



ABU DHABI SEWERAGE SERVICES COMPANY (ADSSC)

GENERAL SPECIFICATION FOR ELECTRICAL WORKS

DIVISION 16 ELECTRICAL

SECTION 16180 LIGHTING AND SMALL POWER

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DOCUMENT CONTROL SHEET

| Revision No. | Date | Revision Description / Purpose of Issue |
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1. LIGHTING

- a) All items described within this section shall comply with the provisions of Section 15001: General M&E Requirements.
- b) Lighting installations shall be designed to provide the illumination levels to suit the site orientation. They shall conform to CIBSE or some other national approved standard.
- c) Lighting levels shall be measured at a plane 1,000mm above finished floor level (or above walkway levels in pump chambers and dry wells if applicable). Two-way switching shall be provided for areas where access may be gained via two physically separate doors.
- d) The Contractor shall prepare lighting layout drawings providing sufficient details to enable duct requirements to be ascertained prior to the casting of roof beams and columns. Lighting conduits shall be concealed and/or surface-mounted on ceilings and walls as per the requirements as specified. Conduits in tiled areas shall be concealed only beneath the tiles.
- e) Lighting fittings shall be complete with all supports, suspensions, flexible cables, pendants and plugs. They shall be connected to the main circuit wiring with 105°C heat resisting flexible cables of a minimum conductor size of 1.5mm². Silicon rubber insulated cables shall be used wherever necessary as per the instructions/approval of ADSSC.
- f) Break joint rings shall be used in conjunction with batten holders ceiling roses or back plates mounted onto a flush installation.
- g) Earthing of all pendant or semi-pendant fittings shall be by a separate core in the connecting flex or cable securely bonding the earth terminal on the fitting to the glanded joint of interconnecting cables. The use of pendant chains or the conduit support tubes as a means of earthing is prohibited.
- h) Standard fluorescent lighting fittings shall have two suspension or fixing points.
- i) All lampholders for flexible pendants shall be of the all insulated-skirted pattern with cord grips and for batten- or wall-mounting shall be of similar pattern. All lampholders shall be of the bayonet cap pattern.
- j) The point box suspensions and other parts of the lighting fittings shall be erected at times to suit the building programme for decoration. The glassware diffusers shade lamps and tubes shall not be fitted until all building work is complete.

- k) All fittings shall be left clean inside and outside ready for use. All fluorescent fittings shall be suitable for instant start. All ballasts shall be suitable for 240V, single-phase 50Hz supply and quick start type and power factor corrected.
- l) All fluorescent tubes shall be of an approved manufacture and standard white. They shall be suitable for the lighting fittings in which they are installed and of the correct voltage. Diffusers on fluorescent fittings shall be polycarbonate.
- m) All incandescent lamps shall be of an approved manufacture with metal coil filament gas filled pearl in all standard sizes with standard caps to suit the fittings in which they are installed.
- n) The Contractor shall supply and install all lamps for the entire lighting fitting installation and shall replace all burned out lamps up to the issue of the Final Acceptance Certificate.
- o) Emergency lights shall be wall-mounted twin lamp units arranged to give at least 4 hours illumination in the event of mains power supply failure and shall meet the specifications as described hereinafter.
- p) Control gear of lighting fitting shall be suitable for prolonged and continuous service in accordance with the service conditions as described under Section 15001: General M&E Requirements.
- q) Lighting poles shall be hot dipped galvanised. Other accessories, such as foundations, cut-outs and control gear, shall be in strict compliance with ADWEA standards and their associated companies' regulations.
- r) Internally-mounted light fittings not liable to splashing shall have a minimum of IP54. Internally mounted fittings liable to splashing and all externally mounted fittings shall have be IP65 or better with an exception of control gear compartment having a minimum of IP42 or better.

2. PORTABLE PLANT

- a) Handlamps shall be: fitted with a wire cage; 24V 40W lamp and 10 metres of 3-core tough, rubber-sheathed cable with plug suitable for low voltage socket outlets.
- b) Weatherproof portable floodlights shall be 500W, 110V, 50Hz complete with a 10-metre pole of adjustable height. The Contractor shall furnish the detail of wiring and installation on the workshop drawings for ADSSC review/approval prior to the work.

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- c) Transformer shall be adequate capacity double wound step down with 240V, 50Hz, single-phase primary and 110V and 24V tapping on the secondary side with earthed centre tap. Transformers shall be complete with primary and secondary fuses and housed in a weatherproof enclosure complete with carrying handle and 20 metres of cable complete with fused plug.

3. WIRING

- a) Wiring shall be installed using PVC cable to BS 6004 or equivalent, enclosed in high-impact PVC conduit or steel conduit.
- b) Wiring may also be carried out where necessary in high-impact PVC or metal trunking to BS 4678 subjected to the prior approval from ADSSC.
- c) The minimum copper conductor size used shall meet current ADWEA and their associated company's standards.
- d) The use of junction boxes between fittings shall be kept to a minimum and where practicable all connections shall be made at the fitting.
- e) Junction boxes shall be rectangular pattern and where possible their position shall be hidden from immediate view. They shall still be accessible.
- f) Circuit wiring shall not be connected directly onto the terminals of lighting fittings but shall be made off in point boxes consisting of a standard box containing shrouded pinch screw connectors to which connections shall be made to the light fitting by heat resistant flexible cables to 105°C.

4. DISTRIBUTION BOARDS

- a) Three-phase distribution boards shall be of the totally enclosed metal-clad pattern, manufactured in accordance with BS EN 60439 and as described under Section 16020: Factory Built Assembly.
- b) Three-phase distribution boards and single-phase consumer units shall be manufactured by using manufacturer standard type-tested panel assemblies facilitating plug-in fixing and removing of the MCB/RCCB/MCCBs.
- c) The minimum IP rating for single-phase consumer units installed indoors shall be IP42.
- d) Combined busbars and row type arrangement of MCBs and RCCBs inside distribution boards and consumer units are not permitted under any circumstances.
- e) The enclosure shall be made from zinc-coated mild steel formed to a clean line and complete with a lockable, hinged cover with gasket.

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- Removable plates with conduit knockouts shall be provided at top and bottom.
- f) All distribution boards shall be complete with a Residual Current Circuit Breaker with a tripping current of 30mA/100mA/300mA as appropriate.
 - g) Selection of the appropriate circuit breaker type (i.e. MCB/RCCB/ELCB/MCCB etc.) and their breaking capacity, design and application shall be in accordance with Section 16050: Circuit Breakers.
 - h) Distribution boards shall incorporate combinations of single pole and neutral and triple-pole Miniature Circuit Breakers (MCBs) as required. All circuit breakers shall be rated and have the same number of phases as the circuit from which it is fed.
 - i) Doors shall be fitted with gaskets and be easily removable to preserve the finish and simplify installation. Distribution boards shall be arranged for top and bottom cable entry and be provided with an ample cable termination plate and chamber to enable cables to be neatly glanded.
 - j) Distribution boards shall be wall- or floor-mounted and, where specified, incorporate on-load isolators which shall be 'front of panel' operated with ON/OFF indicator and be capable of being padlocked in the OFF position.
 - k) Each bank of MCBs shall be clearly identified with its appropriate phase colour code. The mounting framework for the banks of MCBs shall be easily removable to simplify installation. Adequate phase barriers and shields shall be fitted to ensure that after installation and wiring all bare terminals and wires are covered to prevent accidental contact with live conductors during the normal procedure of resetting of MCBs.
 - l) All distribution boards shall be complete with MCBs manufactured in accordance with BS EN 60898 to afford "close" over-current protection to circuits as defined by BS 7671.
 - m) All neutral bars shall have a separate terminal for each MCB within the distribution boards.
 - n) Termination of the circuit cables at distribution boards shall be neat. Slack shall be left at each MCB bank or neutral bar to enable the complete assembly to be removed for inspection without disconnection. Neutral conductors shall be connected to the bar in the same order as the phase conductor to the MCB.
 - o) Each distribution board shall be complete with a permanent circuit identification chart preferably fixed to the interior of the front door. This chart shall be permanently and legibly completed as circuits are completed with the circuit description and the MCB rating.

- p) Painting of distribution boards shall be subject to the approval of ADSSC.
- q) Distribution boards shall be properly earthed by connecting an earthing conductor from the main distribution earth busbar to the internal earth connector stud.

5. SOCKET OUTLETS

- a) Internally-mounted socket outlets shall be connected to a ring circuit of minimum wire size 2.5mm² PVC insulated.

Ratings shall be as follows:

- i) Radial circuits for served area up to 20m² shall be provided with minimum wire size of 2.5mm² PVC insulated.
 - ii) Radial circuits for served area between 20 and 50m² shall be provided with minimum wire size of 4mm², PVC insulated.
 - iii) The maximum rating of a ring circuit shall be 30A feeding a floor space of between 50m² and 100m².
- b) All socket outlets shall be of the shuttered type to comply with BS 1363 and shall accept 13A square pin plugs. All socket outlets shall be switched, flush mounting and supplied with one spare plug per socket.
 - c) Externally-mounted socket outlets shall conform to the specifications requirements as described under Section 16190: Industrial Plugs and Sockets.
 - d) Socket outlets shall comply with Section 16320: Wiring Devices.
 - e) Fused connection units shall be to BS 5733 or equivalent. The appropriate size fuse for the equipment being controlled shall be fitted.
 - f) The Contractor shall prepare detailed load schedules and drawings in accordance with ADWEA's regulation specially pertaining to sizing of wires, colour codes, phase orientation, protective conductors (ECC), short circuit protective devices (SCPD) maximum rating, distance between the sockets in case of dissimilar phase orientation, maximum rating of the ring circuit in conjunction with sizing of wires, SCPD, distance etc. for review and approval by ADSSC prior to commencement of work at site.

6. SWITCHES

- a) Internally-mounted switches shall be of the "multiple phase" type with the switches arranged in multi-gang boxes where applicable.
- b) Externally-mounted switches shall be weatherproof to suit site conditions, manufactured from polycarbonate and fully protected.

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- c) Flush-mounted switches shall be of the grid switch pattern with matt chrome finish covers complete with heat cured powder lacquer finish.
- d) Special care shall be taken to ensure that all switches are securely fixed truly vertical and that flush mounted switches are flush with the wall finish so that the overlapping cover plates seat onto the rims of the boxes.

7. EMERGENCY LIGHTING

- a) Emergency lighting shall provide illumination levels in accordance with BS 5266 or equivalent.
- b) Emergency lights shall be wall-mounted, twin lamp units arranged to give at least 4 hours or more illumination in the event of mains power supply failure.
- c) The composite unit shall include integral maintenance-free sealed nickel cadmium battery, battery charger and battery status indicator. A lamp test facility shall be included.
- d) Emergency light units shall be connected to a dedicated electrical circuit separate from all other lighting or small power supplies.
- e) The wiring shall be carried out in a separate and independent conduit system from other system circuits. A steel conduit system with compression-type fittings shall be used in dry areas where the conduit is not liable to be subject to damage. Rigid galvanized steel conduit shall be used in damp/wet areas and areas where conduit is liable to be subject to damage.
- f) Junction boxes containing emergency power system wiring, circuits and conductors shall have red covers and marked "EM" in white letters.
- g) Emergency lighting shall be provided in transformer, generator, electrical and mechanical rooms, including remote panels' location (e.g. fire alarm panels, distribution boards in corridors, valve chambers, dry well etc.).

PRO-FORMA LOAD SCHEDULE

| | | | | | | | | | |
|--------------------|-------|---------------------------|---------|----------|---------------|--------------|----------|--------|------------------|
| Project Reference | | xxxx | | | | DATE | xxx | | |
| Project Title | | xxxx | | | | Manufacturer | xxx | | |
| Project Location | | xxxx | | | | Supplier | xxx | | |
| DISTRIBUTION BOARD | | | | | | | | | |
| No. | Title | Type | Rating | | | Location | Fed From | | Switching Device |
| xxx | xxx | xxx | xxx | | | xxx | xxx | | xxx |
| Way | | Protection/Control Device | | | | LOAD | | | Notes |
| No. | Phase | Fuse (A) | MCB (A) | RCD (mA) | Other specify | L1 (A) | L2 (A) | L3 (A) | Notes |
| 1 | L1 | | | | | xxx | xxx | xxx | |
| | L2 | | | | | | | | |
| | L3 | | | | | | | | |
| 2 | L1 | | | | | xxx | xxx | xxx | |
| | L2 | | | | | | | | |
| | L3 | | | | | | | | |
| 3 | L1 | | | | | xxx | xxx | xxx | |
| | L2 | | | | | | | | |
| | L3 | | | | | | | | |
| 4 | L1 | | | | | xxx | xxx | xxx | |
| | L2 | | | | | | | | |
| | L3 | | | | | | | | |
| 5 | L1 | | | | | xxx | xxx | xxx | |
| | L2 | | | | | | | | |
| | L3 | | | | | | | | |
| 6 | L1 | | | | | xxx | xxx | xxx | |
| | L2 | | | | | | | | |
| | L3 | | | | | | | | |
| 7 | L1 | | | | | xxx | xxx | xxx | |
| | L2 | | | | | | | | |
| | L3 | | | | | | | | |
| 8 | L1 | | | | | xxx | xxx | xxx | |

END OF SECTION