widths etc.

a) Relevant Excerpts from NFPA 101, 2006

Table 7.2.8.4.1(a) Fire Escape Stairs

Feature	Serving More than 10 Occupants	Serving 10 or Fewer Occupants
Minimum widths	22 in. (560 mm) clear between rails	18 in. (455 mm) clear between rails
Minimum horizontal dimension of any landing or platform	22 in. (560 mm) clear	18 in. (455 mm) clear
Maximum riser height	9 in. (230 mm)	12 in. (305 mm)
Minimum tread, exclusive of nosing	9 in. (230 mm)	6 in. (150 mm)
Minimum nosing or projection	1 in. (25 mm)	No requirement
Tread construction	Solid ½ in. (13 mm) diameter perforations permitted	Flat metal bars on edge or square bars secured against turning, spaced 1 ¼ in. (32 mm) maximum on centers
Winders	None	Permitted subject to capacity penalty
Risers	None	No requirement
Spiral	None	Permitted subject to capacity penalty
Maximum height between landings	12 ft (3660 mm)	No requirement
Headroom, minimum	6 ft 8 in. (2030 mm)	6 ft 8 in. (2030 mm)
Access to escape	Door or casement windows, 24 in. x 6 ft 8 in. (610 mm x 1980 mm); or double-hung windows, 30 in. x 36 in. (760 mm x 915 mm) clear opening	Windows providing a clear opening of at least 20 in. (510 mm) in width, 24 in. (610 mm) in height, and 5.7 ft^2 (0.53 m^2) in area
Level of access opening	Not over 12 in. (305 mm) above floor; steps if higher	Not over 12 in. (305 mm) above floor; steps if higher
Discharge to ground	Swinging stair section permitted if approved by authority having jurisdiction	Swinging stair, or ladder if approved by authority having jurisdiction
Capacity	½ in (13 mm) per person, if access by door; 1 in (25 mm) per person, if access by climbing over windowsill	10 persons; if winders or ladder from bottom balcony, 5 persons; if both, 1 person

Table 7.2.2.2.1.1(a) New Stairs

	Dimensional Criteria	
Features	**ft/in.**	**mm**
Minimum width	Sec 7.2.2.2.1.2	
Maximum height of risers	7 in.	180
Minimum height of risers	4 in.	100
Minimum tread depth	11 in.	280
Minimum headroom	6 ft 8 in.	2030
Maximum height between landings	12 ft	3660
Landing	Sec 7.2.1.3, 7.2.1.4.4 and 7.2.2.3.2	

Table 7.2.2.2.1.1(b) Existing Stairs

	Dimensional Criteria	
Features	**ft/in.**	**mm**
Minimum width clear of all obstructions, except projections not more than 4½ in. (114mm) at or below handrail height on each side	36 in.	915
Maximum height of risers	8 in.	205
Minimum tread depth	9 in.	230
Minimum headroom	6 ft 8 in.	2030
Maximum height between landings	12 ft	3660
Landing	Sec 7.2.1.3 and 7.2.1.4.4	

Table 7.2.2.2.1.2 (B) New Stair Width

Total cumulative Occupant Load Assigned to the Stair	**Width**
<2000 persons	44in. (1120 mm)
>2000 persons	56in. (1420 mm)

Sections 7.2.2.2.1.2 – (A), (B), (C), (D), (E) & (F) of NFPA101, 2006, shall be referred to while calculating the minimum stair width.

In general, minimum stair width shall be derived from

Maximum Occupant Capacity for any given floor (Gross floor area / Occupant load factor. Table 7.3.1.2 of NFPA101, 206) X Egress Capacity factor (Table 7.3.3.1 of NFPA 101, 2006)

Exit width: The width of an exit passageway, shall be adequate to accommodate the aggregate required capacity of all exits that discharge through it, unless one of the following conditions applies:
(1) *Where an exit passageway serves occupants of the level of exit discharge as well as other stories, the capacity shall not be required to be aggregated.

(2) As provided in Chapter 36 and Chapter 37 of NFPA 101, 2006 an exit passageway in a mall building shall be permitted to accommodate occupant loads independently from the mall and the tenant spaces. (see 36.2.2.7.2 and 37.2.2.7.2).

Note: NFPA 101, 2006 shall be referred to for additional information / details.

b) Other examples of Minimum width of escape routes, exits and minimum numbers of exits from large spaces (where appropriate and necessary, EHS-Fire Dept shall insist upon compliance with these requirements)

Minimum Widths of Escape Routes And Exits	
No. of People	Width of Exits
1 to 50	800mm
51 to 110	900mm
111 to 170	1000mm
171 to 220	1100mm
221 to 240	1200mm
241 to 260	1300mm
261 to 280	1400mm
281 to 300	1500mm
301 to 320	1600mm
321 to 340	1700mm

Minimum Numbers of Exits from Large Spaces	
No. of People	Number of Exits
1 to 50	1
51 to 500	2
501 to 1000	3
1001 to 2000	4
2001 to 4000	5
4001 to 7000	6
701 to 11000	7

APPENDIX – 6

Relevant Excerpts from NFPA 101, 2006
Table 7.3.1.2

Sl No.	Use	Factor	
		(ft^2 per person)[a]	(m^2 per person)[a]
1	**Assembly Use**		
	(i) Concentrated use, without fixed seating.	7 net	0.65 net
	(ii) Less concentrated use, without fixed seating.	15 net	1.4 net
	(iii) Bench-type seating	1 person/18 linear in.	1 person/ 455 linear mm
	(iv) Fixed seating	Number of fixed seats	Number of fixed seats
	(v) Waiting spaces	See 12.1.7.2 and 13.1.7.2.	See 12.1.7.2 and 13.1.7.2
	(vi) Kitchens	100	9.3
	(vi) Library stack areas	100	9.3
	(vii) Library reading room	50 net	4.6 net
	(viii) Swimming pools	50 (water surface)	4.6 (water surface)
	(ix) Swimming pool decks	30	2.8
	(x) Exercise rooms with equipment	50	4.6
	(xi) Exercise rooms without equipment	15	1.4
	(xii) Stages	15 net	1.4 net
	(xiii) Lighting and access catwalks, galleries,	100 net	9.3 net
	(xiv) Casinos and similar gaming areas	11	1
	(xv) Skating rinks	50	4.6
2	**Educational Use**		
	(i) Classrooms	20 net	1.9 net
	(ii) Shops, laboratories, vocational rooms	50 net	4.6 net
3	**Day – Care Use**	35 net	3.3 net
4	**Health Care Use**		
	(i) Inpatient treatment departments	240	22.3
	(ii) Sleeping departments	120	11.1
	(iii) Ambulatory health care	100	9.3
5	**Detention and Correctional Use**	120	11.1
6	**Residential use**		
	(i) Hotels and dormitories	200	18.6
	(ii) Apartment buildings	200	18.6
	(iii) Board and care, large	200	18.6
7	**Industrial Use**		
	(i) General and high-hazard industrial	100	9.3
	(ii) Special-purpose industrial	NA	NA
8	**Business Use**	100	9.3
9	**Storage Use**		
	(i) In storage occupancies	NA	NA
	(ii) In mercantile occupancies	300	27.9
	(iii) In other than storage and mercantile occupancies	500	46.5
10	**Mercantile Use**		
	(i) Sales area on street floor	30	2.8
	(ii) Sales area on two or more street floors	40	3.7
	(iii) Sales area on floor below street floor	30	2.8
	(iv) Sales area on floors above street floor	60	5.6
	(v) Floors or portions of floors used only for offices	See business use.	See business use.
	(vi) Floors or portions of floors used only for storage, receiving, and shipping, and not open to general public	300	27.9
	(vii) Mall buildings	Per factors applicable to use of space	Per factors applicable to use of space

Note: NFPA 101, 2006 shall be referred to for additional information / details.

APPENDIX – 7

Relevant Excerpts from NFPA 101, 2006

Table A.7.6 Common Path, Dead-End, and Travel Distance Limits (by occupancy)

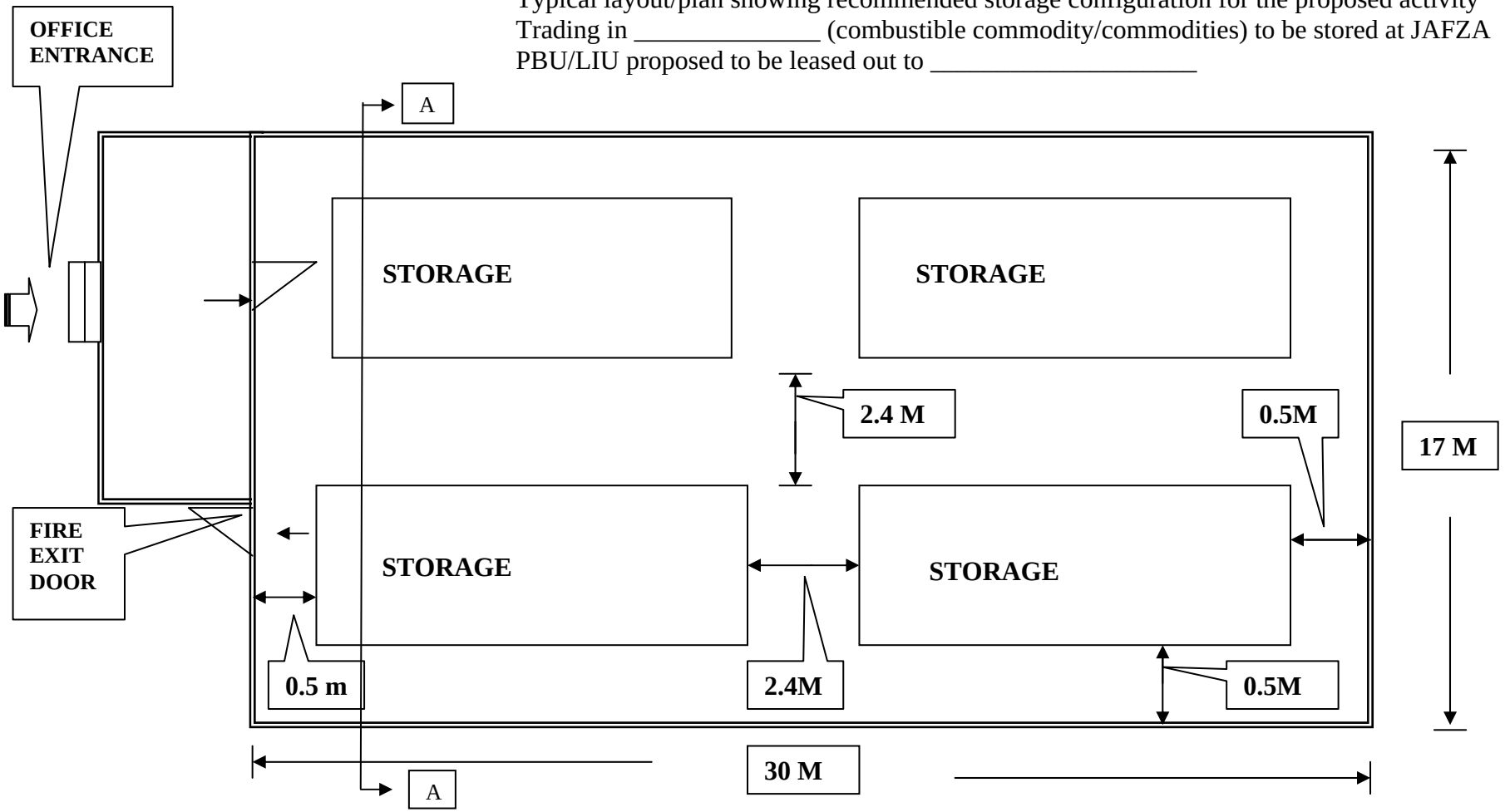
Type of Occupancy	Common Path Limit				Dead-End Limit				Travel Distance Limit			
	Unsprinklered		Sprinklered		Unsprinklered		Sprinklered		Unsprinklered		Sprinklered	
	ft	m	ft	m	ft	m	ft	m	ft	m	ft	m
Assembly												
New	20/75	6.1/23	20/75	6.1/23	20	6.1	20	6.1	1501	45	250	76
Existing	20/75	6.1/23	20/75	6.1/23	20	6.1	20	6.1	150	45	250	76
Educational												
New	75	23	100	30	20	6.1	50	15	150	45	200	61
Existing	75	23	100	30	20	6.1	50	15	150	45	200	61
Day Care												
New	75	23	100	30	20	6.1	50	15	150	45	200	61
Existing	75	23	100	30	20	6.1	50	15	150	45	200	61
Health Care												
New	NR	NR	NR	NR	30	9.1	30	9.1	NA	NA	200	61
Existing	NR	NR	NR	NR	NR	NR	NR	NR	150	45	200	61
Ambulatory Health Care												
New	75	23	100	30	20	6.1	50	15	150	45	200	61
Existing	75	23	100	30	50	15	50	15	150	45	200	61
Detention and Correctional												
New-Use Condition II, III, IV	50	15	100	30	50	15	50	15	150	45	200	61
New-Use Condition V	50	15	100	30	20	6.1	20	6.1	150	45	200	61
Existing –Use condition II, III, IV, V	50	15	100	30	NR	NR	NR	NR	150	45	200	61
Residential												
One-and two-family dwellings	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Lodging or rooming houses	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Hotels and dormitories												
New	35	10.7	50	15	35	10.7	50	15	175	53	325	99
Existing	35	10.7	50	15	50	15	50	15	175	53	325	99
Apartments	35	10.7	50	15	35	10.7	50	15	175	53	325	99
New	35	10.7	50	15	50	15	50	15	175	53	325	99
Existing												
Board and care												
Small, new and existing	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Large, new	NA	NA	125	38	NA	NA	50	15	NA	NA	325	99
Large, existing	110	33	160	49	50	15	50	15	175	53	325	99
Mercantile *Class A, B, C*												
New	75	23	100	30	20	6.1	50	15	150	45	250	76
Existing	75	23	100	30	50	15	50	15	150	45	250	76
Open air	NR	NR	NR	NR	0	0	0	0	NR	NR	NR	NR
Mall	75	23	100	30	20	6.1	50	15	150	45	400	120
New	75	23	100	30	50	15	50	15	150	45	400	120
Existing												
Business	75	23	100	30	20	6.1	50	15	200	61	300	91
New	75	23	100	30	50	15	50	15	200	61	300	91
Existing												
Industrial												
General	50	15	100	30	50	15	50	15	200	61	250	75
Special purpose	50	15	100	30	50	15	50	15	300	91	400	122
High hazard	0	0	0	0	0	0	0	0	0	0	75	23
Aircraft servicing hangars, ground floor	50	15	100	30	50	15	50	15	note1	note1	note1	note1
Aircraft servicing hangars, Mezzanine fl	50	15	75	23	50	15	50	15	75	23	75	23
Storage												
Low hazard	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Ordinary hazard	50	15	100	30	50	15	100	30	200	61	400	122
High hazard	0	0	0	0	0	0	0	0	75	23	100	30
Parking structures, open	50	15	50	15	50	15	50	15	300	91	400	122
Parking structures, enclosed	50	15	50	15	50	15	50	15	150	45	200	60
Aircraft servicing hangars, ground floor	50	15	100	30	50	15	50	15	note1	note1	note1	note1
Aircraft servicing hangars, mezzanine fl	50	15	75	23	50	15	50	15	75	23	75	23
Underground spaces in grain elevators	50	15	100	30	50	15	100	30	200	61	400	122

Note: NFPA 101, 2006 shall be referred to for additional information / details.

APPENDIX-8

EHS- FIRE DEPARTMENT

Typical layout/plan showing recommended storage configuration for the proposed activity Trading in _____ (combustible commodity/commodities) to be stored at JAFZA PBU/LIU proposed to be leased out to _____



NB:(1) Storage configuration, so recommended, may not be suitable/applicable to the commodities other than the one(s) specified above; and

(2) The mandatory requirement of sprinkler system shall apply axiomatically when the activities [other than storage] that considerably increase the ignitability and fire-spread potential of the commodities are involved and/or the storage height exceeds 3.5 meters.

ACCEPTABLE MAXIMUM STORAGE HEIGHT = 3.5M

APPENDIX –9

SAFEGUARDS AGAINST FIRES & EXPLOSIONS DURING CONSTRUCTION

1.0 SCOPE:

1.1 The requirements applies to construction sites, including those where demolition, alteration, fitting out, renovation, refurbishment or repair work is being carried out, will minimize the risk of accidental or malicious fires.

2.0 DESIGN PHASE:

2.1 The consultant/project management shall ensure that the fire risk and potential for damage have been properly assessed and are kept to a minimum during construction.

2.2 The following Quality Assurance measures shall be adhered to: -

a) Safeguards during construction shall meet the requirements of NFPA-241.
b) Temporary Light and Power shall be provided in accordance with NFPA-70.
c) Use of Explosives for demolition shall be subject to approval of AHJ. If allowed, shall conform to requirements of Section 10.5 of NFPA-241.
d) Registered Design Professionals (RDPs) responsible for design & inspection shall determine the frequency and extent of applicability of tests, inspections and observations required for the project, as per the Quality Assurance Program.
e) The procedures conducted by RDPs shall provide evidence and documentation to owner and AHJ that establishes that the work is being constructed in accordance with approved construction documents.
f) The contractor shall provide Quality Control Programs for construction works to be executed for the project. Refer section 40.1 & 40.2 of NFPA-5000 in this regard.
g) Quality Assurance (QA) for structural and geotechnical components and assemblies shall be as per Section 40.3, NFPA-5000.
h) QA for wall finish shall be as per Section 40.4, NFPA-5000.
i) QA for sprayed Fire Resistive Materials shall be as per Section 40.5, NFPA-5000.
j) QA for Smoke Control Systems shall be as per Section 40.6, NFPA-5000.
k) QA for Stairs & Railings shall be as per Section 40.7, NFPA-5000.
l) QA for Non-structural components & systems shall be as per Section 40.8, NFPA-5000.
m) QA for penetrative & joints shall be as per Section 40.9, NFPA-5000.

3.0 CONSTRUCTION PHASE:

3.1 The consultant or project management shall appoint a competent person/site safety officer who shall be responsible for assessing the degree of fire risk and for creating and regularly updating the site safety plan as construction proceeds. The plan shall have following details: -

a) Records of training imparted to site operative.
b) General site precautions, fire detection and warning alarms.
c) The requirements of hot work permit.
d) Fire escape and communications.
e) Evacuation plan and procedures for calling Fire Dept.
f) Fire Vehicle access.
g) Initiation of emergency action plan.
h) Security measures to minimize the risk of arson.
i) Housekeeping, material storage and waste control.

3.2 Main contractor or site safety officer shall ensure that:

a) All precautionary measures and safe standards as laid down in the site Fire safety plan are clearly understood and complied by all those on site.
b) Where necessary hot work permit system shall be established.
c) Check all fire extinguishers (weekly) and test all fire alarm devices.
d) Inspect all escape routes, Fire brigade access, fire fighting facility and work areas as per site Fire safety plan.
e) Liaise with site security.
f) Maintain a written record of training of site operatives and fire drill.
g) Put in place efficient mustering system to enable evacuation and head count.
h) During alarm, ensure that all staff and visitors report to assembly points.
i) Promote safe working environment at all times.

4.0 EMERGENCY PROCEDURES:

4.1 Means of giving warning of Fire shall be established. Hand bells, whistles or manually operated sounders clearly audible above background noises in all areas and can be readily identified as fire alarm.

4.2 A written emergency action plan that is consistent with the available equipment, personnel and Emergency Management Procedures of the Corporation shall be prepared to establish an effective emergency response system.

4.3 Instruction notices: At conspicuous locations in all parts of the building, printed notices should be exhibited stating in concise terms the essentials of the action to be taken upon discovering a fire and on hearing fire alarm.

4.4 Clear signs shall be installed and maintained in prominent positions indicating the locations of fire access routes, escapes routes and position/location of fire fighting equipments.
4.5 Clear access to the site and building shall be maintained at all times.
4.6 Security guards shall be briefed to provide clear access to the site in an event of emergency.

5.0 FIRE PROTECTION:

5.1 The consultant or project management shall ensure, so far as reasonably practical, that the project is designed and planned in sequence to achieve the early installation and operation of the following system:

a) Fire compartments within the building under construction, including the installation of fire doors, and the completion of fire stopping and special attention given to lift shafts, service ducts and voids which offer a passage way to heat and smoke.
b) Fire fighting shafts commissioned and maintained.
c) Installation of automatic fire detection and sprinkler installation where planned.
d) Adequate water supply for fire fighting should be available. Riser and temporary fire mains outlets to be provided where planned.
e) At the end of each working day a fire check shall be undertaken, particularly in areas where hot work has been undertaken.

6.0 FIRE PREVENTION:

6.1 Management shall (i) ensure good housekeeping from fire prevention view point (ii) exercise effective control on limiting the quantities of flammable & combustible commodities so as to limit the occupancy fire load & (iii) segregate the commodities to check the fire spread.
6.2 Unwanted materials shall be collected at regular interval.
6.3 Separate metal bins with close metal lids shall be provided for flammable materials.
6.4 NO SMOKING policy should be established on the site with the exception of designated areas where smoking will be allowed. NO SMOKING notices shall be displayed in areas where smoking is not allowed.
6.5 Adequate number of suitable types of portable fire extinguishers shall be available through out the site. These shall be provided at strategic locations/points.
6.6 Flammable liquid, LPG and combustible materials shall be stored at areas that are suitably protected.
6.7 Temporary buildings /offices shall be separated from the permanent building by at least 10meters.
6.8 Appropriate warning signs e.g. “HIGHLY FLAMMABLE LIQUIDS”, “NO SMOKING” and “NO NAKED LIGHTS” shall be prominently displayed outside the stores.
6.9 Electrical lighting both temporary and permanent shall be installed in accordance with NFPA 70.

7.0 HOT WORK PERMIT:

7.1 A permit-to –work system shall be adopted where hot work is being undertaken unless there is no risk of damage to any surrounding property.
7.2 Before starting hot work, the area shall be cleared of all loose combustibles material and, if work is to take place on one side of a wall or partition, the opposite side shall be examined to ensure no combustibles material will be ignited by heat conduction.
7.3 Welding, cutting or grinding works shall be suitably screened by non combustible material.
7.4 Suitable type of fire extinguisher shall be available.
7.5 Gas cylinders shall be secured in vertical position and fitted with regulator and flash arrester.
7.6 Any areas specified in a hot work permit shall be thoroughly examined one hour after work has finished.

NB

(a) 1 to 7 as above (i) provide only an outline of the specific requirement(s) of EHS-Fire Dept for the guidance of qualified & approved consultants/users & (ii) serves as ready reckoner for maintaining consistency in approach. However, the consultants/users are cautioned and advised that they meet all requirements/recommendations as specified / cited in drawing review report(s) issued by EHS-Fire Department.
(b) Consultant shall submit design drawings meeting the above requirements and obtain approval of EHS – Fire Department, before commencement of construction works.
(c) Refer to Fire Department and relevant codes & standards for additional information/details.

APPENDIX - 10

Requirements for temporary buildings, facilities or structures at construction sites for the use of offices & labour accommodation.

1.General Requirement:

a) The site shall be organized/ prepared for the easy access of Emergency Vehicle.
b) The recommended site set up shall be submitted to the Fire Dept. for approval.
c) Telephone line for emergency use shall be provided.
d) Any building /structure shall not exceed 200 sq. m.
e) If the building/ structure exceeding 200 sq. m in size it shall be separated into 200 sq. m blocks from each other by 6 m.
f) These type of buildings / structures shall not be used for storage / warehousing.

2. Protection from external Fire Spreading:

a) To prevent the external spread of fire between the buildings/ structures. The buildings/ structures may be separated from each other or by providing fire resistant material (metal or fire retardant treated wood forms) as below:

Distance between buildings / Structures	Rating in hours
0 – 1.5 m	2 hours
1.5 – 3 m	1 hour
03 – and above	

b) The buildings/ structures shall be 6 m away separated from kitchens, workshops & stores.
c) Combustible materials & vegetation shall be removed 3 m away from any building/ structure.
d) Kitchens shall be away from any building/ structure by 6m and protected internally by fire resistant material & LPG cylinder shall be stored outside.
e) Electrical equipment and installation shall be fixed as per the requirement of Electrical Dept.

3. Means of Escape:

Travel distance should not exceed 15 m one direction & 30 m two-direction from any point to the main road of the site.

4. Fire Alarm & Fire Fighting:

a) Fire point(s) for Fire Extinguishers (DCP) and manual call points shall be provided at location where it can be reached within 30 m of travel.
b) Hose Reel system/network shall be provided according to the Fire Dept. requirement.
c) Fire alarm bell to be provided inside each room.

5. Fire Training:

All staff shall be trained in the use of fire fighting equipment provided.

6. Fire Notices/ Instructions:

Fire sign shall be provided at each fire point and written in Arabic, English & the languages that can be read & understood by the employees / occupants/users.

1. No Cooking
2. No Smoking
3. Fire / Emergency Actions ie
   (i) Raise the alarm.
   (ii) Call Fire Brigade 997, Ambulance 998 / 999 & Police 999 &
   (iii) attack the fire if possible using fire extinguishers/ appliances provided.

APPENDIX - 11

EHS-FIRE REQUIREMENTS FOR COVERED TEMPORARY STRUCTURES - ENCLOSED TENTS NORMALLY USED FOR EVENTS/ACTIVITIES SUCH AS STAGE SHOWS, CONCERTS, CIRCUS, EXHIBITIONS, TRADE FAIRS, SPORTING EVENTS & CELEBRATORY FUNCTIONS.

a) Layout Planning and Means of Escape

1. The maximum size of a single tent shall not exceed 2,000 square m.
2. Tents shall be separated from the building facades and from other tents by at least a distance equal to the highest point of the tent.
3. Enclosed tents shall be of material having a minimum surface flame spread class 2 rating (to be supported by certification).
4. Tents acting as a sheltered link from buildings to tents or from tents to tents shall not be more than 6m wide and 3m high. These tents shall not be enclosed. They shall be spaced at least 36m apart.
5. A minimum of 2 exits shall be provided and each exit shall be of minimum 2m width irrespective of occupant load. The exit capacity is based on a maximum of 120 persons per metre width of exit.
6. The maximum travel distance from any point within the tent to the nearest exit at the external edge of the tent shall not exceed 30m.
7. The occupant load shall be based on a minimum of 1.5 square m per person.
8. Seats if are provided, they shall be in accordance to plans submitted for approval. Maximum number of seats in a row shall not exceed 12 and a minimum aisle width of 1.5m shall be provided. Seats shall be secured properly to the floor.
9. To submit a plan (prepared and endorsed by a qualified person) of the tent layout with calculations of designed occupant load, travel distance and exit capacity.
10. Any row of stall inside a tent shall not exceed 15m in length.
11. Separation distance of at least 3m between rows of stalls shall be maintained.
12. Tents and event areas are to be provided with sufficient numbers of self-contained emergency lighting.
13. All designated exits points shall be provided with illuminated “Exit” signs incorporated with battery operated standby power supply.
14. All escape routes / passageways shall be free of obstruction. Exit points shall lead directly to open exterior areas.

b) Fire Fighting Provisions and Structural Fire Precautions

1. All parts of a tent are to be located within 100m of a fire hydrant. And no tent shall be located within 3m of any fire hydrant, breeching inlets of fire fighting rising mains or fire exit staircases of neighboring buildings.(This requirement may be waived by EHS-Fire Dept for the sites where fire hydrants are not available).
2. No activity shall be carried out on the fire engine access way / fire engine hard standing (parking space) or pedestrian walkways.
3. ABC dry chemical powder fire extinguisher (approved type) of 2.5 kg capacity shall be provided such that no person needs to travel more than 15m to reach them.

4. Two 2.5kg capacity carbon dioxide fire extinguishers (approved type) shall be provided in the vicinity of each generator / air conditioning set. Generators are to be sited at least 5m away from buildings and tents / stalls.
5. AC units with return-air shall be fitted with smoke detectors.
6. Roofing or false ceiling of covered booths shall be of non-combustible material or minimum class 2 surface flame spread rating (to be supported by certification.)
7. The erection of multi-storey structures is prohibited.
8. All sides of the timber flooring decking / stage / platform shall be properly sealed with no storage of goods / materials / electrical services beneath them.
9. Fabric materials / curtains for stage shall be of minimum class 2 surface flame spread rating (to be supported by certification).
10. Fire Vehicle(s) & ambulance(s) shall be kept standby at the site throughout the event.

c. <u>Other Fire Safety Precautions</u>

1. Any activity involving the use LPG and flammable liquids / gases is prohibited.
2. "Open-flame" cooking is not allowed except where solid fuel burners are used to warm food that has already been prepared and cooked.
3. Combustible materials are kept to a minimum and away from heat sources.
4. Electrical fixtures /wiring are firmly secured away from public's path.
5. The event organizer shall provide a team of personnel for emergency evacuation and for fighting incipient fires on site.
6. Civil or structural engineer's certification is required wherever structural safety is involved.
7. To contact EHS-Fire Dept at 8835999 to arrange for an inspection of the site 2 days before the commencement of the event.
8. To remove / clear the temporary structures within 3 days upon expiry of the approved period. The duration of the event is limited to at most 2 months.

Appendix-12

AIR CONDITIONING, VENTILATION & SMOKE MANAGEMENT SYSTEMS

1.0 *General*

1.1 *Scope.*

Construction, installation, operation, and maintenance of systems for air conditioning and ventilating, including filters, ducts, and related equipment, to protect life and property from fire, smoke, and gases resulting from fire or from conditions having manifestations similar to fire shall comply with latest editions of NFPA 90 A & 90 B, NFPA Referenced Publications and Informational References.

1.2 *Purpose.*

The purpose shall be to accomplish the following:

a) Restrict the spread of smoke through air duct systems within a building or into a building from the outside.

b) Restrict the spread of fire through air duct systems from the area of fire origin, whether located within the building or outside.

c) Maintain the fire-resistive integrity of building components and elements such as floors, partitions, roofs, walls, and floor- or roof-ceiling assemblies affected by the installation of air duct systems.

d) Minimize the ignition sources and combustibility of the elements of the air duct systems.

e) Permit the air duct systems in a building to be used for the additional purpose of emergency smoke control.

1.3 *Application.*

On all systems for the movement of environmental air in structures that serve the following:

a) Spaces of over 708 m3 (25,000 ft3) in volume

b) Buildings of Types III, IV, and V construction over three stories in height, regardless of volume

c) Buildings and spaces not covered by other applicable NFPA standards

d) Occupants or processes not covered by other applicable NFPA standards

1.4 *Definitions*: All related systems and components definitions shall mean NFPA Official Definitions & General Definitions per sections 3.3 of NFPA 90 A, 2002 edition.

2.0 *HVAC Systems:*

2.1 General Requirements for Equipment: *Access*:- Equipment shall be arranged to afford access for inspection, maintenance, and repair.

2.2 *Equipment* shall be selected and installed based on its application with respect to the manufacturer's installation instructions and listing as applicable.

2.3 *Protection*:(i) Equipment shall be guarded for personnel protection(ii) Equipment shall be guarded against the intake of foreign matter into the system (iii)Electrical wiring and equipment shall be installed in accordance with NFPA 70, National Electrical Code. (iv)Air-handling equipment rooms shall meet the requirements of Section 5.1. NFPA 90 A, 2002 edition.

2.4 *System Components*:

2.4.1 Outside Air Intakes shall comply with 4.2.1.1 – 4.2.1.4.1 of NFPA 90 A, 2002 edition.

2.4.2 Air Cleaners, Air Filters, Liquid adhesive coatings and Fans shall comply with 4.2.2 & 4.2.3 of NFPA 90 A, 2002 and be LISTED to UL 867 & 900.

2.4.3 Air-Cooling and Heating Equipments shall comply with 4.2.4 of NFPA 90 A, 2002 edition.

2.4.4 Where electrical resistance or fuel-burning heaters are installed in air ducts, the air duct coverings and their installation shall comply with the provisions of 4.3.5.3. of NFPA 90A, 2002 edition. The installation of electrical duct heaters shall comply with the provisions of NFPA 70, National Electrical Code, Article 424, Part F, "Duct Heaters."

2.5 *Air Distribution.*

2.5.1 *Air Ducts*: Air ducts shall be constructed of iron, steel, aluminum, copper, concrete, masonry, or clay tile as per 4.3.1.1 of NFPA 90 A.

2.5.2 *Per 8.16.1.2, & 8.16.1.2(1) of NFPA 5000, 2006 edition Duct and pipe insulation, coverings, and linings contained in plenums for buildings of all type of construction shall comply with 7.2.3.2.15 of NFPA 5000, 2006 edition. Foam plastic insulations, other than duct and pipe installation, coverings and linings contained in plenums shall comply with Chapter 48 – NFPA 5000, 2006 in all aspects.*2.5.3 *Plenum Material Combustibility: Material exposed to the airflow shall be noncombustible and have a maximum smoke developed index of 50 or comply with 7.2.3.2.15.1,2,3,4,5,6,7, &8 of NFPA 5000, 2006 edition.*

2.5.4 Gypsum Board Air Ducts: Gypsum board having a maximum flame spread index of 25 without evidence of continued progressive combustion and a maximum smoke developed index of 50 when tested in accordance with NFPA 255, Standard Method of Test of Surface Burning Characteristics of Building Materials, shall be permitted to be used for negative pressure exhaust and return ducts where the temperature of the conveyed air does not exceed 52°C (125°F) in normal service. (4.3.1.3.1 of NFPA 90A, 2002 edition)

2.5.5 Per 4.3.1.2 of NFPA 90 A, 2002 edition Class 0 or Class 1 rigid or flexible air ducts tested in accordance with UL 181, Standard for Safety Factory-Made Air Ducts and Air Connectors, and installed in conformance with the conditions of listing shall be permitted to be used for ducts when air temperature in the ducts does not exceed 121°C (250°F) or when used as vertical ducts up to two stories in height.

2.5.6 The materials, thickness, construction, and installation of ducts shall provide structural strength and durability in conformance with recognized good practice.

2.5.7 Air connectors shall conform to 4.3.2 of NFPA 90 A, 2002 edition.

2.5.8 Vibration isolation connectors in duct systems shall be made of an approved flame-retardant fabric or shall consist of sleeve joints with packing of approved material, each having a maximum flame spread index of 25 and a maximum smoke developed index of 50.

Approved flame-retardant fabric having a maximum length of 254 mm (10 in.) in the direction of airflow shall be permitted to be used. (4.3.2.2 & 4.3.2.3 of NFPA 2002, edition)

2.6 *Supplementary Materials* for Air Distribution Systems shall comply with 4.3.3 of NFPA 90 A, 2006 edition.

2.6.1 Closure systems for use with rigid and flexible air ducts tested in accordance with UL 181, Standard for Safety Factory-Made Air Ducts and Air Connectors, shall have been tested, listed, and used in accordance with the conditions of their listings, in accordance with (i) UL 181A, Standard for Safety Closure Systems for Use with Rigid Air Ducts and Air Connectors (ii) UL 181B, Standard for Safety Closure Systems for Use with Flexible Air Ducts and Air Connectors

2.6.2 Air duct, panel, and plenum coverings and linings, and pipe insulation and coverings shall not flame, glow, smolder, or smoke when tested in accordance with a similar test for pipe covering, ASTM C 411, Standard Test Method for Hot-Surface Performance of High-Temperature Thermal Insulation, at the temperature to which they are exposed in service. In no case shall the test temperature be below 121°C (250°F).

2.6.3 Air duct coverings shall not extend through walls or floors that are required to be fire stopped or required to have a fire resistance rating, unless such coverings meet the requirements of 5.4.6.4. Air duct linings shall be interrupted at fire dampers to prevent interference with the operation of devices. Air duct coverings shall not be installed so as to conceal or prevent the use of any service opening. (4.3.3.5 & 6 of NFPA 90 A, 2006 edition)

2.6.4 Air Duct Access and Inspection shall comply with 4.3.4 of NFPA 90 A, 2002 edition.

2.6.5 Air Duct Integrity shall comply with 4.3.5 of NFPA 90 A, 2002 edition.

2.6.6 Corridor Air Systems shall comply with 4.3.11 of NFPA 90 A, 2002 edition.

3.0 I*ntegration of a Ventilation and Air-Conditioning System(s) with Building Construction*:

3.1 Air-Handling Equipment Rooms shall be classified generally into the following three categories (i)Those used as air plenums (usually return air)(ii) Those with air ducts that open directly into a shaft (iii) Other air-handling unit rooms as per 5.1.1 of NFPA 90 A, 2002 edition.

3.2 Air-handling equipment rooms, including the protection of openings, shall be separated from shafts by construction having a fire resistance rating not less than that required for the shaft by 5.3.4 of NFPA 90A, 2002 edition.

3.3 Other spaces housing air-handling units shall meet the requirements of the building code NFPA 5000 & 101 latest editions.

3.4 Air Duct Clearance, Structural Members and Ceiling Assemblies shall comply with 5.2 of NFPA 90 A, 2002 edition.

3.5 Protection of Openings, Penetrations, Fire-rated walls and partitions shall comply with 5.3 of NFPA 90 A, 2002 edition.

3.6 The shaft enclosure shall have a minimum fire resistance rating (based on possible fire exposure from either side of the partition or wall) of 1 hour where such air ducts are located in a building less than four stories in height. The shaft enclosure shall have a minimum fire resistance rating (based on possible fire exposure from either side of the partition or wall) of 2 hours where such air ducts are located in a building four stories or more in height.(5.3.4.2 & 3 of NFPA 90 A, 2002 edition)

3.7 Smoke Barriers application and function shall comply with 5.3.5 of NFPA 90 A, 2002 edition.

3.8 Fire dampers used for the protection of openings in walls, partitions, or floors with fire resistance ratings of less than 3 hours shall have a 1½-hour fire protection rating in accordance with UL 555, Standard for Safety Fire Dampers.

Fire dampers used for the protection of openings in walls, partitions, or floors having a fire resistance rating of 3 hours or more shall have a 3-hour fire protection rating in accordance with UL 555, Standard for Safety Fire Dampers.(5.4.1.1 & 5.4.2 of NFPA 90 A, 2002 edition)

3.9 Smoke Dampers. Smoke dampers used for the protection of openings in smoke barriers or in engineered smoke-control systems shall be classified in accordance with UL 555S, Standard for Safety Smoke Dampers. (5.4.3 of NFPA 90 A, 2002 edition)

3.10 Ceiling dampers or other methods of protecting openings in rated floor- or roof-ceiling assemblies shall comply with the construction details of the tested floor- or roof-ceiling assembly or with listed ceiling air diffusers or listed ceiling dampers.

Ceiling dampers shall be tested in accordance with UL 555C, Standard for Safety Ceiling Dampers. (5.4.4.1 & 5.4.4.2 of NFPA 90 A, 2002 edition)

3.11 Installation & Maintenance of Damper shall be in accordance with 5.4.6 & 7 of NFPA 90 A, 2002 edition)

4.0 *Controls and Acceptance Testing*:

4.1 Controls and Acceptance Testing shall be in accordance with Chapter 6 & Chapter 7 of NFPA 90 A, 2002 edition)

4.2 ANNEX A, B & C of NFPA 90 A, 2002 edition shall be referred for Performance Based Application, Installation and Testing of Air Handling Systems & Equipments.

5.0 *Test Reports & Listing Documents*:

5.1 Material lists & technical submittals with test reports and proof of Listings shall be submitted by Manufacturers / Contractors for review & approval by EHS- Fire Dept prior to purchase of materials.

Note:

a) 1 to 5 as above(i) provides only an outline of the specific requirement(s) of EHS-Fire Dept for the guidance of qualified & approved consultants/users & (ii) serves as ready reckoner for maintaining consistency in approach. However, the consultants/users are cautioned and advised that they meet all requirements/recommendations as specified / cited in drawing review report(s) issued by EHS-Fire Department.

b) Consultant shall submit design drawings meeting the above requirements and obtain approval of EHS – Fire Department, before commencement of construction works.

c) Refer to Fire Department and relevant codes & standards for additional information/details.

APPENDIX – 13

FIRE TRAINING REQUIREMENTS

SR. NO.	OCCUPANCY CHARACTERISTICS	TOTAL NO. OF EMPLOYEES TO BE TRAINED IN FIRST AID FIRE FIGHTING	TOTAL NUMBER OF EMPLOYEES TO BE TRAINED IN FIRE HOSES, FIXED INSTALLATIONS, FIRE ALARM SYSTEMS, AND AUTOMATIC FIRE SUPPRESION SYSTEMS. ETC.
1.	OFFICES, ASSEMBLY, COMMERCIAL, RESIDENTIAL, SHOPS.	5%	5%
2.	INDUSTRIES		
	(2.1) HIGH RISK	ALL	ALL
	(2.2) MEDIUM RISK	10%	10%
	(2.3) LOW RISK	5%	5%
3.	STORAGE		
	(3.1) HIGH FUEL RISK	ALL	ALL
	(3.2) MEDIUM FUEL RISK	10%	10%
	(3.3) LOW FUEL RISK	5%	5%

List of approved training facility / institutions

Sl. No	Name	Contact Details
1	PCFC Training Facility at West Fire Station Near R/A 11.	Tel: 04 - 8835999 Fax: 04 - 8839171
2	Dubai Civil Defence Training Center, Al Aweer, Dubai.	Tel: 04- 2870666 Fax: 04 – 2871210
3	Gulf Technical & Safety Training Center, Abu Dhabi.	El: 02 – 5541220 Fax: 02 – 5541716

APPENDIX – 14

AVOIDANCE OF FALSE ALARMS FROM AUTOMATIC SMOKE DETECTORS

Sl.No	CAUSE	PREVENTIVE/CORRECTIVE MEASURES	RESPONSIBILITY
1	Accumulation of dust inside the detector	Sensitivity adjustment depending on the ambient dust level in the protected area.	Maintenance Contractor
2	Smoking	To avoid smoking in the area protected by smoke detectors.	Building Occupant / Owner
3	Artificial simulation of "smoke condition" by dust (getting kicked up) due to clean up activities viz. sweeping, blowing etc.	Prior intimation to DPA/JAFZA Emergency Control Centre (Tel: 8833222) and all building occupants before commencing clean-up activities.	Building Occupant / Owner
4	Smoke generated by welding & cutting processes	1. Detectors to be disabled/isolated temporarily (short term measure). 2. Detectors to be disabled/isolated temporarily through zone isolation panel(s) (to be installed as long term measure) 3. Prior intimation to DPA/AFZA Emergency Control Centre (Tel: 8833222) (Refer to Tables 2 & 3)	Building Occupant / Owner
5	Ingress of insects into detectors	Treatment of the protected areas with insecticides at regular intervals.	Building Occupant / Owner
6	Repairs to or periodical checking of fire alarm panels, circuits & loops etc.	Prior intimation to DPA/JAFZA Emergency Control Centre (Tel: 8833222).	Maintenance Contractor
7	Earth fault	To be rectified	Maintenance Contractor
8	Loop fault	To be rectified	Maintenance Contractor
9	Faulty detector	Detector to be replaced	Maintenance Contractor
10	Faulty panel	To be rectified	Maintenance Contractor
11	Faulty selection of detector	Replacement by appropriate type of detector (Refer to Tables 2 & 3)	Maintenance Contractor

APPENDIX –15

DOCUMENTS SUBMISSION SCHEDULE
(MEP SERVICES and Fixed Fire Protection and Suppression Installations/Systems)

Sl. No.	Drawings	Date of Submission [Tentative]
1	Fire Detection & Alarm System	
2	Emergency Warning Systems	
3	Portable Fire Extinguishers	
4	Fixed Fire Protection & Suppression Installations / systems consisting of the following systems (as applicable): - Standpipe & hose, Sprinkler, Water Spray, Hydrant, Fire Water Pumping and Tank Station, Foam, Dry Chemical, Carbon-dioxide, Chemical, Wet Clean Agent, Water Mist and Smoke & Heat Ventilation	
5	Design Basis Calculations for Each System	
6	Equipment Submittal for Each System	

Note: The requirements concerning some of the systems / installations mentioned at 4 above are contained in Appendices 23, 24, 25, 26, 27 & 28. The same provide only an outline of the specific requirement(s) of EHS-Fire Dept for the guidance of qualified & approved consultants/users & (ii) serves as ready reckoner for maintaining consistency in approach.

APPENDIX –16

REQUIREMENTS FOR DESIGN OF FIRE WATER PUMPS

(1) Pumps shall conform to NFPA **20 in** all respects.

(2) Proposed models of pumps / drivers /controllers shall be listed in the latest edition of UL & FM directories

(3) **FWP** shall be installed with flooded suction conditions. The minimum water level for FWP shall be fixed above the level of pump casing if Horizontal Pumps are installed. If Vertical Turbine Pumps are installed, the minimum submergence level recommended by Pump Manufacturer shall be complied. The Tank depth shall be finalized based on this data. Level Indicator & Level switch shall be installed to monitor the water levels and transmit alarm to BMS for taking corrective actions.

Pump with Suction Lift is not allowed by **Section 6.1.2 , NFPA – 20 .**

(4) The Fire pump unit, consisting of pump, driver, controller, reliable normal power supply/an alternative power supply where required and water supply arrangement & accessories, shall be initially selected in accordance with (1) & (2) above by the concerned Consultant / Client and later by EHS–Fire & Rescue Dept, if all the requirements are satisfied / strictly met. , for the project and field conditions encountered as per **Section 5.2.4, NFPA 20.**

(5) The pump manufacturer shall send test report for pump, drive and controller certified by Pump Manufacturer.

(6) The Engine Exhaust pipe shall be provided with a Residential **Grade Muffler** if installed inside Buildings, to restrict the noise to acceptable dB levels (approx. 85 to 90 dB).
Industrial Type Mufflers (noise level approx. 110 to 140) may be acceptable subject to its application and location.

The engine exhaust pipe size if exceeds 5M, pipe size shall be increased as per Pump/ Engine Manufacturer's recommendations to achieve desired engine performance at site conditions.

Engine Manufacturer shall furnish the maximum permissible Back Pressure for engine. The Contractor shall submit design calculations based on as erected piping system to satisfy Manufacture's requirements.

(7) **Tests Requirements**
All Acceptance Tests and Performance shall be as per guidelines given in Section **14 of NFPA – 20**.
Section 14.1 - Hydrostatic Tests & Flushing
Section 14.2 - **Field Acceptance Tests**
Tests shall be carried out by Factory – authorized representatives as per **Section 14.2.1**.
Field Acceptance Tests will be witnessed by **GFD as** per **Section 14.2.2.**

(8) **Equivalencies**
Equivalencies to any established prescriptive criteria of NFPA and its companion codes, standards and publications may be approved by the EHS-Fire Dept / AHJ, if the alternative fire protection engineering design provides an equivalent level of fire protection and life safety. Written requests for approval shall include justification demonstrating equivalencies on the basis of pertinent data. Approved equivalencies and alternatives shall only apply to the specific building, facility or structure involved in extraordinary case where no technical alternatives exist; and shall not constitute blanket approval for similar cases.

NB

(d) 1 to 8 as above (i) provide only an outline of the specific requirement(s) of EHS-Fire Dept for the guidance of qualified & approved consultants/users & (ii) serves as ready reckoner for maintaining consistency in approach. However, the consultants/users are cautioned and advised that they meet all requirements/recommendations as specified / cited in drawing review report(s) issued by EHS-Fire Department.

(e) Consultant shall submit design drawings meeting the above requirements and obtain approval of EHS – Fire Department, before procurement of materials.

(f) Refer to Fire Department and relevant codes & standards for additional information/details.

APPENDIX-17

REQUIREMENTS FOR DESIGN OF WATER TANK FIRE WATER PUMP ROOM

1.0 Fire Water Tank (FWT)

1.1 The Water Tank shall be designed in accordance with NFPA – 22 in all respects.

1.2 The **FWT** shall be constructed in two equal compartments with isolation facilities to allow periodic cleaning and maintenance works of each compartment.

2.0 Fire Water Pump Room

2.1 The Pump room shall be designed in accordance with Section 5.12, NFPA- 20.

The Pump room shall be provided with proper ventilation system and allow sufficient intake air for the diesel engine ensuring satisfactory performance.

2.2 The Fuel Oil Tank **(FOT**) shall be fitted with a Level Indicator and a Level Switch.

2.3 The following signals shall be annunciated on the FACP and BMS Panel :

a) Low Level Alarm in FWT for FWP.
b) Low Level Alarm in FWT for domestic water pumps (if installed).
c) Low Level Alarm in FOT.
d) FWP ' fails to start ' (all pumps)
e) Normal Source Power Failure

2.4 All Flow and instrument parameters shall be specified. Pump Start Up / Operational logic notes shall be submitted.

2.5 Pump Room Equipment layout – Plan & Section (1: 20 Scale) , Water Tank with water levels and suction pipe arrangement shall be submitted.

2.6 Fire Water Pump sets Fire Protection

The Pump Room shall be protected by sprinkler system in accordance with Section 5.12.13 , NFPA-20 and designed as per Section A – 7- 10.28 (o) , NFPA – 13.

2.7 Generator Set Fire Protection

The Generator Set Room shall be protected by sprinklers designed in accordance with Section A-7-10.28 (n), NFPA – 13.

3.0 Equivalencies

Equivalencies to any established prescriptive criteria of NFPA and its companion codes, standards and publications may be approved by the EHS-Fire Dept / AHJ, if the alternative fire protection engineering design provides an equivalent level of fire protection and life safety. Written requests for approval shall include justification demonstrating equivalencies on the basis of pertinent data. Approved equivalencies and alternatives shall only apply to the specific building, facility or structure involved in extraordinary case where no technical alternatives exist; and shall not constitute blanket approval for similar cases.

NB

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(b) Consultant shall submit design drawings meeting the above requirements and obtain approval of EHS – Fire Department, before procurement of materials.

(c) Refer to Fire Department and relevant codes & standards for additional information/details.

APPENDIX-18

REQUIREMENTS FOR DESIGN OF PIPES & VALVES - FIRE WATER SERVICE

1.0 ABOVE GROUND PIPING

1.1 **Steel Pipes Size - 2 inch NB & smaller**

1.1.1 Pipe**:** Mill galvanized, Sch 40, conforming to ASTM A53 Gr. B / ASTM A 795 Gr. B, **seamless s**hall be preferable. ERW pipes shall also be acceptable subject to use of approved quality pipes.

1.1.2 **Threaded Fittings:** Malleable Iron, mill galvanized conforming to ANSI B16.3.

1.2 **Steel Pipes - 2.5 inch size & larger**

1.2.1 **Pipe : BLACK** (where welded pipes are to be installed) **Mill galvanized** (where grooved couplings are permitted) , conforming to ASTM A53 Gr. B / ASTM A 795 Gr. B , **seamless** shall be preferable.

ERW pipes shall also be acceptable subject to use of approved quality pipes

1.2.2 **Fittings:**

a) Butt welded fittings conforming to ASME B 16.9 [ANSI B 16.25 Ends]
b) Pipe Flanges conforming to ASME B 16.5
c) **Listed** Grooved couplings & Fittings

2.0 UNDERGROUND PIPING [6 inch and Larger]

2.1 **Ductile Iron Pipes**

a) Pipe - conforming to AWWA C 151
b) Fittings - conforming to AWWA C 110
c) Joints - conforming to AWWA C 115
d) Anticorrosive Protection - conforming to AWWA C 105

2.2 **Steel Pipes**

a) Black or mill galvanized , ASTM A 53 , seamless , Schedule 40 , with epoxy coat and anticorrosive surface protection . Proposed materials shall be submitted for approval.

b) The fittings shall be butt welded or socket welded. Joints shall be flanged.

3.0 Non Metallic Pipes

Use of **Non** metallic pipes – CPVC and others shall be used for sprinkler system in accordance with provisions of NFPA – 13 D & 13 R.

4.0 VALVES

4.1 General

All isolating on – off valves shall be OS & Y type and Listed unless otherwise specified. The Valve downstream of Flow Meter shall be Globe Type to for ease of throttling.

Valves upstream of Alarm Control Valve & isolation valves on each wet riser shall be provided with supervisory switch for remote monitoring.

4.2 Valves shall be rated for pressure and temperature service.

5.0 Technical Submittals

Manufacturer's Technical Data Sheet with material specification and pressure ratings, Listings and Approval Certificates shall be submitted for review and acceptance.

6.0 Equivalencies Equivalencies to any established prescriptive criteria of NFPA and its companion codes, standards and publications may be approved by the EHS-Fire Dept / AHJ, if the alternative fire protection engineering design provides an equivalent level of fire protection and life safety. Written requests for approval shall include justification demonstrating equivalencies on the basis of pertinent data. Approved equivalencies and alternatives shall only apply to the specific building, facility or structure involved in extraordinary case where no technical alternatives exist; and shall not constitute blanket approval for similar cases.

NB

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(b) Consultant shall submit design drawings meeting the above requirements and obtain approval of EHS – Fire Department, before procurement of materials.

(c) Refer to Fire Department and relevant codes & standards for additional information/details.

APPENDIX-19

REQUIREMENTS FOR DESIGN OF FIRE & SMOKE CONTROL DOORS

1.0 The rating of Doors shall be selected for each occupancy classification as per NFPA – 101. The ratings vary depending on whether the building is fully sprinklered or unsprinklered.

2.0 **Fire rated Doors – Protected stairway**

2.1 A fire door forming part of the enclosure of protected stairway shall be 1 hour fire rated including frame and ironmongery.

2.2 All doors shall have self closing device.

2.3 All doors shall be provided with insulated vision panel.

2.4 Final exit door at the ground floor shall have panic bolt or panic latch and should have the words 'PUSH BAR TO OPEN'.

2.5 A notice with the words 'Fire door keep shut' in lettering of appropriate size [both English & Arabic] should be permanently displayed at eye level on both the faces of the doors.

3.0 **Smoke control Doors – Doors Sub-dividing corridors (where applicable)**

3.1 Smoke stop doors shall be double swing opening and shall be 20 min. Fire rated.

3.2 Leakage rate shall not exceed $3m^3$ /h / m at 25pa or the threshold gap should not exceed 3mm at any point.

3.3 Doors shall be provided with insulated vision panel.

4.0 **Other Doors**

Details of door shall be submitted for comments / approval.

5.0 **APPROVALS:**

5.1 The local Agent / Distributor shall have a valid certificate from Dubai Civil Defense.

5.2 Fire doors should be clearly and permanently marked with the fire rating established by recognized Test Houses. The Door Rating refers to door with frame and ironmongery.

6.0 **Equivalencies**

Equivalencies to any established prescriptive criteria of NFPA and its companion codes, standards and publications may be approved by the EHS-Fire Dept / AHJ, if the alternative fire protection engineering design provides an equivalent level of fire protection and life safety. Written requests for approval shall include justification demonstrating equivalencies on the basis of pertinent data. Approved equivalencies and alternatives shall only apply to the specific building, facility or structure involved in extraordinary case where no technical alternatives exist; and shall not constitute blanket approval for similar cases.

NB

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(b) Consultant shall submit design drawings meeting the above requirements and obtain approval of EHS – Fire Department, before procurement of materials.

(c) Refer to Fire Department and relevant codes & standards for additional information/details.

APPENDIX-20

REQUIREMENTS FOR DESIGN OF ELEVATORS AS PER NFPA - 101

1.0 **General (Construction Features)**
New Elevators: New Elevators shall be designed in accordance with ASME A 17.1 " Safety Code for Elevators & Escalators ", with special reference to Section 2.11 entitled " Protection of Hoist way Openings". (Refer **to Section 9.4.2.1, NFPA – 101**).

2.0 **Number of Cars:** The number of elevator cars permitted in a hoist way shall be in accordance with the following: -

2.1 Where there are three or fewer elevator cars in a building, they shall be permitted to be located within the same hoist way enclosure.

2.2 Where there are four elevator cars in a building, they shall be divided in such a manner that not less than two separate hoist way enclosures are provided.

2.3 Where there are more than four elevator cars in a building, the number of elevator cars located within a single hoist way shall not exceed four (**Refer to Section 8.6.8.3 & 9.4.5 NFPA – 101**).

3.0 **Elevator Machine Rooms and Standby Power to Ventilation & A/c System**
Elevator machine rooms that contain solid state equipment for elevators having a travel distance exceeding 15 metres above the level of exit discharge or exceeding 9150 mm below the level of exit discharge shall be provided with independent ventilation or air conditioning systems required to maintain temperature during fire fighter's service operation.
When standby power is connected to the elevator, the machine room ventilation or air conditioning shall be connected to the standby power. (Refer **to Section 9.4.5, NFPA – 101**).

4.0 **Openings:** Elevators serving various stories of building shall not open to an exit. (**Refer to Section 9.4.7, NFPA – 101**).

5.0 **Elevator Testing:** Elevators shall be subjected to periodic inspections and tests as specified in ASME A 17.1. All elevators equipped with fire fighter's emergency operation shall be subject to monthly operation with a written record of the findings made and kept on the premises as required by ASME A 17.1. (Refer **to Section 9.4.6, NFPA – 101**).

6.0 **Fire Fighter's Emergency Operation:** All new elevators shall conform to emergency operation requirements of ASME A17.1. (Refer **to Section 9.4.3.1, NFPA – 101**).

7.0 Lifts designed in accordance with Dubai Municipality standards shall also be approved.

8.0 **Equivalencies**
Equivalencies to any established prescriptive criteria of NFPA and its companion codes, standards and publications may be approved by the EHS-Fire Dept / AHJ, if the alternative fire protection engineering design provides an equivalent level of fire protection and life safety. Written requests for approval shall include justification demonstrating equivalencies on the basis of pertinent data. Approved equivalencies and alternatives shall only apply to the specific building, facility or structure involved in extraordinary case where no technical alternatives exist; and shall not constitute blanket approval for similar cases.

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(b) Consultant shall submit design drawings meeting the above requirements and obtain approval of EHS – Fire Department, before procurement of materials.

(c) Refer to Fire Department and relevant codes & standards for additional information/details.

APPENDIX-21

SPECIFICATION FOR PILLAR HYDRANTS

1.0 CODES AND STANDARDS

The Pillar Type Hydrant shall conform to AWWA C 502 and shall be UL listed, FM approved.

2.0 CONSTRUCTION FEATURES

2.1 Pillar Hydrant

The pipe connecting each Pillar Hydrant to the mains shall be not less than 6 inch. The lower and upper barrel of pillar hydrant shall be 6 inch.

The upper barrel above grade level shall be provided with two (2)2.5 inch size valved outlets conforming BS 336 **instantaneous female** with cap & chain and one (1) connection 4 inch size, **round male thread** conforming to BS : 336 with cap & chain. The lower barrel below grade level shall be provided with a valve and a stem extending to the top of the pillar hydrant with an operating nut pentagonal design. The barrel shall be provided with a breakable flange.

3.0 HYDRANT INSTALLATION REQUIREMENTS

3.1 The depth of cover over buried pipes shall be as per Section 8 – 1.1, NFPA –24.

3.2 The flushing of pipelines shall be as per Section 8 – 8.2 , NFPA – 24 .Washout Chamber shall be provided at appropriate locations.

3.3 The pipes shall be hydro tested as per Section 8 – 9.3 , NFPA – 24.

3.4 The capacity rating , color coding , residual pressure & flow testing shall be as per NFPA-291.

3.5 Adequate number of sectionalizing valves shall be provided on the MAINS and at all branch lines

3.6 Protection barriers shall be provided around the pillar hydrants.

4.0 SPACING OF HYDRANTS

	Spacing - M e t r e s
4.1 Residential Type Occupancies	100
4.2 Storage Type Occupancies	
4.2.1 Light Hazard	100
4.2.2 Ordinary Hazard	75
4.2.3 High Hazard	50 or less
4.3 Industrial Type Occupancies	
4.3.1 General	100
4.3.2 Special Purpose	75
4.3.3 High Hazard	50 or less

5.0 A sample of Hydrant Assembly, Technical Data Sheet, cross sectional drawing with part name, and numbers, UL & FM Approval Documents shall be submitted to Fire Department for review.

6.0 Equivalencies

Equivalencies to any established prescriptive criteria of NFPA and its companion codes, standards and publications may be approved by the EHS-Fire Dept / AHJ, if the alternative fire protection engineering design provides an equivalent level of fire protection and life safety. Written requests for approval shall include justification demonstrating equivalencies on the basis of pertinent data. Approved equivalencies and alternatives shall only apply to the specific building, facility or structure involved in extraordinary case where no technical alternatives exist; and shall not constitute blanket approval for similar cases.

NB

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(b) Consultant shall submit design drawings meeting the above requirements and obtain approval of EHS – Fire Department, before procurement of materials.

(c) Refer to Fire Department and relevant codes & standards for additional information/details.

APPENDIX-22

SPECIFICATION FOR UNDERGROUND HYDRANTS

1.0 **Codes and Standards:** The underground Hydrant shall conform to BS 750, Screw – down Type 2 Design.

2.0 **Approval Documents:** Dubai Civil Defense.

3.0 **Construction Features:** The construction features comply with BS 750 for Type 2 Design.

4.0 **Materials of Construction:** One of the alternate materials as per BS 750 or materials suited to the quality of water handled for specific project, subject to approval of Fire Department.

5.0 **Test Requirements**

Hydrant shall be Tested in accordance with Section 6.3.2.
Test Certificate from a competent Test House shall be submitted for review and approval.

6.0 **INSTALLATION REQUIREMENTS**

6.1 The depth of cover over buried pipes shall be as per Section 8 – 1.1, NFPA –24.
6.2 The flushing of pipelines shall be as per Section 8 – 8.2, NFPA – 24. Washout Chamber shall be provided at appropriate locations.
6.3 Adequate number of sectionalizing valves shall be provided on the MAINS .
6.4 Hydrant shall be housed in a surface box . Drawing of Hydrant with surface box shall be submitted for review and approval.

7.0 **SPACING OF HYDRANTS**

	Spacing - Metres
7.1 Residential Type Occupancies	100
7.2 Storage Type Occupancies	
7.2.1 Light Hazard	100
7.2.2 Ordinary Hazard	75
7..2.3 High Hazard	50 or less
7.3 Industrial Type Occupancies	
7.3.1 General	100
7.3.2 Special Purpose	75
7.3.3 High Hazard	50 or less

8.0 Technical Data Sheet, Catalogue, Drawings of hydrant and accessories shall be submitted for Fire Department review.

9.0 Equivalencies: Equivalencies to any established prescriptive criteria of NFPA and its companion codes, standards and publications may be approved by the EHS-Fire Dept / AHJ, if the alternative fire protection engineering design provides an equivalent level of fire protection and life safety. Written requests for approval shall include justification demonstrating equivalencies on the basis of pertinent data. Approved equivalencies and alternatives shall only apply to the specific building, facility or structure involved in extraordinary case where no technical alternatives exist; and shall not constitute blanket approval for similar cases.

NB

(a) 1 to 9 as above (i) provide only an outline of the specific requirement(s) of EHS-Fire Dept for the guidance of qualified & approved consultants/users & (ii) serves as ready reckoner for maintaining consistency in approach. However, the consultants/users are cautioned and advised that they meet all requirements/recommendations as specified / cited in drawing review report(s) issued by EHS-Fire Department.
(b) Consultant shall submit design drawings meeting the above requirements and obtain approval of EHS – Fire Department, before procurement of materials.
(c) Refer to Fire Department and relevant codes & standards for additional information/details.

APPENDIX-23

REQUIREMENTS FOR PORTABLE FIRE EXTINGUISHERS

1.0 Carbon Dioxide

1.1 Codes reference	: NFPA – 10
1.2 Test Standard	: UL 711
1.3 Performance Standard	: ANSI /UL 154
1.4 Technical Data	: Submit Manufacturer's Data Sheet
1.5 Test Certificate	: Submit Certificate from Recognized Test House
1.6 Capacity	: As per project requirements
1.7 Effective Range	: Manufacturer to guarantee Range

2.0 Dry Chemical Powder

2.1 Code reference	: NFPA – 10
2.2 Test Standards	: UL 711
2.3 Performance Standards	: ANSI /UL 299
2.4 Technical Data	: Submit Manufacturer's Data Sheet
2.5 Test Certificate	: Submit Certificate from Recognized Test House
2.6 Capacity	: As per project requirements
2.7 Effective Range	: Manufacturer to guarantee Range

3.0 Stored Pressure Water

3.1 Codes and Standards	: NFPA – 10
3.2 Test Standards	: UL 711
3.3 Performance Standards	: UL 626
3.4 Technical Data	: Submit Manufacturer's Data Sheet
3.5 Test Certificate	:Submit Certificate from Recognized Test House
3.6 Capacity	:As per project requirements
3.7 Effective Range	: Manufacturer to guarantee Range

Note: Fire extinguishers conforming to other International Standards having DCD approval shall also be acceptable where the clients/users have not specified / expressed compliance with the above NFPA code / UL & ANSI standards. However, manufacturer's Certified Test Data, standards references, listing etc. shall be submitted in all cases.

NB

(a) This document (i) provides only an outline of the specific requirement(s) of EHS-Fire Dept for the guidance of qualified & approved consultants/users & (ii) serves as ready reckoner for maintaining consistency in approach. However, the consultants/users are cautioned and advised that they meet all requirements/recommendations as specified / cited in drawing review report(s) issued by EHS-Fire Department.

(b) Consultant shall submit design drawings meeting the above requirements and obtain approval of EHS – Fire Department, before procurement of materials.

(c) Refer to Fire Department and relevant codes & standards for additional information/details.

Appendix-24

REQUIREMENTS FOR APPLICATION, INSTALLATION, LOCATION, PERFORMANCE AND MAINTENANCE OF FIRE ALARM SYSTYEM

STANDARDS: Application, installation, location, performance, and maintenance of Fire Alarm Systems and their components shall comply with recommendations of NFPA 72(Including Annex – A & B),70 & 101, the NFPA Referenced Publications, ANSI Publications and Informational References.

PURPOSE: The purpose of standard references shall be to define the means of signal initiation, transmission, notification, and annunciation; the levels of performance; and reliability of the various types of Fire Alarm Systems. All components of Fire Alarm System shall be specifically LISTED for its service.

APPLICATION: As per Section 1.3 of NFPA 72, 2002 edition.

DEFINITIONS: All related systems and components definitions shall mean NFPA Official Definitions & General Definitions per Sections 3.2 & 3.3 of NFPA 72, 2002 edition.

SYSTEM REQUIREMENTS :

1. Equipments, Personnel, System, Power Supplies, Power Sources (Primary & Secondary), Capacity & Continuity, Over current Protection , Integrity Monitoring and Records shall comply with Chapter -4, NFPA 72, 2002 edition.
2. **Smoke** and Heat Detectors coverage shall comply with Section 5.5 of NFPA 72, 2002 edition. All Detectors shall be specifically LISTED for its service. Temperature coding shall be as per Table 5.6.2.1.1 of NFPA 72, 2002 edition, for Heat sensing detectors.
3. Spacing of Detectors shall be as per Section 5.6.5 of NFPA 72, 2002 edition. (Refer Annex A & B of NFPA 72, 2002)
4. All Smoke Detectors shall be OPTICAL, Photo Electric Type. (Ionization type shall not be permitted)
5. Manually Actuated Fire Alarm Devices shall comply with Section 5.12 of NFPA 72, 2002 edition.
6. Protected Premises Fire Alarm Systems shall comply to Chapter 6, NFPA 72, 2002 edition in reference to Application, System Performance & Integrity, Class, Signaling Paths & System Requirements.
7. System Cables shall be LISTED for its service.
8. Indicating Devise Circuits (IDC) shall be as per table 6.5 of NFAP 72, 2002 edition.
9. Signaling Line Circuits (SLS) shall be as per table 6.6.1 of NFAP 72, 2002 edition.
10. Notification Appliance Circuits (NAC) shall be as per table 6.7 of NFPA 72, 2002 edition.
11. Alarm signals outputs & inputs shall be monitored, controlled & operated through LISTED equipments.
12. Notification Appliances for Fire Alarm Systems shall comply with Chapter 7, NFPA 72, 2002 edition. All appliances shall be specifically LISTED for its service.
13. Room Spacing for Wall and Ceiling mounted visible appliances, shall be as per tables 7.5.4.11(a) & 7.5.4.1.1(b) of NFPA 72, 2002 edition.
14. Supervising Station Fire Alarm Systems shall comply with Chapter 8 of NFPA 72, 2002 edition in all aspects.
15. Public Fire Alarm Reporting System shall comply with recommendations in Chapter 9, NFPA 72, 2002 edition.
16. The Fire Alarm system shall be compatible and integrated with voice alarm system.

17. Inspection, Testing, & Maintenance of Fire Alarm System shall comply with recommendations, procedures and recordings of Chapter 10, NFPA72, 2002 edition.
18. Annex – A & Annex –B of NFPA 72, 2002 edition shall be referred for Performance Based Application, Installation and Testing of Fire Alarm Systems.
19. Listing: System and components of Fire Alarm System shall be LISTED for its service. Listing bodies shall comply with NFPA standards, and acceptable to Authority Having Jurisdiction; EHS – Fire Dept.
20. Equivalencies: Equivalencies to any established prescriptive criteria of NFPA and its companion codes, standards and publications may be approved by the EHS-Fire Dept / AHJ, if the alternative fire protection engineering design provides an equivalent level of fire protection and life safety. Written requests for approval shall include justification demonstrating equivalencies on the basis of pertinent data. Approved equivalencies and alternatives shall only apply to the specific building, facility or structure involved in extraordinary case where no technical alternatives exist; and shall not constitute blanket approval for similar cases.

NB:

(a) 1 to 20 as above (i) provide only an outline of the specific requirement(s) of EHS-Fire Dept for the guidance of qualified & approved consultants/users & (ii) serves as ready reckoner for maintaining consistency in approach. However, the consultants/users are cautioned and advised that they meet all requirements/recommendations as specified / cited in drawing review report(s) issued by EHS-Fire Department.

(b) Consultant shall submit design drawings meeting the above requirements and obtain approval of EHS – Fire Department, before procurement of materials.

(c) Refer to Fire Department and relevant codes & standards for additional information/details.

Appendix-25

REQUIREMENTS FOR DESIGN, INSTALLATION & TESTING OF CLEAN AGENT EXTINGUISHING SYSTEM

1.0 Standards

The design , installation & Testing shall comply with NFPA – 2001, 2004 Edition including the referenced NFPA , ANSI , ASME , ASTM , CGA ,ISO , UL publications. The section and table references given below are from NFPA –2001, 2004 Edition unless otherwise noted.

2.0 System Requirements

2.1 System Design

The system design shall comply with Chapter 5.

2.1.1 Working plans and flow calculations shall be as per Section 5.1 & 5.2.

2.1.2 Design shall take into account the factors noted in Section 5.3, 5.4, 5.5.

2.1.3 Agent discharge time shall comply with Section 5.7.1.2.

2.2 Type of Clean Agents

2.2.1 The type of clean agent (Halogenated agent or Inert) its suitability and the storage space shall be proposed by Consultants. The same including System Configuration and layout shall be discussed and finalized with Fire Dept.

2.2.2 The proposed agent properties shall meet the standards of quality given in Table 4.1.2(a) , 4.1.2(b) & 4.1.2(c).

2.2.3 The Agent shall meet the safety limits as per Section 1.5.

2.3 Agent Storage Containers

2.3.1 The Storage Containers shall be manufactured in accordance with Section 4.1.4.2.

2.3.2 The containers shall be installed outside the protected room in a safe and accessible area. The storage temperature shall not exceed the maximum permissible temperature limit.

2.4 Discharge Piping

2.4.1 The pipe schedule shall be determined in accordance with Section 4.2.1.1.

2.4.2 Pipe joints & fittings shall comply with Section 4.2.2, 4.2.3.

2.5 Discharge Nozzles

The discharge nozzles sizes shall be as per the flow calculations to be reviewed & approved by Fire Dept.

2.6 Fire Detection , Alarm & Control System

Detection, alarm and control system shall comply with Section 4.3. The Fire Alarm cables shall be fire resistant. The Control panel shall be suitable for interfacing with shutdown systems to ensure satisfactory performance of extinguishing system .

2.7 The Manufacturer shall be the single entity responsible for design , supply , installation & performance of the system

3.0 Testing & System Acceptance

Inspection and Tests shall be carried out as per Section 6.1, 6.2, 6.3, 6.4, 6.7. Installer shall maintain Log of all the tests carried out and submit to Fire Dept. after installation. The tests to be witnessed at site will be advised by Fire Dept.

4.0 Listings

The software used for flow calculations shall be UL Listed.

All the components of the system shall be Listed for their intended services. The Listing bodies (with product directories) shall comply with NFPA Standards and acceptable to Fire Dept.

5.0 **<u>Equivalencies</u>:** Equivalencies to any established prescriptive criteria of NFPA and its companion codes, standards and publications may be approved by the EHS-Fire Dept / AHJ, if the alternative fire protection engineering design provides an equivalent level of fire protection and life safety. Written requests for approval shall include justification demonstrating equivalencies on the basis of pertinent data. Approved equivalencies and alternatives shall only apply to the specific building, facility or structure involved in extraordinary case where no technical alternatives exist; and shall not constitute blanket approval for similar cases.

<u>NB:</u>

(a) 1 to 20 as above (i) provide only an outline of the specific requirement(s) of EHS-Fire Dept for the guidance of qualified & approved consultants/users & (ii) serves as ready reckoner for maintaining consistency in approach. However, the consultants/users are cautioned and advised that they meet all requirements/recommendations as specified / cited in drawing review report(s) issued by EHS-Fire Department.

(b) Consultant shall submit design drawings meeting the above requirements and obtain approval of EHS – Fire Department, before procurement of materials.

(c) Refer to Fire Department and relevant codes & standards for additional information/details.

Appendix-26

REQUIREMENTS FOR DESIGN, INSTALLATION & TESTING OF STANDPIPE AND HOSE SYSTEM

1.0 Standards

The design , installation & Testing shall comply with NFPA – 14 , 2007Edition including the referenced NFPA , ANSI , ASME , ASTM , AWS , AWWA publications. The section and table references given below are from NFPA – 14, 2007 Edition unless otherwise noted.

2.0 System Requirements

2.1 System Design

The system design shall comply with Chapter 5 & 7.

2.1.1 The Class of System shall be as per Section 5.3 & 5.4

2.1.2 The system components – pipe , fittings and valves shall be selected as per the limitations set forth in Section 7.2 & 7.8.

2.1.3 The flow demand for each riser shall be taken as 250 US GPM.

If the Fire water pump also serves the sprinklers , the system demand shall Be taken as follows :

a) 500 US GPM for two 2.5 inch hose stream application at hydraulically remotest points and maximum sprinkler demand at the hydraulically remotest floor, both the system operating together for Class III system.

b) 100 US GPM for 1.5 or 1.0 inch hose stream application and maximum sprinkler demand at the hydraulically remotest floor , both the systems operating together Class II system.

2.1.4 If the pump serves only Class II Equipment – 1.5 inch and / or 1.0 inch hose stations, the pump capacity shall be 100 US GPM , for any number of hose stations. The Hose Rack with nozzle and Hose Reel with nozzle shall be Listed.

2.1.5 The minimum residual pressure at hydraulically remotest 2.5 inch hose connection shall be 6.9 bar and at 1.5 inch hose connection shall be 4.5 bar, as per Section 7.8.1 & 7.8.2. Approved pressure – regulating devices shall be used as per Section 7.8.3.1 & 7.8.3.2.

2.1.6 The system configuration shall be on the guidelines of schemes given in Figure A.7.1 (a), (b) or (c). A common riser supplying water to hose and sprinkler / spray system shall not be permitted. The system schematic shall be discussed and finalized with Fire Dept

2.1.7 The hydraulic calculations shall be as per the guidelines of Section 8.1. The Software used for hydraulic calculations shall be acceptable to and approved by Fire Dept. The orifice size, flow and pressure characteristics of flow devices – Hose reel nozzle, hose rack nozzle, sprinkler, shall be submitted with he calculations.

2.1.8 The pipe, fittings and valves shall comply with the requirements contained in Annex–A.

2.1.9 The Fire Water Pump shall comply with the requirements contained in Annex – B.

2.1.10 The materials for pipes and fittings shall comply with the requirements contained in Annex – C. The pipe supports shall comply with Chapter 9, NFPA – 13, 2002 Edition.

2.2 System Installation

The system shall be installed as per Chapter 6.

3.0 Testing and System Acceptance

Flushing, Hydro Test and Flow Test shall be carried out as per Chapter 11. Installer shall maintain Log of all the tests carried out and submit to Fire Dept after installation. The tests to be witnessed at site will be advised by Fire Dept.

4.0 Listings and Approvals

All the components of the system shall be Listed for their intended services. The Listing bodies (with product directories) shall comply with NFPA Standards and acceptable to Fire Dept.

5.0 **Equivalencies:** Equivalencies to any established prescriptive criteria of NFPA and its companion codes, standards and publications may be approved by the EHS-Fire Dept / AHJ, if the alternative fire protection engineering design provides an equivalent level of fire protection and life safety. Written requests for approval shall include justification demonstrating equivalencies on the basis of pertinent data. Approved equivalencies and alternatives shall only apply to the specific building, facility or structure involved in extraordinary case where no technical alternatives exist; and shall not constitute blanket approval for similar cases.

NB:

(a) 1 to 5 as above (i) provide only an outline of the specific requirement(s) of EHS-Fire Dept for the guidance of qualified & approved consultants/users & (ii) serves as ready reckoner for maintaining consistency in approach. However, the consultants/users are cautioned and advised that they meet all requirements/recommendations as specified / cited in drawing review report(s) issued by EHS-Fire Department.

(b) Consultant shall submit design drawings meeting the above requirements and obtain approval of EHS – Fire Department, before procurement of materials.

(c) Refer to Fire Department and relevant codes & standards for additional information/details.

Appendix-27

REQUIREMENTS FOR DESIGN, INSTALLATION & TESTING OF SPRINKLER SYSTEM

1.0 Standards

The design, installation & testing shall comply with NFPA – 13, 2002 Edition including the referenced NFPA , ASME , ASTM , AWS , AWWA, UL publications. The section and table references given below are from NFPA – 13, 2002 Edition unless otherwise noted.

2.0 System Requirements

2.1 System Design

The system design shall comply with Chapter 7& 11.

2.1.1 The Classification of Occupancies and Commodities shall be as per Chapter 5.

2.1.2 The system components - pipe, fittings and valves shall be selected as per Chapter 6.

2.1.3 If the Fire water pump also serves the hose stream demand , the system demand shall be taken as follows :

a) Maximum sprinkler demand at the hydraulically remotest floor and 500 US GPM for two 2.5 inch hose stream application at hydraulically remotest points , both the systems operating together , for Class III system, as defined in NFPA- 14.

b) Maximum sprinkler demand at the hydraulically remotest floor and 100 US GPM for 1.5 or 1.0 inch hose stream application , both the systems operating together for Class II system as defined in NFPA – 14.

c) The system configuration shall be on the guidelines of schemes given in Figure A.7.1 (a), (b) or (c), NFPA – 14, 2007 Edition. A common riser supplying water to hose and sprinkler / spray system shall not be permitted. The system schematic shall be discussed and finalized with EHS – Fire Dept.

2.1.4 The water demand requirements shall be determined as per Chapter 11 as follows :

a) For Occupancy Hazard Fire Control Approach as per Section 11.2.The selection of design area shall be established based on the severity of fire acceptable to Fire Dept.

b) For Storage Design Approach as per Chapter 12.

c) Fir Special Design Approach as per Chapter 13.

2.1.5 The hydraulic calculations shall be as per the guidelines of Chapter 14. The Software used for hydraulic calculations shall be acceptable to Fire Dept. The orifice size, flow and pressure characteristics of flow devices – Sprinkler (and Hose reel nozzle, hose rack nozzle, open spray nozzle), shall be submitted with he calculations.

2.1.6 The pipe, fittings and valves shall comply with the requirements contained in Annex-A.

2.1.7 The Fire Water Pump shall comply with the requirements contained in Annex – B.

2.1.8 The materials for pipes and fittings shall comply with the requirements contained in Annex – C. The pipe supports shall comply with Chapter 9, NFPA – 13, 2002 Edition.

2.2 System Installation

The system shall be installed as per Chapter 8.

3.0 Testing and System Acceptance

Flushing, Hydro Test and Flow Test shall be carried out as per Chapter 16. Installer shall maintain Log of all the tests carried out and submit to Fire Dept after installation. The tests to be witnessed at site will be advised by Fire Dept.

4.0 Listings and Approvals

All the components of the system shall be Listed for their intended services. The Listing bodies (with product directories) shall comply with NFPA Standards and acceptable to Fire Dept.

5.0 Equivalencies: Equivalencies to any established prescriptive criteria of NFPA and its companion codes, standards and publications may be approved by the EHS-Fire Dept / AHJ, if the alternative fire protection engineering design provides an equivalent level of fire protection

and life safety. Written requests for approval shall include justification demonstrating equivalencies on the basis of pertinent data. Approved equivalencies and alternatives shall only apply to the specific building, facility or structure involved in extraordinary case where no technical alternatives exist; and shall not constitute blanket approval for similar cases.

NB:

(a) 1 to 20 as above (i) provide only an outline of the specific requirement(s) of EHS-Fire Dept for the guidance of qualified & approved consultants/users & (ii) serves as ready reckoner for maintaining consistency in approach. However, the consultants/users are cautioned and advised that they meet all requirements/recommendations as specified / cited in drawing review report(s) issued by EHS-Fire Department.

(b) Consultant shall submit design drawings meeting the above requirements and obtain approval of EHS – Fire Department, before procurement of materials.

(c) Refer to Fire Department and relevant codes & standards for additional information/details.

Appendix-28

REQUIREMENTS FOR DESIGN, INSTALLATION & TESTING OF HYDRANT SYSTEM

1.0 Standards

The design , installation & Testing shall comply with NFPA – 24 , 2007 & NFPA – 291 , 2007 Edition including the referenced NFPA ,ANSI , ASME , ASTM , AWS , AWWA publications. The section and table references given below are from NFPA – 24, 2007 & NFPA – 291, 2007 Edition, unless otherwise noted.

2.0 System Requirements

2.1 The hydrant system with its Pumping System shall be dedicated for fire fighting service only. The System can be designed to supply water to sprinkler, water spry, foam, monitors as per project requirements. The system shall not be used for other services including irrigation.

2.2 The Fire water pumps shall comply with the requirements contained in Annex – A.

2.3 The Fire Water Tank and Pump room shall comply with the requirements contained in Annex – B.

2.4 The piping system shall comply with Chapter 10 & 11.

2.5 The Pillar Hydrants shall comply with the requirements contained in Annex – G.

2.6 The Underground Hydrants shall comply with the requirements contained in Annex – H.

2.7 The Water Monitors shall have a capacity more than 250 US GPM. The pressure and flow characteristics of monitors shall be submitted for review.

2.8 Hydraulic calculations shall be submitted to establish pressure and flow requirements of each system. The maximum expected demand scenarios shall be discussed and finalized with EHS FD.

2.9 The Fire Dept connections shall comply with Section 5.9 .The Valves and Hose Houses shall comply with Chapter 6 & 8.

2.10 The system shall be installed as per Chapter 10.

3.0 Testing and System Acceptance

The System shall be tested in accordance with Section 10.10, NFPA – 24. Marking and flow testing shall comply with NFPA – 291.

4.0 Listings and Approvals

All the components of the system shall be Listed for their intended services as noted in the standards. The Listing bodies (with product directories) shall comply with NFPA Standards and acceptable to Fire Dept.

5.0 Equivalencies: Equivalencies to any established prescriptive criteria of NFPA and its companion codes, standards and publications may be approved by the EHS-Fire Dept / AHJ, if the alternative fire protection engineering design provides an equivalent level of fire protection and life safety. Written requests for approval shall include justification demonstrating equivalencies on the basis of pertinent data. Approved equivalencies and alternatives shall only apply to the specific building, facility or structure involved in extraordinary case where no technical alternatives exist; and shall not constitute blanket approval for similar cases.

NB:

(a) 1 to 20 as above (i) provide only an outline of the specific requirement(s) of EHS-Fire Dept for the guidance of qualified & approved consultants/users & (ii) serves as ready reckoner for maintaining consistency in approach. However, the consultants/users are cautioned and advised that they meet all requirements/recommendations as specified / cited in drawing review report(s) issued by EHS-Fire Department.

(b) Consultant shall submit design drawings meeting the above requirements and obtain approval of EHS – Fire Department, before procurement of materials.

(c) Refer to Fire Department and relevant codes & standards for additional information/details.

Appendix-29

REQUIREMENTS FOR DESIGN, INSTALLATION & TESTING OF WATER MIST SYSTEM

1.0 Standards

The design , installation & Testing shall comply with NFPA – 750, 2006 Edition including the referenced NFPA , ANSI , ASME, ASTM , CGA ,ISO , UL publications. The section and table references given below are from NFPA – 750 Edition unless otherwise noted.

2.0 System Requirements

2.1 System Design

2.1.1 Design objectives shall be as per Chapter 8.

2.1.2 Working plans, documentation including Calculations shall be submitted as per Section 11.

2.2 Type Of Systems

The system can be either stored pressure Cylinder Units or continuous Pressure Pump Units depending upon the application and recommendation of Manufacturer. The initial pressure shall be 200 bar for Cylinder Units and minimum 100 bar for pressure pump unit. The System Configuration and layout shall be discussed and finalized with Fire Dept.

2.3 Discharge Piping

The piping material shall be stainless steel.

2.4 Discharge Nozzles

The discharge nozzles sizes shall be as per the approved flow calculations. Pressure versus flow characteristics shall determine the nozzle selection for given application. Proposed K – factors of nozzles shall be indicated.

2.5 Fire Detection , Alarm & Control System

Detection, alarm and control system shall comply with NFPA – 72 and Section 5.1. The Fire Alarm cables shall be fire resistant.

The Control panel shall be suitable for interfacing with shutdown systems to ensure satisfactory performance of extinguishing system.

3.0 Testing & System Acceptance

Inspection and Tests shall be carried out as per Section 12.2. Installer shall maintain Log of all the tests carried out and submit to Fire Dept. after installation. The tests to be witnessed at site will be advised by Fire Dept.

4.0 Listings

All the components of the system shall be Listed for their intended services. The Listing bodies (with product directories) shall comply with NFPA Standards and acceptable to Fire Dept.

5.0 Equivalencies: Equivalencies to any established prescriptive criteria of NFPA and its companion codes, standards and publications may be approved by the EHS-Fire Dept / AHJ, if the alternative fire protection engineering design provides an equivalent level of fire protection and life safety. Written requests for approval shall include justification demonstrating equivalencies on the basis of pertinent data. Approved equivalencies and alternatives shall only apply to the specific building, facility or structure involved in extraordinary case where no technical alternatives exist; and shall not constitute blanket approval for similar cases.

NB:

(a) 1 to 20 as above (i) provide only an outline of the specific requirement(s) of EHS-Fire Dept for the guidance of qualified & approved consultants/users & (ii) serves as ready reckoner for maintaining consistency in approach. However, the consultants/users are cautioned and advised that they meet all requirements/recommendations as specified / cited in drawing review report(s) issued by EHS-Fire Department.

(b) Consultant shall submit design drawings meeting the above requirements and obtain approval of EHS – Fire Department, before procurement of materials.

(c) Refer to Fire Department and relevant codes & standards for additional information/details.

Appendix-30

REQUIREMENTS FOR DESIGN, INSTALLATION & TESTING OF SMOKE & HEAT VENTILATION SYSTEM

1.0 Standards

The design , installation & Testing shall comply with following standards: -

1.1 NFPA – 92 A , 2006 Edition
1.2 NFPA – 92 B , 2005 Edition
1.3 NFPA - 204 , 2002 Edition
1.4 BS EN - 12101, 2003 Edition

2.0 System Requirements

2.1 System shall be designed based on the following design objectives :

a) Safe evacuation of occupants
b) Protection of property
c) To aid Fire Fighting operations

2.2 The system design shall establish size of fire based on the class of fire hazard, clear height of smoke layer above the floor, ambient temperature, temperature rating of sprinklers, area of door openings among other factors.

2.3 The criteria for smoke zoning and vent spacing shall be established.

2.4 Design calculations and the reference code shall be submitted for review.

2.5 The operation of system shall be interfaced with Fire Detection and Sprinkler system operation.

2.6 Conceptual design with proposed layout drawings shall be discussed and finalized with Fire Dept.

3.0 Testing & System Acceptance

Installer shall maintain Log of all the tests carried out and submit to Fire Dept. after installation. The tests to be witnessed at site will be advised by Fire Dept. Certificate of Conformity to codes and Warranty period shall submitted by the installer.

4.0 Listings and Approvals

Smoke and Ventilation system equipment shall Listed for its service. Equipment for which listings are not available, details of equipment with test reports from Accredited Bodies shall be submitted for Fire Dept approval.

5.0 Equivalencies: Equivalencies to any established prescriptive criteria of NFPA and its companion codes, standards and publications may be approved by the EHS-Fire Dept / AHJ, if the alternative fire protection engineering design provides an equivalent level of fire protection and life safety. Written requests for approval shall include justification demonstrating equivalencies on the basis of pertinent data. Approved equivalencies and alternatives shall only apply to the specific building, facility or structure involved in extraordinary case where no technical alternatives exist; and shall not constitute blanket approval for similar cases.

NB:

(a) 1 to 20 as above (i) provide only an outline of the specific requirement(s) of EHS-Fire Dept for the guidance of qualified & approved consultants/users & (ii) serves as ready reckoner for maintaining consistency in approach. However, the consultants/users are cautioned and advised that they meet all requirements/recommendations as specified / cited in drawing review report(s) issued by EHS-Fire Department.

(b) Consultant shall submit design drawings meeting the above requirements and obtain approval of EHS – Fire Department, before procurement of materials.

(c) Refer to Fire Department and relevant codes & standards for additional information/details.

APPENDIX-31

DEFINITION OF TERMS, ACRONYMS & ABBREVIATIONS

- **"PCFC**" denotes Ports, Customs & Free Zone Corporation.
- **"JAFZA**" denotes Jebel Ali Free Zone Authority**.**
- "**EHS"** denotes Environment, Health & Safety
- "**AHJ"** denotes Authority Having Jurisdiction which indicates the office of responsibility i.e. EHS-Fire Dept for enforcing the requirements of NFPA and its companion codes, standards and publications, the provision of these regulations, the requirements of EHS-Fire Dept and applicable statutes and regulations of UAE/Dubai Governments.
- "**DOH**" denotes Department of Health, Government of Dubai.
- "**Civil Defence**" means Civil Defence of any of the emirates of UAE.
- The "**Project"** means the construction of a permanent building, any other civil work on a leased property including any modifications or installations in pre-built facilities within PCFC jurisdiction.
- The "**Developer"** shall mean the lessee or his authorized Agent who submits an application to the concerned "Authority" of PCFC on behalf of the lessee.
- "**Lessee"** shall mean a client leasing premises in any areas falling within PCFC jurisdiction.
- **"Licencee"** shall mean a client having a licence to operate in any areas falling within PCFC jurisdiction.
- **"Permanent Building"** means the building designed and constructed with reinforced concrete, or steel with block or metal cladding or other durable material.
- **"Temporary Building**" means a building used as a site office or to house construction equipment during the construction period.
- **"The Consultant**" means a registered consultant holding a valid consulting Engineers' licence from the Dubai Economic Department.
- **"Regulations**" mean these regulations issued by the "AHJ"
- The **"Contractor**" means a registered contractor holding a valid contracting license from the Dubai Economic Department.
- **"Inhabited"** means the facilities, buildings or structures involving routine occupation by human beings.
- "**Uninhabited"** means the facilities, buildings or structures not involving routine occupation by human beings.
- **'Shall"** indicates mandatory

Note: All official definitions contained in NFPA and its companion codes, standards & publications shall apply (Refer to Section 8 of Part 1)