

Concessionaire Construction Guidelines

Annexure I

General MEP Requirements

Finishes Workmanship Quality / Project Delivery / E&M

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**GENERAL MEP REQUIREMENTS**

This Manual presents the MEP & ICT guidelines for Concessionaire's Fit-out, maintenance during the operational phase and any other works within the Airport Premises.

This Manual shall be applied to all works being carried out / installed in YIAPL premises. The works specifications are for the assistance and guidance of the Concessionaire to design, perform the fit-out works, maintain high-quality standards in a safe manner and in compliance with all necessary requirements.

The Concessionaire shall be deploying experienced and licensed Contractors and supervisors and skilled workers having valid permits as per the regulations and YIAPL's guidelines.

Concessionaire must follow the Concessionaire Services Matrix for loads of all services.

# Electrical System

## Licensed Electrical Worker

The Concessionaire shall be deploying licensed supervisors and skilled workers having valid permits as per the regulation of Indian Electricity Rules and Local Electrical Inspector's requirements. The Concessionaire shall employ a competent, licensed qualified full-time electrical Foreman/Supervisor to direct the work for electrical installation in accordance with the drawings and specifications.

## Regulations & Standards

The system shall be governed by the requirements of IS: 732, IE Rules, and IEE regulations. The installation shall conform in all respects to Indian Standard Code of Practice for Electrical wiring installation IS: 732-1989. It shall also be in conformity with the current Indian Electricity Rules, CEA Regulations, and requirements of the Local Electric Supply Authority as far as these become applicable to the installation. In addition to the above, the electrical installations must comply with the National Build Code 2016, NFPA-70, IS-3043 & CPWD regulations.

In general, the materials, equipment and workmanship not covered by the specification shall conform to the following Standards, unless otherwise called for.

## Requirements

The Concessionaire and its representatives must comply with the following:

1. All electrical drawing submitted for information must bear the company’s seal and must be endorsed by the Lead Engineer who undertakes the design and installation work.
2. All electrical installations shall conform to Indian electrical rules and other relevant standards. Any violation of any of the statutory regulations, the concessionaire shall be liable.
3. Comply with the provisions made available, and the electrical load allocated for the Demised Premises based on the area used.
4. The connected power load and Max demand (max running load) of the Concessionaire should not be in any circumstances more than the allotted connection. In case the load exceeds the allotted limit then the Concessionaire shall get the prior approval from YIAPL before progressing the work.
5. Concessionaire to ensure that elements downstream are coordinated with the point of power supply.
6. The Concessionaire shall provide emergency lights with battery pack or UPS back up of 90 minutes (about 1 and a half hours) to be able to operate during a power failure.
7. Proper enclosure and trunking area to be provided by the Concessionaire for the cables from the isolators to the Distribution Board. Panel & Enclosures shall be fire rated. The Concessionaire shall label the distribution boards with circuit nos.
8. The Concessionaire shall install only LED light fixtures with electronic Ballast/driver from standard OEM. Halogen/ CFL lamps shall not be used.
9. All the wires shall be FRLS copper wire. The FRLS Copper wires used for power and lighting circuits shall be 4mm2 and 2.5mm2. Stranded copper conductors shall be used. All cables shall be with XLPE insulation, FRLS sheathed only. Up to 16Sqmm copper cables shall be used & aluminum shall be used for sizes of 25Sqmm & above.
10. Multi plug and extension plug are not allowed. The Concessionaire shall have separate switches for Normal Light fixtures as per area of application, Emergency lights need to be directly connected from UPS backed up Distribution Boards which must turn on (to 100% capacity) at the time of power supply failure.
11. The Concessionaire shall provide proper circuit labels / cable tags on the sub-main cables and all outgoing cables.
12. The Concessionaire shall provide GI conduits / trunking & accessories for the laying of outgoing cables from the Concessionaire distribution board at his premises. No PVC conduits are allowed in installation work. Metal flexible conduits shall be used for circuit drops. Proper glands joint caps shall be used at joints / junctions.
13. The Concessionaire shall label the distribution board, light fittings, light switches, equipment and socket Shop / Outlets with circuit nos.
14. All cables and conduits/ trunking installed in the Concessionaire premises must be labelled accordingly at regular intervals.
15. The Concessionaire shall install Uninterruptible Power Supply (UPS) with desired backup time to support any critical equipment during power failure as per their business need. Battery should be acid free and fire protection to be provided if required. Necessary approval from YIAPL to be taken prior to installation of any battery rack system.
16. All electrical equipment used during the electrical installation work must obtain electricity supply through 30mA RCBO. Nunsense tripping needs to be avoided after ensuring safe operation.
17. The Concessionaire shall duly complete and submit the Insulation test report and other forms as required for cables, Panels switch gears, etc. to YIAPL after installation work.
18. The Concessionaire shall provide ‘As-Built’ electrical layout and single line diagram including the circuit protection arrangement at the Concessionaire’s distribution board.
19. The Concessionaire shall submit 4 sets ‘As-built’ electrical drawing to YIAPL for information and arrange an inspection upon completion of work. Authorized Electrical Engineer from Concessionaire shall be present at site during inspection.
20. LED shall be used for sign boards. The signboard installed shall be evenly lit up without any dark patches.
21. The Concessionaire should inform YIAPL immediately of any change of Licensed Electrical Worker during the works.
22. YIAPL shall terminate at one point inside the premises of the retails area a suitably rated Electrical cable feeder to the Concessionaire’s DB for Electrical supply. These points shall be metered, and the metering shall be installed by YIAPL.
23. The Concessionaire under no circumstances shall draw power more than his allotted connections. The concessionaire shall provide all the detailed calculations, layout and SLD and other equipment drawing for the approval of YIAPL.
24. Electrical distribution within the Concessionaire battery limit including the Concessionaire DB shall be carried out by concessionaire.
25. All electrical raceway from YIAPL's electrical distribution network shall be extended by the Concessionaire for his distribution.
26. All wiring shall be done according to Color code as follows:
	1. R Phase: Red
	2. Y Phase: Yellow
	3. B Phase: Blue
	4. Neutral: Black
	5. Earth: Green
	6. Control wire: Grey.
	7. Different phase circuits shall not be run in the same conduit.
27. The number of wires permitted in one conduit as per standard shall be strictly followed.
28. Separate Switch boards/boxes and conduits shall be used for Lighting and emergency lighting.
29. Wiring shall be done without any open joints, if situation demands, appropriate closed type Male - Female connectors shall be use.
30. All cables shall be fully run from panel to panel without any joints or splices.
31. Cables shall be bent to a radius not less than 12 (twelve) times the overall diameter of the cable or in accordance with the manufacturer’s recommendations whichever is higher.
32. Cable shall be properly clamped in tray/wall/ceiling. Adequate size GI perforated cable tray shall be used where bunch of cables are laid.
33. Cable terminations shall have the necessary double compression type glands. The end terminations shall be insulated with at least six half-lapped layers of PVC non-adhesive tape. Cable armoring shall be earthed at both ends.
34. All switches and sockets shall be used in accordance with the IS standard. Switch boxes shall be metallic, Switches and sockets shall be modular type, sockets shall be with safety shutter/safety interlock.
35. All industrial sockets and associated plugs shall be of IP65 protection class, especially used in kitchen and wet areas. Multiplug and extension plugs are not allowed to be used. Wires in power sockets shall be connected with proper Copper lugs / terminals.
36. All switches and Power sockets / Industrial sockets shall be installed at standard height and an easily accessible location. No equipment shall be placed in front of Power socket. Power sockets shall be fixed away from heating equipment.
37. Power socket wiring inside kitchen and serving area shall be done concealed. Exposed wiring shall not be permitted unless and until the situation demands.
38. Adequate protection like Overload, short circuit and earth fault protections with variable current and fixed time settings shall be provided at incomer breaker.
39. All MCCBs up to 160Amp shall have thermal magnetic release and above 160Amps shall have microprocessor-based trip unit.
40. MCB DB Incomer breaker/Breakers in each phase shall be with residual current with overload trip breaker (RCBO/RCCB) and Outgoing breaker with Overload/Leakage protection according to connected equipment.
41. All DB’s shall be internally prewired using copper insulated high temperature PVC wires brought to a terminal strip of appropriate rating for outgoing feeders.
42. MCB DB shall be designed in such a way that any equipment fault will not shutdown the power supply of other circuits. Adequate phase wise protection shall be used.
43. Certificate for all routine and type tests for circuit breakers in accordance with the IS: 2516-1963 shall be furnished. All test certificate/calibration certificate of accessories such as MCCB, MCB, RCCB, RCBO, ELR, Multifunction meter shall be produced if requested by YIAPL
44. Fabrication drawings of all Panel/Distribution boards shall be approved by YIAPL Electrical Department before fabrication.
45. 3 Phase power panels and distribution boards shall have 2 distinct earth connections. Size of the earth strip shall be as per standard and specification.
46. All panels/MCB DB shall be meggared phase to phase and phase to neutral by using a 1000V meggar with all switchgear in closed position. The meggar value should not be less than 2.5 megohms between phases and 1.5 megohms between phase and neutral.
47. Details of incoming and outgoing cable size to be marked in Metallic tags by indicating from where the incoming cable has originated or feeding to. All circuits shall be marked with respective phase in DB as well as at load end
48. There shall be one earth terminal for single phase boards and two for 3-phase Distribution boards.
49. All Earthing shall be done in accordance with IS Code of Practice on earthing IS 3043. All Metallic Enclosure shall be earthed with suitable earthing conductor. Proactive earth conductor shall be selected as per IS standard for earthing. All three phase DB enclosure/Panels and circuits shall be with double earth continuity conductor. Concessionaire shall tap the earthing from the main Earth strip with adequate bolting/welding. All Electrical equipment metallic body shall be earthed. Armored cable gland shall be earthed at both ends. Cable armor or metal conduits shall not be used as protective earth conductor. Separate earth conductor shall be laid from main earth strip. Proper Earth strip/connectors shall be used for multiple earth connection for DB enclosure and Panels. The entire system of metallic conduit work, all metal part shall be mechanically and electrically continuous by proper screwed joints. Protective loop earthing conductors shall be laid inside the conduit between switch boxes and the equipment with proper termination by using Lugs/terminals. All earth wires shall be used green in Color. Other external metallic parts at the premises shall not be used as earth conductor.
50. Concessionaire shall give prior intimation and avail approval for Temporary construction power supply if needed. Concessionaire shall tap the power supply according to the recommendation of YIAPL Electrical In charge. Concessionaire shall provide Calibrated Energy meter for Construction power supply with circuit Protection devices like RCCB/RCBO/ELR. Concessionaire shall maintain the quality of workmanship and material used at site. Any deviation in quality shall not be permitted. Concessionaire shall update the progress of the work to YIAPL in a periodic manner and complete the work within agreed period. Any incident/accident related to electrical at work site shall be intimated to YIAPL electrical department.
51. ‘Code of safety procedures and practices in Electrical works’ specified in IS 5216 shall be strictly followed Electrical room premises shall be kept clean, storing of hazardous/inflammable items strictly prohibited. Ensure proper ventilation in Electrical room.
52. Rubber or insulating mats should be provided in front of Main/Sub Electrical panels and DB. Rubber mats shall be tested for 1.1KV rating or above. Electricians/workers shall use PPE during work.
53. Necessary Caution boards such as ‘Men at work’, ‘Don’t Switch ON the Breaker’ shall be used. Lock out – tag out procedure shall be strictly followed for any Electrical maintenance.
54. Standard First Aid boxes shall be provided in Electrical rooms with specified medicines. Expired medicines shall not be kept in First Aid boxes. Periodical Examination of the first aid facilities and protective/safety equipment shall be undertaken to ensure their adequacy and effectiveness, proper record also shall be maintained. Charts Displaying the Methods of giving Artificial respiration during electrical shock should be prominently displayed at appropriate places.
55. A chart containing the names, address and Phone numbers of nearest authorized medical practitioner/Hospital, Fire Officer and other emergency Details shall be displayed at appropriate places. All Electricians/Workers shall undergo Electrical First Aid training.
56. All electrical equipment shall comply relevant Indian/international electrical standard. Concessionaire shall furnish all test certificates of the equipment installed on their premises. General safety requirements for Electrical equipment prescribed by the manufacturer shall be followed, if not specified by the manufacturer relevant standard shall be applied. Separate Circuit protective devise like RCCB/RCBO shall be provided for higher rated kitchen equipment. All equipment/appliances Earthing connection shall be ensured. Cable connecting to equipment/appliances shall be of flexible type with metallic covering to prevent damage from heat/external force.
57. The concessionaire shall appoint a qualified electrician on site to manage electrical installations round the clock. Person engaged for maintenance works should be competent enough and possess Necessary valid license issued by relevant authority.
58. Concessionaire shall ensure all Panels/Distribution boards, power sockets and lighting Preventive maintenance are carried out and submit report to YIAPL Electrical Department. Preventive maintenance shall be carried out every month for Electrical Panels/DBs and fortnight checks for all power sockets.
59. Concessionaire shall maintain a maintenance register where all Preventive and breakdown maintenance shall be registered and furnished to YIAPL as and when needed. All Electrical components like MCCB, MCB, RCCB/RCBO, ELR, Energy meters shall be tested/calibrated once in a year and record to be maintained. Any addition/deletion of equipment shall be notified in the maintenance register.

## Additional Requirements for Tapping of New Power Supply from Switch Rooms

1. New power supply to be tapped from Switch room or as advised by YIAPL. New breakers to be installed in a compartment by YIAPL. All breakers to be labeled with circuit number and the Concessionaire name with the purpose & area. The new distribution board at the Concessionaire premises shall be provided by the Concessionaire within a closed room which is designated for electrical panels & DB’s.
2. YIAPL shall arrange to terminate all cables into the switchboards within the switch room.
3. YIAPL shall terminate at one point inside the premises of the Concessionaire area a suitably rated Electrical cable feeder to the Concessionaire DB as per the Connected Load allotted to them on a one-time chargeable basis. The cost include infrastructure required to provide such connection till the Concessionaire premises like man and material cost of outgoing cable, isolator/breaker at Concessionaire end, support system and accessories
4. The Concessionaire shall provide new trunking for the laying of the sub-main cables from the Electrical Low-Tension Room/load center to the new distribution board at the premises. The trunking must be painted yellow. Cable run from load center to the Concessionaire’s DB shall be coordinated and submitted for YIAPL’s approval. The Concessionaire’s contractor must comply with the approved method and support system for all services. All installed runs must be inspected and accepted by YIAPL.
5. All Electrical works done by the Concessionaire shall be in accordance with the latest applicable standards and regulations laid down in NFPA & relevant IS & IEC standards.

## Additional Notes

**APPLICATION FOR A NEW LICENCE OR ITS RENEWAL**

1. You are required to submit your application for the renewal of the licenses at least one month before the expiry date.
2. For a new installation, Concessionaire shall require turn-off of the electricity power supply at least 7 days in advance.
3. When there is a management change, an application must be made for a new license.

**VERIFICATION BY APPLICANT**

Where an application for a license or a renewal is made by:

1. A firm, the application form shall be signed by a partner or manager of the firm
2. A company, the application form shall be signed by a director, secretary or general manager of the company.

**LICENSED ELECTRICAL WORKER**

The grade of licensed electrical worker required to take charge of the electrical installation is based on the total approved capacity which is as follows:

1. Electrician
2. Electrical Technician
3. Electrical Engineer
4. Electrical Engineer possessing appropriate High Voltage switching authorization.

**CERTIFICATE OF FITNESS**

The installation is to be inspected and tested at regular intervals, preferably not more than 6 months.

1. Approved Load: Load approved by YIAPL.
2. Installed Load: Total connected load of the electrical installation in KVA (based on a power factor of 0.8)
3. Standby Generator (if any) or UPS: State the number of standby generators or UPS as applicable and the rating of each in KVA.
4. Single-Line & Layout Drawings: The relevant drawings of the installation shall be resubmitted as an annexure of the application.
5. In addition to other information, the following has to be provided on the drawings (minimum size A1):
	1. Signature of the licensed electrical worker.
	2. License No. of the licensed electrical worker.
	3. Date.
	4. Name and Address of the installation.
	5. Proper Title Block with Legend.
	6. Installation load in KVA.

# HVAC System

## Regulations & Standards

The HVAC system shall be governed by the requirements of ASHARE 62.1, ASHRAE 90, NBC 2016, IE Rules, and IEE regulations.

The following documents and standards shall be followed as a minimum:

* ASHRAE standard 62.1.2019 for fresh air ventilation.
* AMCA 210-16 for Fans
* ASHRAE Fundamentals 2013.
* ASHRAE HVAC Application 2015.
* ASHRAE HVAC System & Equipment’s 2016.
* ASHRAE 52.2.2012.
* ASHRAE Standard 90.1.2016
* NFPA Standards

The Installation shall conform in all respects to Indian Standard Code of Practice for Electrical wiring installation IS: 732-1989. It shall also be in conformity with the current Indian Electricity Rules, CEA Regulations, and requirements of the Local Electric Supply Authority as far as these become applicable to the installation. In addition, the electrical installations must comply with the National Building Code 2016. Wherever this specification calls for a higher standard of materials and/or workmanship than those required by any of the above regulations, this specification shall take precedence over the said regulations and standards. In general, the materials, equipment and workmanship not covered by the specification shall conform to the following Indian Standards, unless otherwise called for.

## Requirements

The Concessionaire and its representatives must comply with the following:

1. Power supply to run the AHU, fans, Scrubbers, Air washers or any other HVAC equipment shall be provided by the Concessionaire from his distribution panel.
2. No alteration is authorized on the main duct without approval from YIAPL.
3. The fit-out work to be carried out must comply with the requirements of regulatory authority and relevant building codes.
4. The Concessionaire should engage a Professional HVAC consultant for the design, supervision, certification, testing and commissioning of the HVAC installation work.
5. The type, make, model and rating of any fitting/equipment used are to be clearly indicated in the drawings & manufacturer catalogue/test certificate also to be submitted. All the samples component and make should be approved by YIAPL before procurement.
6. All ducts to be installed shall be insulated internally or externally. Flexible duct (Insulated or uninsulated) installed must not exceed 1.2 meters in length.
7. Concessionaire to note the provisions for HVAC System for their Demised Premises as indicated in tenancy matrix. In case of installation of excess equipment and erection of full height partitions will affect the space temperature and ventilation. Concessionaire is to take note that the supply air (if provided) “off-grille” temperature is around 15°C. If no modification works is done to the provided air conditioning supply, Concessionaire shall submit a letter from a HVAC consultant to ensure that the stipulated space temperature of 24±1°C can be achieved. Failing which the Concessionaire must install additional air-conditioning units at their own cost and submit proposal drawings for YIAPL approval before installation starts.
8. Concessionaire is required to provide and install additional VAV boxes, if required, with local control thermostat with the necessary connecting ducts to YIAPL design and specifications. Concessionaire to link the power supply cables for VAV boxes to their own DB and labelled. In addition, Concessionaires are required to provide an “Access Panel” near each VAV box for maintenance purposes. The air-conditioning distributing system including VAV boxes and local control thermostat which the Concessionaire installed, shall be properly maintained by the Concessionaire themselves and shall be dismantled upon expiry of tenancy. YIAPL has the right to ensure that the VAV boxes and local control thermostat are properly and sufficiently maintained.
9. There shall be no illegal tapping of air conditioning at the main ducts before the VAV boxes or tampering with the approved installed VAV Boxes. Any illegal tapping or VAV box tampering will be removed by YIAPL in-house Contractor and a penalty above the cost will be charged to the Concessionaire.
10. The standalone air-conditioning unit(s) is subjected to the proposed equipment technical capabilities, the refrigerant piping distance and availability of space for mounting the Condensing Units. Concessionaires shall install standalone air-conditioning unit(s) at their own costs using VRV /DX refrigerant system or chilled water fan-coil (tapping from the nearest chilled water supply available) or any special air-conditioning system, whichever is applicable and feasible if air-conditioning is required for kitchen area or if the proposed heat loads exceed the existing cooling capacity provided by YIAPL. Concessionaires are advised to strictly adhere to the recommended lighting levels to prevent air conditioning overload.
11. The Concessionaire shall switch off or decide on automatic switching-off of the air conditioning system when space is not in operation to avoid energy wastage.
12. The air conditioning distribution system, especially in the F&B area, shall be designed and configured as such to minimize smell propagating to the adjacent spaces.
13. The Concessionaire shall provide double skin air handling units / fan Coil Units with piping, PIBCV & other valves, strainers, controls, thermometer, pressure gauges, flexible connection, electrical panel, power, and control cable etc. to align with technical specification and approved by the YIAPL. Sound level should be less than 55 db.
14. All condensate pipes shall be run in trunking and sleeves when penetrating walls and floors. Concessionaires shall provide these and make good the affected YIAPL ceiling area and floor penetration at their own cost.
15. Condensate pipe must be drained to the nearest floor trap with Concessionaire insulating the floor trap if it is not insulated. The proposed routing of all condensate pipes and penetrations details shall be subjected to YIAPL approval.
16. The Concessionaire shall ensure that provisions on the HVAC system are made available to meet the requirements indicated in this Manual.
17. All duct, pipe & refrigerant pipe insulating material shall be free from asbestos & dust. Materials shall not contain asbestos, lead, mercury and mercury compounds. Foam insulation materials shall not use CFC blowing agents in the manufacturing process. All thermal insulation shall be non-corrosive to the metal, free from chlorine, water repellent and fire retardant.

**Duct/ Pipe Insulation**

1. Thermal insulation material for Duct insulation shall be with factory laminated black fiber glass cloth closed cell Nitrile rubber. Density of the nitrile rubber shall be 40-60 Kg/m3.
2. Thermal conductivity as per BS 874 part 2 – 86 (DIN 52613, 52612) / DIN EN 12667 / EN ISO8497 of the insulation material shall not exceed 0.038 W/m°K or 0.212 BTU / (Hr-ft2-oF/inch) at an average temperature of 30°C. The product shall have a temperature range of –40°C to 105°C.
3. The insulation material shall be fire rated for Class 0 as per BS 476 Part 6: 1989 for fire propagation test and for Class 1 as per BS 476 Part 7, 1987 for surface spread of flame test. Water vapour permeability shall be not less than 0.024 per inch (2.48 x 10-13 Kg/m.s.Pa i.e. μ>7000: Water Vapor diffusion resistance) as per DIN 53122 part 2, DIN 52615 / EN 12086 & EN13469.
4. Insulation material for ducts shall be anti-microbial. Microbiological growth on insulation surface shall be in accordance with ASTM G-21 and bacterial resistance to ASTM2180/ ISO22196.
5. The Material shall comply to ISO 5659 / BS 6853 / ABD 0031 for smoke density and toxicity values. The thermal conductivity of insulation material shall not be affected by aging as per DIN 52616 standard.
6. All piping shall be insulated using specified insulation material as described here under:
	1. The material used shall be Rigid Poly Urethane Foam for chilled water pipes, The RPUF used shall conform to the following requirements:
		1. Density: Not less than 32 kg/cum
		2. Compressive strength: Not less than 1.73 kg /cm2
		3. K’Valve: Not greater than 0.019W/m °C at 10°C.
		4. Water Vapour: Not more than 13 Mg / NH.
7. Duct acoustic lining material shall be Nitrile Rubber open cell foam. Thermal conductivity of the insulation material shall not exceed 0.047 W/m K at an average temperature of 20°C. Density of the nitrile rubber shall be 140 – 180 Kg/m3.
8. Kitchen Ducts should be finished off with 50mm thick mineral wool on the external surface of the ducts, enveloped in 0.1mm thick aluminum foil and joints sealed off with aluminum tape.

## Additional Requirements for Split Air-Conditioning Units

1. All DX type indoor units shall be with CFC free refrigerant, minimum BIS 4-star energy rating and shall be installed as securely suspended with spring isolator from slab/steel substructure and the condensing units shall have neoprene pad installed on civil foundations.
2. All refrigerant pipes, condensate pipes and electrical wires shall be run in trunking and sleeves when penetrating walls and floors. Such wall/floor openings shall be fire sealed.
3. Condensate pipe must be drained to the nearest floor trap with Concessionaire insulating the floor trap if it is not insulated. The proposed routing of all refrigerant pipes and condensate pipes and penetration details shall be subjected to YIAPL approval.
4. The Concessionaire is to ensure that the electrical load of the additional air-conditioning unit will not trip the electrical mains.
5. The Concessionaire shall seek approval in writing from YIAPL for the condensing unit installation's location. The loading of the condensing unit is to be endorsed by a certified structural engineer Concessionaire must submit the loading details and suspension/ installation arrangement to YIAPL for seeking approval and shall start work only approval has been obtained in writing from YIAPL.
6. The Concessionaire shall properly label all condensing units, refrigerant and condensate pipe installed. In addition, Concessionaires are to submit the refrigerant pressure pipe test. Insulation for refrigerant and condensate pipe shall be class ‘O’ only.

## Mechanical Ventilation System

1. The mechanical ventilation work to be carried out must comply with the regulations laid down by NFPA and relevant codes.
2. The ventilation works drawings must be endorsed and supervised by a Professional HVAC consultant.
3. The ducting layout of kitchen outdoor air and exhaust system from and to the kitchen area to be provided by Concessionaire as per Concessionaire matrix.
4. Concessionaire is to provide the outdoor air grilles, kitchen hoods complete with grease filters, UV filters and automatic grease wash system similar to Gaylord GX2/ CG3 UV Ultima or other approved equal from YIAPL, volume control dampers, fresh and exhaust air distribution ductworks and connect to the provided main fresh air duct and exhaust air duct respectively. They are to maintain them and bear the cost of leaks and breakdowns.
5. The kitchen exhaust and fresh air fan shall be interlocked. Control wiring shall be installed by the Concessionaire if not provided. To conduct testing on the interlocking with the exhaust fan together with YIAPL after all the installations have been completed.
6. The Concessionaire shall indicate in their proposed drawing the design air flow (in CFM) on their respective exhaust cooker hoods and outdoor air grilles.
7. The Concessionaire shall submit detailed calculations of kitchen exhaust and hood sizing requirements for the Concessionaire area and the calculations are to be endorsed by a professional HVAC consultant). Concessionaire shall ensure that the design of kitchen exhaust does not permit cooking smell to propagate to other areas.
8. Concessionaire shall arrange for the kitchen exhaust duct to be chemically cleaned at least once a year and submit a copy of the servicing report for YIAPL record purposes.
9. The Concessionaire shall maintain at least once every month the kitchen exhaust and fresh air fans and submit a copy of the servicing report for YIAPL record purposes. The concessionaire shall attend and bear the cost of any breakdowns due to poor maintenance fans.
10. The Concessionaire should maintain, attend and bear the cost of the breakdowns of the all-control panels and electrical switchboard serving the Concessionaire kitchen ventilation system.
11. The Concessionaire shall switch off the kitchen ventilation system when space is not in operation to avoid energy wastage.
12. The thickness and insulation on the exhaust air distribution duct should be suitable to meet the specification and approved by YIAPL.
13. Dedicated Toilet & Pantry ventilation Fan (s) located within Demised Premises boundary shall be provided by the Concessionaire with exhaust air rate as per requirement of NFPA standard and ensure the space remains under negative pressure to avoid smell propagation to the other areas and makeup air from nearby space via door transfer grills.
14. For Lounge and F&B: As per current arrangement, with shops / outlet premises and common area cooled via centrally located Air handling units and supply through jet nozzle arrangement. If the concessionaire required a roof above the lounge or partition between common area and Demised premises or both with prior approval from YIAPL, following works will be required by Concessionaire.
15. The necessary modification in ductwork/ air Shop/Outlets including any adjustments/ re-commissioning required AHU (feeding to lounge and common area) shall be carried out by the Concessionaire.
16. The Concessionaire shall submit for previous YIAPL's approval, the relevant drawings and documents prior to proceeding with any modification work.
17. For closed lounges, the Concessionaire shall provide necessary provision for smoke removal system similar to existing building (with all equipment’s/duct work and other ancillary works carried out by the Concessionaire).

## Cutting & Patching

1. Prior to undertaking any floor penetrations approved by the YIAPL, the Concessionaire is required to X‐ray the floor area in question to determine locations of any in-slab re-bar and/or conduit. Copies to be provided to the YIAPL. X‐raying of any floor area within the Demised Premises should be done after normal operating hours and all precautions should be taken to procedures.
2. Mechanical coring must be undertaken for slab penetrations greater than 25 mm (1’’) in diameter. Such work will be carried out by YIAPL’s forces at the Concessionaire’s expense.
3. Provide sleeves for all wall and floor penetrations.
4. All wall and floor penetrations must be sealed to the YIAPL’s satisfaction. All penetrations must be fire‐proofed as required and all floor penetrations must have a watertight seal.

## Coordination of Services

1. The Concessionaire or his contractor must coordinate the locations of all existing services with the Development Coordinator and Mechanical Coordinator before any work on site begins.
2. The Concessionaire must complete a Building Services Shutdown Request Form to arrange for equipment to be isolated before starting work.

## Access Panel and Doors

The Concessionaire shall prepare drawings showing the location and type of all access doors for the existing equipment in co-ordination with other trades before proceeding with installation of False Ceiling of Concessionaire areas and hand these to the Contractor/YIAPL to obtain approval.

# Fire Fighting System

## Regulations & Standards

The Firefighting system of the project shall be designed based on the Fire Strategy Documents, applicable codes, and standards with specific reference to the following:

* National Building Code 2016 of India.
* NFPA 10, Standard for Portable Fire Extinguishers.
* NFPA 13, Standard for the Installation of Sprinkler Systems.
* NFPA 14, Standard for the Installation of Standpipe and Hose Systems.
* NFPA 20, Standard for the Installation of Stationary Pumps for Fire Protection.
* NFPA 101, Life Safety Code, 2018 Edition.
* NFPA 415, Standard on Airport terminal building, 2016 Edition.
1. As per the Fire Strategy document, the governing Code shall be NFPA. However, some specific references shall be made to NBC. A similar design philosophy shall be planned for TL2. All firefighting system design basis to be read with the Fire Strategy Report.
2. The Concessionaire shall submit the technical details of the proposed addressable fire alarm panel along with the integration methodology with YIAPL fire alarm system for approval.

## Requirements

The Concessionaire and its representatives must comply with the following:

1. Concessionaire to obtain Hot work permit from YIAPL prior to start any welding work.
2. All the drawings are to be endorsed by a Professional FPS consultant having mor than 15 years of experience. All FPS layout drawings shall be colored in the plan with the required section.
3. The Concessionaire should engage a Professional Engineer for the design, supervision, certification, testing and commissioning of the fire protection installation work.
4. The Concessionaire shall ensure that all fire detection/protection system drawings to YIAPL are endorsed by their Qualified Person/Professional Engineer who designs and installs the areas.
5. The Professional Engineer responsible for the fire protection installation shall submit in writing if a waiver for any statutory requirements or any building regulations is required.
6. The Concessionaire’s qualified person (i.e. Professional Engineers) must state in the drawings whether the fire protection system has been affected by the construction.
7. For the work of fire sprinkler & alarm/detection system, the Concessionaire shall carry out the works subject to the approval of YIAPL & State Fire & Emergency Services authority.
8. The Concessionaire should appoint a registered Fire Protection & Alarm systems Contractor to carry out the work of the fire protection/detection system.
9. The Concessionaire should ensure that the fire detection/protection installation carried out by their contactor comply with the requirements stipulated in NFPA and as per the approval of the YIAPL and the relevant local authorities having legal control over the installation.
10. The Concessionaire shall forward a copy of the approval letter for the fire protection addition and alteration works to YIAPL for record.
11. The Concessionaire should submit a certificate of supervision for the fire detection/protection installation work to YIAPL. The fire alarm and detection system shall be connected to the building’s looping zone.
12. Upon completion, the Concessionaire/sub-contractor shall submit two copies of the certificate of fitness to YIAPL. YIAPL and the Airport Emergency Service shall be informed in writing (7 working days’ notice) of any fire sprinkler works and modifications to be carried out.
13. The allowable time for the fire protection system to be isolated or discharged shall be within the timings agreed and approved by YIAPL & Airport Emergency Service. The Concessionaire shall be responsible for ensuring that the entire sprinkler installation within his premises is charged up and in operation by time allocated for working hours.
14. Upon completion of the installation work, the Concessionaire shall be responsible for the proper maintenance of the complete fire sprinkler and alarm system on their premises.
15. The Concessionaire shall conduct regular servicing and maintenance of the fire protection and/or detection system on their premises. The fire alarm systems are to be wired to the existing zone as designed by YIAPL. Servicing and maintenance shall be carried out in such a way that the overall healthiness of the entire system is not affected.
16. The Concessionaires must adhere fully to the standards and regulations laid down in NFPA & relevant IS codes.
17. If the Fire Protection System is affected:
	1. The Concessionaire must submit the proposed sprinklers additions/alteration works for the premises with the Qualified Person’s endorsement on the drawings to YIAPL for approval.
	2. YIAPL’s endorsement of the drawings for the above submission is required prior to commencement of any works.
	3. The Concessionaire must also submit 4 sets of fire sprinkler drawings with endorsement and approval letter from YIAPL once he receives the required approval from the authorities.
18. If the Fire Protection System is not affected, drawings must still be submitted to YIAPL for approval with the said status of the Fire Protection System endorsed onto the drawings by the Qualified Person.
19. Any proposed sprinklers that are to be installed by the Concessionaires shall be of the Quick Response type.
20. If there are any decorate false ceiling, canopy, display cabinets, etc. installation below the existing ceiling which has sprinkler installed, the Concessionaire’s Qualified Person shall ensure and certify that the sprinkler discharge pattern is not affected.
21. The Concessionaire shall be responsible for providing the second layer of fire alarm smoke detectors for their installed false ceilings. These fire smoke detectors shall be linked to the existing fire alarm system.
22. The proposed fire alarm detectors shall be designed and installed in accordance with the NFPA & relevant IS standards and in full compliance with the rules and regulations of the State Fire & Emergency Services and other relevant authorities.
23. The Concessionaire shall submit the proposed fire alarm smoke detector plan clearly indicating all existing, additional or alteration of the detectors and drawing must be endorsed by their own Professional Engineer.
24. The Concessionaire must arrange at his own cost to engage YIAPL's Fire Alarm system OEM or System supplier for the software programming & graphics upload to be integrated into existing fire alarm system and subsequently the network to be established with the Master GUI workstation.
25. All materials required for the modification and networking of the fire system shall be in the Concessionaire's scope.
26. If there is any alteration, addition or relocation to the existing detector, it must be submitted to YIAPL with endorsement for approval.
27. Fire Extinguishers & Emergency and Life safety signages inside the Concessionaire areas shall be provided and distributed in compliance with NFPA & relevant IS standards and YIAPL requirements by the Concessionaires. The type of fire extinguishers shall be as per approval of YIAPL.
28. The Concessionaire shall arrange inspection for all incoming material at site upon completion of works. During the execution of works, YIAPL shall have the authority to accept or reject the installation accounting for quality reasons.

**Isolation & Draining**

1. Any isolation, draining and recharging to the affected sprinkler system must be done by YIAPL’s maintenance contractor and is chargeable to the Concessionaire. This work can only be performed provided the Concessionaire has obtained “Work Permit to Work” from YIAPL and is supervised by the Concessionaire’s Professional Engineer. The system must be promptly charged within the stipulated working hours.
2. The request to be submitted minimum 3 working days prior to the isolation and draining could only be made by supervisor of the work and he/she is required to be present during draining and charging of the requested zone. Notwithstanding this, YIAPL reserves the right to schedule for the requested isolation works to be carried out together in a zone to safeguard the building fire safety during the mass construction works.
3. The sprinkler works contractor must carry out physical site checks with YIAPL maintenance contractor to ensure that the requested zone is the right one. The date of the site check must be indicated on the isolation form. No approval will be given at all if physical checks on site were not carried out, regardless of how urgent the work may be.
4. For new pipe work, a pressure test report (certification) is required before it can be connected to the existing sprinkler system. The existing sprinkler layout is given to the Concessionaires who must upgrade or make any changes to the pipe size or distribution in accordance with the current code.
5. All sprinkler work must be done by experienced workers.

**F&B, Cooking, Reheating Areas Requiring Hoods**

1. The Concessionaires should install their own cooker hood complete with a Fire-Suppression System suitable for deep fry cooking and open flames. The Concessionaires should include this item in the submission for YIAPL approval.
2. The Fire protection & detection system (Sprinklers & Detectors) provided in Demised premises area by YIAPL with a provision of extension of Fire sprinkler & detector system. Any change, alteration required due to additional works in Demised premises areas, shall be done by the Concessionaire in compliance with standards and codes mentioned hereafter and technical specifications of main contract document and Demised premises guidelines.
3. The existing sprinkler system in PTB and Pier has been designed as per classifications of Ordinary Hazard group. The addition and alteration shall be carried out to meet the classification, as required.
4. The scope of work for the Concessionaire includes integration of fire alarm system of Demised premises areas with fire alarm system of PTB & Pier, in accordance with system operation and specification requirements. The proposed system and equipment shall be the same or compatible with the fire alarm system of PTB. All the initiating and notification appliances shall be of existing (Siemens) make only.
5. All the plants and material required for extension of Fire protection & alarm system services, in Demised premises areas shall be compatible with existing systems and as per list of manufacturers approved by YIAPL.
6. The sizes of sprinkler piping shall be as per calculation & standards.
7. Beam detectors have been installed in double height areas of more than 10mtrs. The same philosophy must be maintained in Demised premises areas, if any corrective action required, due to additions and alterations.
8. Fire Extinguishers & Emergency and Life safety signages inside the Concessionaire areas shall be provided and distributed in compliance with NFPA & relevant IS standards and YIAPL requirements by the Concessionaires. The type of fire extinguishers shall be as per approval of YIAPL.
9. Kitchen Hoods (if installed by the Concessionaire) shall be complete with an automatic liquid fire suppression system with the approval of YIAPL.
10. Before the start of works, YIAPL concerned system maintenance contractor will carry out a pre-test with the Concessionaire. This is to verify that the building fire detection and protection system is in working condition before handing over the fire system to the Concessionaires.
11. A post-test will be carried out after the Concessionaire has completed the work. If the post-test fails, the Concessionaire/works contractor shall rectify the fault (fault of the entire system, not limited to the Concessionaire area) at his own cost to the satisfaction of YIAPL.
12. All required interface with the existing system shall be in the scope of the Concessionaire.

## Requirements for Isolation of Fire Alarm and Draining of Fire Sprinkler System

1. Fire alarm isolation and/or draining of fire sprinkler application form shall be submitted at least 3 working days before work commences.
2. Working times will be defined by YIAPL guidance, only. YIAPL will notify the Concessionaire accordingly about the working times and allowed services. Isolation/discharging of the protection system is not allowed on Sundays and Public Holidays.
3. A joint physical site inspection shall be carried out with YIAPL to ensure the requested zone is compliant.
4. A copy of the fire sprinkler drawing / floor plan shall be submitted priorly.
5. No hot work is allowed when the building’s fire protection/detection systems are not in service or vice-versa
6. The Concessionaire’s project officer shall be present during draining and charging of the fire protection system.
7. In case of fire alarm activation due to the negligence of the workers, a Service Charge will be levied to the Concessionaire or contractor for the fire engine turnout.
8. The Concessionaires shall ensure that the 2nd layer fire sprinklers are charged-up before completing the false ceiling finishes.
9. The Concessionaire’s Professional Engineer shall ensure that pipe pressure tests are carried out (In accordance with the Code of Practice) on all newly installed sprinkler pipes before connecting to the building’s fire protection system and a copy of the report/certificate to be forwarded to YIAPL.
10. A physical sprinkler burst test will be conducted on all newly installed sprinkler pipes and it shall be witnessed by YIAPL.

##  Fire Suppression System (For Kitchen and F&B)

1. The Concessionaires shall install an approved kitchen fire suppression system for all “Open flame” cooking facilities and deep-frying activities in their premises. This is in addition to the premises fire protection system. The system shall be linked to the building’s fire alarm system.
2. A copy of the fire suppression system manual and the layout plan shall be submitted to YIAPL for reference. A copy of the layout plan shall be posted in the kitchen/ preparation area.
3. The Concessionaire is to ensure that the suppression system is included in the submission drawings for YIAPL approval.

## Additional Requirements for Fire Safety

1. The Concessionaires are hereby informed that provision of one-way locking electromagnetic devices linked to the building’s fire alarm system will not be allowed unless otherwise permitted via wavier applications by the Relevant Authority.
2. Use of and/or storage of portable LPG cylinder gas is not allowed in the Terminal Buildings and other YIAPL owned buildings. Only piped gas from Power Gas Company is allowed.
3. The layout of the piped gas installation shall be posted in the kitchen and a copy submitted to YIAPL for reference.
4. A Letter of Approval or a Fire Safety Certificate (FSC) must be obtained by the Concessionaire of the Demised premises for the fire safety works before it is used. The Concessionaire shall forward a copy of the FSC to YIAPL for reference.
5. The Concessionaires are to forward a copy of the Certificate/ test report on flame propagation and smoke toxicity tests on carpet used in the premises to YIAPL.

**Firefighting Audit Check Points Before Clearing Fit-out Works (Only for Reference)**

* Double Earth wire shall be ensured in all electric sockets, UPS/Battery cabinet.
* Terminal cover for all batteries.
* Auto glow signage for extinguishers at eye level.
* Emergency Exit signage added in the panic room.
* Sprinklers caps – Groove to be provided.
* Technical room – Carbon dioxide cylinders (4.5 kg).
* Fire rated door to be provided for electrical room.
* Auto glow exit signage for electrical room.
* Emergency lights to marked with red dots.
* Sprinkler in electrical rooms (one 68 degrees and one 79 degrees (yellow and red)).
* CQRS – Electrical panel and server rack.
* Fire extinguishers are to be placed on metal stands.
* Hooter with strobe light to be installed.
* ELCB 40 amps connection.
* DB’s to have proper dressing, labelling, SLD and danger sign on DB board.
* MCB nomenclature in DB to be provided.
* Blankers in empty space - DB.
* Fill all gaps and holes.
* Electrical Panel. All thimbles to be in place.
* Feeder location chart on AHU panel should be present.

## Emergency Contact Numbers

1. Emergency Contact Numbers shall be provided by YIAPL to the Concessionaire on the time of the Fit-out kick-off and HSE onboarding sessions.
	1. Fire Call
	2. Booking of fire engine standby (Advance Notice)
	3. Hot work application
	4. Isolation of fire alarm system
	5. Draining of fire sprinkler system
2. Concessionaire shall inform YIAPL its representative's contact number (in case of an emergency), priorly to the commencement of any works.

# PHE System

## Regulations & Standards

The Plumbing system of the project shall be designed based on the Fire Strategy Documents, applicable codes, and standards with specific reference to the following:

* National Building Code 2016 of India.
* SP 35
* Uniform Plumbing Code.
* CPHEOO.

## Requirements

The Concessionaire and its representatives must comply with the following:

1. Water meter to be provided by the Concessionaire if not provided.
2. Meter calibration certificate along with technical data sheet to be submitted for approval.
3. Water meter to have open protocol communication port to interface with YIAPL's BMS system.
4. Tap-off points will be provided by YIAPL at the boundary of the Demised Premises area (or as per LOD). From this tap-off, the Concessionaire must do all the associated piping, fixing of fixture, etc.
5. Drainage piping from Tee point including fixtures and fittings to be provided by the Concessionaire.
6. All drainage piping shall be done by the Concessionaire above the floor slab on the raised floor and connected to the respective Shop/Outlet points for connection. Any additional penetrations/core-cuts require consent from YIAPL and coordination with other services. For raised floor details/specifications, Concessionaire must refer to structural guidelines.
7. All floor penetrations, core cuts within the RCC slab (around Pipes and fittings, etc.), between levels must be sealed against water, smoke and flame using fire stop materials.
8. Separate piping to be provided by the Concessionaire for soil, waste and grease waste. It must be connected to the respective Shop/ Outlet point provided.
9. Localized (within Demised premises under table type) grease trap to be provided by the Concessionaires for all washing sinks in Kitchen and Service Areas.
10. All grease traps shall be located as close to fixtures or drain as possible and located such that they are fully accessible from the top cover. Design calculations are to be submitted for YIAPL's approval.
11. All potable/hot water piping wherever required within the Demised premises boundary including water heaters with all related plumbing, mechanical and electrical fittings, and fixtures to be provided by the Concessionaire.
12. All domestic hot water lines shall be insulated with the approved insulation material nitrile rubber and clad with 26-gauge aluminum cladding.
13. All the piping for drains till the connection point provided in the header waste pipe to be provided by the Concessionaires. The drainpipes are to be connected to the floor trap provided in the Demised area or to the nearest floor trap (Toilet, kitchen, etc.) in the vicinity.
14. The tap-off points for the entire Demised space are provided in the drawings for further working.

## Hot & Cold Water System

1. All the drawings are to be endorsed by the Professional Engineer/ licensed plumber who undertakes the design and installation work.
2. The Concessionaire shall engage their own Professional Engineer/licensed plumber to submit the installation drawings and arrange for inspection.
3. All fittings/ material must be approved by YIAPL and all fixtures to be low flow fixtures.

# FDAS System

## Regulations & Standards

The FDAS system of the project shall be designed based on the Fire Strategy Documents, applicable codes and standards with specific reference to the following:

* National Building Code 2016 of India.
* NFPA 72

## Requirements

The Concessionaire and its representatives must comply with the following:

1. Loop tap-off point will be provided by YIAPL at the boundary of the Demised premises area. From this tap-off, the Concessionaire must do all the associated fixing of fixture, etc. as per specifications.
2. The Concessionaire FDAS system will be connected to the Main FDAS panel.
3. YIAPL will provide only module Tap-off.
4. Interface module shall be provided by Concessionaire as per specifications.

# BMS System

## Regulations & Standards

The BMS system of the project shall be designed based on the Concept of operation, Schematic and Equipment schedule.

## Requirements

The Concessionaire and its representatives must comply with the following:

1. YIAPL will integrate with the Concessionaire Energy meters for real time energy monitoring in the centralized BMS.
2. YIAPL will integrate with the Concessionaire BTU meter for energy consumption monitoring in the centralized BMS.
3. YIAPL will integrate with the Concessionaire water meter for energy consumption monitoring in the centralized BMS.

# ICT System

## Regulations & Standards

The ICT services of the project shall be designed based on the applicable codes and standards with specific reference to the following:

* BICSI
* TIA
* IEEE

## Requirements

The Concessionaire and its representatives must comply with the following:

1. The number of Passive Consolidation Points (CP) for each Concessionaire shall be decided based on space allocated as per contract.
2. Passive Consolidation Points (CP) will be connected from nearest Telecomm Room, and the port activation shall be done based on the requirements received from the YIAPL commercial team as per the agreement with the Concessionaire.
3. The internal passive cabling but not limited to, termination, testing and commissioning from Passive Consolidation Point (CP) till endpoint shall be under Concessionaire’s scope.
4. Concessionaire cannot install Server & Network equipment in retail space. If Concessionaire wants to build the infra, the server & network equipment can be placed in YIAPL's datacenter based on Concessionaire agreement.
5. Concessionaire server to endpoint connectivity shall be through YIAPL's Campus L2 network based on YIAPL's commercial guidelines.
6. The Concessionaire shall not be allowed to install their own Wi-Fi systems. If Concessionaire wants their network work to run on WIFI, they can avail the service from YIAPL's approved partner based on shared or dedicated WIFI access point. YIAPL will broadcast concessionaire define SSID to restricted zone.
7. No open internet shall be allowed, Concessionaire shall follow Cert in Cyber Security guidelines to set up their infrastructure.
8. Regarding Public Addressing and Voice Announcement (PAVA) requirements, YIAPL shall ensure the required dB level is being maintained for the Concessionaire’ s area. If the dB level is not achieved, YIAPL shall install additional ceiling speakers that will be used only for Emergency Evacuation. This is applicable only for open F&B and retail units. Rest Concessionaire spaces having enclosed area, Concessionaire may have its own PAVA system which will be integrated with PAVA system being installed by YIAPL and during the emergency evacuation, Concessionaire’s system will be Overwritten by the Terminal's PAVA system. Integration with PAVA system will be in Concessionaire scope.
9. For Indoor DAS for Tetra (TMRS) signal, YIAPL shall ensure that signal coverage is available at all Concessionaire areas.
10. YIAPL shall provide passive ports for IP based Telephone (Intercom). IP Telephone handset will be provided by YIAPL with standard features as per Concessionaire commercial agreement. STD & ISD service will be available to Concessionaire based on agreement with YIAPL commercial team & telecom provider.
11. Concessionaires shall use their own stand-alone Access Control system (ACS) and shall ensure the system is meeting the YIAPL's and authorities fire alarm/emergency system guidelines.
12. Concessionaires shall use their own stand-alone video surveillances system for the allocated space.