SECTION C8

HIGH INTENSITY DISCHARGE LUMINAIRE AND LAMP

C8.1 GENERAL

This Section covers the requirements for the following high intensity discharge (HID) lamps:

Tubular sodium vapour discharge lamps (SON-T or LBS : HST)

Elliptical sodium vapour discharge lamps (SON-E or LBS : HSE)

Elliptical mercury vapour discharge lamp (MBF or LBS : HME)

Linear metal halide (MBIL) or LBS: HIT-DE / linear high pressure sodium lamp (SON-TD) or LBS: HST-DE

The lamp, in connection with the control gear, shall be suitable for operation at 220 V ± 6%, 50 Hz ± 2%, single phase, AC supply.

The lamp shall be compatible with the luminaire and the control gear of the luminaire.

C8.2 HIGH PRESSURE SODIUM VAPOUR DISCHARGE LAMP (SON-T AND SON-E OR LBS : HST AND HSE)

The lamp shall be manufactured and tested in accordance with IEC 60662:2011.

The lamp shall consist of a high pressure sodium discharge operating within a sintered alumina arc tube. The arc tube shall be mounted in a clear glass bulb completed with an E40 lamp cap.

The lamp shall have a universal operating position and shall be suitable for use with external ignitor.

The correlated colour temperature of the lamp shall be in the order of 2,000K. The light output of the lamp shall be constant and shall not be less than the following figures for the respective wattage type in the initial 2,000 hours:

Nominal Lamp Wattage	Initial Light Output
150 W	16,500 lumens
250 W	28,000 lumens
400 W	48,000 lumens

The rated average life of the lamp shall not be less than 24,000 hours at 50% failure.

C8.3 ELLIPTICAL HIGH PRESSURE MERCURY VAPOUR DISCHARGE LAMP (MBF OR LBS : HME)

The lamp shall be manufactured and tested in accordance with IEC 60188:2001.

The lamp shall consist of a high pressure mercury discharge operating within a quartz arc tube. The arc tube shall be mounted in an elliptical glass bulb coated with a fluorescent phosphor and complete with a cap of the type compatible with the respective lamp wattage type.

The correlated colour temperature of the lamp shall be in the range of 3,400K to 4,000K with respective to the selected nominal lamp wattage.

The lamp shall have a universal operation position.

The light output of the lamp shall be constant and shall not be less than the following figures for the respective wattage type in the initial 2,000 hours:

Nominal Lamp Wattage	Initial Light Output
50 W	2,500 lumens
80 W	4,000 lumens
125 W	6,500 lumens
250 W	13,750 lumens
400 W	22,000 lumens

The rated average life of the lamp shall not be less than 16,000 hours or 24,000 hours with respective to the selected nominal lamp wattage at 50% failure.

C8.4 LINEAR METAL HALIDE/LINEAR HIGH PRESSURE SODIUM LAMP

This Sub-section covers the following lamps:

(a) 750 W/1,500 W linear metal halide (MBIL or LBS : HIT-DE); and

(b) 400 W linear high pressure sodium (SON-TD or LBS : HST-DE)

MBIL (or LBS : HIT-DE) linear metal halide lamp shall be manufactured and tested according to IEC 61167:2015. The lamp consists of an arc burning between tungsten electrodes in an atmosphere of mercury and additional metal halides enclosed in a double-ended quartz arc tube. The halides shall be chosen to have a high efficiency light output of good colour rendering and correlated colour temperature of 5,200K. The lamp shall be 750/1,500 W as specified. The rated average life of the lamp shall not be less than 6,000 hours at 50% failure.

The luminous efficacy of the MBIL lamp shall not be less than the following figures for the respective wattage type in the initial 2,000 hours:

Nominal Lamp Wattage (L)	Initial Light Output
750 W	63,750 1umens
1,500 W	127,500 1umens

SON-TD (or LBS : HST-DE) linear high pressure sodium lamp shall be manufactured and tested according to IEC 60662:2011. The lamp shall be tubular, double ended in construction and shall consist of an arc tube made of sintered aluminium oxide and mounted in a clear tubular quartz outer bulb having a single contact ceramic cap at each end. The lamp shall be rated at 400 W and have a correlated colour temperature of 2,100K. The rated average life of the lamp shall not be less than 24,000 hours at 50% failure.

The luminous efficacy of the SON-TD lamp shall not be less than the following figures for the respective wattage type in the initial 2,000 hours:

Nominal Lamp Wattage (L)	Initial Light Output
400 W	34,000 1umens

C8.5 LUMINAIRE FOR FLOODLIGHTING

C8.5.1 General

The floodlighting luminaires shall be manufactured and tested in accordance with IEC 60598-1:2014 and IEC 60598-2-5:2015.

The floodlighting luminaires shall have a degree of protection of not less than IP54 to IEC 60529:2013/Corr 2:2015 and they shall be constructed from corrosion resistant materials.

The floodlighting luminaires shall be suitable of continuous outdoor operation at an ambient temperature of 35°C without unduly affecting the life and performance of the floodlighting luminaires, the control gear and the lamps.

The floodlighting luminaires shall be supplied in complete set including the main body, reflectors, front glass, lampholder assemblies, terminal box, internal wirings, control gear, control gear box and mounting facilities as specified and as required.

C8.5.2 Construction

The main body shall be manufactured from die cast aluminium, which is fixed to two aluminium alloy end castings. The luminaire should also incorporate removable drain plugs for use in humid conditions.

Internal reflectors consisting of the main body and two end cheeks and the two optional reflectors, baffled and faceted, are to be constructed from highly specular aluminium. The metal reflector shall be polished, anodized and shall be designed to give an asymmetrical light

distribution of beam angle to 1/10 peak to approximately the following requirements:

(a) for 750/1,500 W MBIL (or LBS : HIT-DE) lamp
Horizontal 90°
Vertical 9° above peak, 41° below peak; and

(b) for 400 W SON-TD (or LBS : HST : DE) lamp
Horizontal 84°
Vertical 4° above peak, 19° below peak.

The heat resistant toughened glass shall be fitted to a non-ferrous metal front frame with corrosion resistant hinges and four swivel bolts (stainless steel) for securing to the main body and provided with weatherproofing silicon rubber gasket between the main body and toughened front glass.

The lampholder assembly shall be suitable for accepting the lamp as specified. They shall be incorporated with appropriate heat sinks if necessary to avoid overheating.

Weatherproof wiring terminal box shall be mounted at the rear side of the main body suitable for housing a two-way terminal block, each terminal suitable for 1x10 mm^2 cable. Cable entry is provided via a combined cable gland/cord grip. Earthing stud/terminal shall be provided. Internal wiring shall be of heat resistant type to the appropriate IEC Standard.

The control gear shall be suitable for operation of the lamp as specified, and shall consist of a ballast, ignitor, transformer and power factor correction capacitor(s) as appropriate, to enable the whole assembly to operate at the specified voltage with an overall power factor not less than 0.85.

Control gear shall be provided with facilities for easy and securely fixing to a metal back plate or gear box. Control gear shall be suitable for continuous operation under an ambient temperature of 35°C.

The floodlighting luminaires shall be complete with the stirrup arrangement which permits the floodlighting luminaires to be rotated in azimuth and adjusted in elevation. An aiming stop shall be provided on the floodlighting luminaires to ensure that the aiming angle remains undisturbed even if the floodlighting luminaires are removed from the stirrup for servicing.

C8.5.3 Lamps

All types of lamps suitable for fixing to the specified luminaire shall have a high efficiency and a fairly constant output and be constructed with appropriate lamp caps.

SECTION C9

LIGHT EMITTING DIODE LUMINAIRE & DRIVER

C9.1 GENERAL

C9.1.1 The 'Light Emitting Diode' (LED) luminaires, including the electronic driver and LED module shall be suitable for operation at 220 V ± 6%, 50 Hz ± 2%, single phase AC supply.

C9.1.2 The LED luminaires shall be fully assembled and tested before shipment from factory. The LED luminaire shall comply with the following international standards and their manufacturing process shall conform to the relevant quality standard of ISO 9001:2008:

IEC 60598-1:2014	:	Luminaires – Part 1: General requirements and tests; and
IEC 60598-2-1:1987	:	Luminaires – Part 2: Particular requirements. Section 1: Fixed general purpose luminaires; or
IEC 60598-2-2:2011	:	Luminaires – Part 2 Particular requirements. Section 2: Recessed luminaries; or
IEC 60598-2-3:2011	:	Luminaires – Part 2 Particular Requirements Section 3: Luminaries for road and street lighting; or
IEC 60598-2-5:2015	:	Luminaires – Part 2 Particular Requirements Section 5: Floodlights
IEC 60598-2-13: 2012	:	Luminaires – Part 2 Particular Requirements Section 13: Ground recessed luminaires
IEC 60598-2-22: 2014	:	Luminaires – Part 2 Particular Requirements Section 22: Luminaires for emergency lighting
IEC 62722 – 1:2014	:	Luminaires Performance – Part 1: General Requirements
IEC 62722-2-1: 2014	:	Luminaires Performance – Part 2.1: Particular Requirements for LED Luminaires

Type test certificate shall be provided to demonstrate the compliance with the above standards issued by an accredited test laboratory for the LED luminaries.

C9.1.3 The LED luminaires shall be marked in accordance with the requirements of IEC 60598-2-1:1987 for general-purpose luminaires or IEC 60598-2-2:1997 for recessed luminaries. The ingress protection for indoor and outdoor LED luminaire shall be at least IP2X and IP54 respectively to IEC 60529:2013/Corr 2:2015.

C9.1.4 The irradiance and radiance emission limits of the LED luminaires, that are exposed to view directly, shall be tested to comply with the hazard 'Risk Group 1' (low risk) as stated in the requirements of the IEC 62471:2006 – Photobiological safety of lamps and lamp systems.

C9.1.5 The LED luminaires shall be rated for continuous service at an ambient temperature of 40 ^{o}C without affecting the performance requirements as stated in clause C9.4 of this specification. The EE Contractor shall be responsible to advise the Supervising Officer if the performance of the LED luminaires will be affected by the installation conditions.

C9.1.6 The LED luminaires shall be 'Restriction of Hazardous Substances (RoHS) Compliance'.

C9.1.7 The LED luminaires shall have a full set of photometric data prepared to CIBSE TM5 or IES format for general lighting design purpose.

C9.2 ELECTRONIC DRIVER

C9.2.1 The electronic driver (driver) for the LED luminaire shall include the components of power factor correction, radio interference suppression and also dimming facility if it is specified. The driver shall conform to the following international standards if applicable:

EN 55015:2009	:	Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment.
IEC 61000-3-2: 2009	:	Electromagnetic compatibility (EMC) – Part 3-2: Limits – Limits for harmonic current emissions (equipment input current $\leqq$ 16 A per phase);
IEC 61347-1:2007	:	Lamp controlgear – Part 1: General and safety requirements;
IEC 61347-2-13:2006	:	Lamp controlgear – Part 2-13: Particular requirements for DC or AC supplied electronic controlgear for LED modules;
IEC 61547:2009	:	Equipment for general lighting purposes – EMC immunity requirements; and

IEC 62384:20011	:	DC or AC supplied electronic control gear for LED modules – Performance requirements;

Certificates of compliance issued by accredited test laboratories shall be provided for different ratings of drivers to be used in the Contract.

C9.2.2 Technical information of the drivers shall be provided to indicate the performance of the drivers. The data shall include, but not limited to, minimum and maximum input voltage, frequency, maximum operating temperature, rated output voltage, rated output current, rated output power and power factor.

C9.2.3 The rated life of driver shall not be less than 35,000 hours operating at ambient temperature not lower than 40°C.

C9.2.4 Electronic ballast shall be compatible with the dimming circuit provided. Unless other specified, the electronic ballast shall have at least continuous dimming range 40% - 100% without flickering.

C9.3 LED MODULE

C9.3.1 The LED module, self-ballasted LED module or self-ballasted LED lamp shall be manufactured and tested to comply with the following standards if applicable:

LED module & Self-ballasted LED module	:	IEC 62031:2014: LED modules for general lighting – Safety specifications.
Connector for LED modules	:	IEC 60838-2-2:2012: Miscellaneous lampholders – Part 2-2: Particular requirements – Connectors for LED modules

Certificate of compliance with the above standards shall be issued by an accredited test laboratory or the manufacturer of LED module.

C9.4 PERFORMANCE REQUIREMENTS

C9.4.1 The performance of the LED luminaire and self-ballasted LED lamp shall comply with the following requirements:

(a) Luminaire efficacy (lumen/watt):

The luminaire efficacy of different types of luminaires under different colour temperatures to be used in the Contract shall be provided to indicate its performance.

(b) Lumen maintenance (L_{70})

The lumen output of LED luminaire shall deliver at least 70% of its initial lumen output after operating 35,000 hours and 25,000 hours for LED luminaire and self-ballasted LED lamp respectively. For compliance with the L_{70} threshold lumen maintenance requirements, the lumen maintenance data of each colour temperature LED luminaire using 6,000 hours is acceptable for projecting the L_{70}. The required lumen maintenance at 6,000 hours shall not be less than 94.1% and 91.8% for L_{70} = 35,000 hours and L_{70} = 25,000 hours respectively.

(c) Colour Rendering Index (CRI):

CRI shall be minimum 80 for colour temperature from 2,700 – 6,000K for indoor luminaires and self-ballasted LED lamp.

(d) Power factor:

The power factor of the LED luminaire circuit and self-ballasted LED lamp shall be minimum 0.9 and minimum 0.7 respectively.

(e) Correlated Colour Temperature (CCT) and its tolerance limit:

The colour temperature of a group of LED luminaires in the same space or room shall not be visually noticeable. The nominal CCT of the LED light source shall preferrably be one of the following values. The tolerance limits shall be within the below ranges:

2,700 K	2,725 ± 145 K
3,000 K	3,045 ± 175 K
3,500 K	3,465 ± 245 K
4,000 K	3,985 ± 275 K
5,700 K	5,665 ± 355 K
6,500K	6,530 ± 510 K

C9.4.2 Each model of LED luminaire or self-ballasted LED lamp shall be tested to comply with the above performance requirements. The EE Contractor shall submit the test report from the accredited laboratories to certify each model of LED luminaire or self-ballasted LED lamp complying with the standards or other recognised international/national standards or other standards proposed by the EE Contractor and agreed by the Supervising Officer.

C9.4.3 Self-ballasted LED lamps for general lighting services shall comply with the following requirement;

(a) IEC 62560: 2011: Self-ballasted LED lamps for general lighting services by voltage>50V – Safety specification; and

(b) IEC,62612 – Self-ballasted LED lamps for general lighting services with supply voltages > 50 V - Performance Requirements.

C9.4.4. For double-capped LED tubular lamp designed to retrofit tubular fluorescent lamp, the LED lamp shall comply with IEC62776 “Double-capped LED Lamps Designed to retrofit linear fluorescent lamps – Safety Specifications”.

SECTION C10

DOMESTIC APPLIANCES

C10.1 GENERAL

C10.1.1 Compliance with Regulation

Domestic appliances together with their electric components and cabling shall comply with the currently-in-forced edition of

(a) Electrical Products (Safety) Regulation, (Cap.406G), Laws of Hong Kong; and

(b) IEC 60335-1:2013 Household and similar electrical appliances – Safety – Part 1 : General requirements.

C10.1.2 General Requirements

(a) Unless otherwise specified, the domestic appliances shall be designed for operation on 220 V $\pm$ 10%, 50 Hz $\pm$2%, single phase, AC supply.

(b) Unless otherwise specified, the domestic appliances shall be suitable in all respects for operation in ambient air condition of temperature range between 0°C and 40°C, and relative humidity range between 0% and 99% with condensation due to temperature changes.

(c) Unless otherwise classified, all accessible metal parts of the domestic appliances that may become live in the event of electric fault shall be effectively and suitably bonded to earth via to a common earthing terminal provided within the domestic appliances.

(d) Twin core cables without earth wire are only allowed for double insulated appliances classified as Class II appliances under the specified IEC or equivalent standards.

(e) Where specified, 3-core flexible cord connected to the domestic appliances shall conform to BS EN50525-2-11:2011. The size of the cable shall not be less than that specified and shall be compatible with the rating of the respective domestic appliance. Twin core cables without earth wire are only allowed for double insulated appliances.

(f) Where specified, 13 A plug connected to the flexible cord shall conform to BS 1363-1:1995. The fuse of the plug shall be of a rating compatible with the rating of the respective domestic appliance.

(g) Unless otherwise specified, domestic appliances and office equipment shall have been registered with the Energy Label Grade 1 under the Mandatory or Voluntary Energy Efficiency Labelling Scheme where applicable, or be of recognition types under the Voluntary Energy Efficiency Labelling Scheme from the Electrical and Mechanical Services Department if relevant schemes are available for the items concerned.

C10.1.3 Technical Literature

The following technical litreatures in Chinese and/or English shall be provided, where applicable:

(a) Certificate of safety compliance;

(b) Product catalogue;

(c) Assembly drawings with dimensions;

(d) Electrical circuit diagram;

(e) Installation, operation and service manuals;

(f) Trouble-shooting guide; and

(g) Spare part list with itemised price.

C10.2 900 MM, 1,200 MM and 1400 MM CEILING FAN

C10.2.1 General Requirements

(a) The fan shall be fully balanced after assembly to ensure that the fan shall not oscillate/vibrate due to out-of-balance forces or whatsoever during operation.

(b) The fan shall conform to the latest edition of the following standards:

(i) IEC 60879:1986 Performance and construction of electric circulating fans and regulators; and

(ii) IEC 60335-2-80:2014 Household and similar electrical appliances – Part 2-80 : Particular requirements for fans.

C10.2.2 Performance Requirements

(a) The sweep diameter of the fans shall be:

Size of Fan	Sweep Diameter
900 mm	900 mm ± 5%
1,200 mm	1,200 mm ± 5%
1,400 mm	1,400 mm ± 5%

(b) The air delivery rate of the fans shall be:

Size of Fan	Air Delivery Rate
900 mm	not less than 2.2 m^3/s
1,200 mm	not less than 4.0 m^3/s
1,400 mm	not less than 4.5 m^3/s

(c) The power factors of the fans shall not be less than 0.85 at any speed.

C10.2.3 Construction

(a) Fan unit

(i) Fan motor

The motor shall be a totally enclosed, capacitor run induction motor with internal stator and external squirrel-cage rotor.

The rotor shall be mounted on sealed-for-life grease lubricated ball bearings.

(ii) Fan blades

The fan shall be fitted with two or more well balanced blades so as to be reasonably free from vibration.

The blade assemblies shall consist of blades manufactured from heavy gauge aluminium riveted to steel blade carriers.

The blade carriers shall be manufactured from mild steel plate of not less than 40 mm width at the narrowest point, pressed to shape.

Where the blade carriers are twisted to give the required angle of incidence to the blades, there shall be large radius bends to prevent stress concentrations in the blade carriers.

The blade carriers shall be securely fastened to the frame of the motor by machine screws and spring washers, the whole designed to ensure that there is no possibility of a blade becoming detached during operation.

(b) Connecting piece (capacitor housing)

(i) The plastic terminal block and capacitor shall be mounted in a ferrous metal connecting piece located between the fan and the down-rod assembly. The leads from the stator windings shall be connected to the terminal block. An earthing terminal, consisting of a round head brass screw and washer, shall be provided on the connecting piece. All exposed metal parts of the fan shall be connected to this earthing terminal.

(ii) The bottom portion of the connecting piece shall be screwed on the shaft of the motor. The connecting piece shall be tightened on to a shoulder formed on the motor shaft. A 4 mm minimum thickness steel hexagonal lock-nut with lock bracket underneath shall then be fitted and tightened. The connecting piece shall be secured in the fully tightened position by two (2) hardened steel grub screws. These screws shall engage in shallow depressions drilled in the shaft after the connecting piece has been tightened in place to ensure positive locking.

(c) Down-rod assembly

(i) The down-rod assembly shall consist of a steel down-rod complete with shackle and hard rubber roller for suspension of the fan. The down-rod shall be supplied in lengths of 200 mm, 300 mm, 450 mm, 600 mm, 750 mm, 900 mm and 1,200 mm as specified in the Particular Specification.

(ii) Cable of such a length as to suit the down-rod shall be provided. The down-rod shall be manufactured from steel tube to BS EN 10255:2004, having an outside diameter of approximately 21 mm, with minimum wall thickness of not less than 3 mm as specified in Table 5 of BS EN 10255:2004. It shall be accurately threaded at one end and shall be screwed into the top portion of the fan connecting piece (capacitor housing) from which it shall protrude by a minimum of 2 mm. The minimum wall thickness of the threaded portion, measured from the minor diameter of the thread to the internal diameter of the tube, shall be not less than 1.8 mm.

(iii) The down-rod shall be locked in position by two (2) hexagonal steel lock nuts, having a minimum thickness of 6 mm, tightened on to the upper machined surface of the fan connecting piece.

(iv) The down-rod shall also be locked to the fan connecting piece by means of a steel split-pin, of not less than 5 mm

diameter, passing through both the fan connecting piece and the down-rod.

(v) The split-pin holes in the fan connecting piece shall be of such diameter that the split-pin is a light push-fit there in. The matching split-pin holes in the down-rod shall be just sufficiently large so that the split-pin shall be a light push-fit, when the hole is in its worst position relative to the threading. All burrs and sharp edges shall be removed from the split-pin holes in both the fan connecting piece and the down-rod.

(vi) The steel suspension shackle shall be welded to the down-rod. Welding shall be of good quality. The rubber roller shall be mounted on an 8 mm diameter steel clevis pin secured by a split-pin.

(vii) The ends of the down-rod shall rounded off and free from burrs. There shall be no sharp edges which could cause damage to the insulation of the wiring.

(viii) Suspension joints and threaded parts:

Joints along the suspension rod must be of double-locking design, i.e. at least two independent positive locking devices must be employed to prevent a joint from loosening itself.

All factory-assembled threaded components which form part of a suspension joint must be bonded with glue as approved by the Supervising Officer.

The maximum clearance between threaded mating parts must not exceed 1% of their mean diameter.

The direction of rotation of the fan shall be such that all screwed joints tend to be tightened when the fan is in operation.

(ix) Two (2) canopies manufactured from plastic or pressed steel sheet and fitted over the upper and lower ends of the down-rod shall be provided. They shall be fixed to the down-rod by grub screws.

(d) Surface finish

The whole fan shall be finished in high quality stove enamel in white or ivory colour.

(e) Speed regulator

(i) A speed regulator shall be supplied with each fan.

(ii) The speed regulator shall be of robust construction and built on a flame-retardant moulded plastic or insulated steel base and enclosed by a flame-retardant moulded plastic cover or metal cover. Plastic cover shall be in white or ivory colour to match the fan. Metal cover shall be of stainless steel or metalclad finish.

(iii) The speed regulator shall be equipped with at least three (3) speed controls and an "OFF" position.

(iv) The rotary switch of the speed regulator shall be designed for smooth and easy movement by hand between different speed positions.

(v) For choke type regulator, an earth terminal shall be provided on the base with an earth wire permanently connected to the steel core of the choke unit.

C10.3 400 MM SWEEP AUTO CYCLE/OSCILLATING FAN

C10.3.1 General Requirements

(a) The fan shall be provided with cable entries, conduit opening or glands for permanent connection to fixed wiring. Connection terminal shall be provided and secured by means of screws, nuts or equally effective devices.

(b) The power factor of the fan shall not be less than 0.8.

(c) The fan shall comply with the latest edition of safety standards for household electric fans and regulators as follows:

(i) IEC 60335-2-80:2015; and

(ii) JIS C 9601:2011 issued by Japan Standards Association.

C10.3.2 Performance Requirements

(a) The fan blades shall have a sweep diameter ranging from 385 to 415 mm.

(b) The air delivery rate of the fan shall be not less than 1 m^3/s.

(c) The noise level of the fan at all operating speeds shall not exceed 58 dBA measured at 1 m from the fan.

(d) The fan shall be provided with double oscillating mounting of not less than 360° (i.e. the direction of the axis of the air flow is changed automatically and continuously in more than one plane).

C10.3.3 Construction

(a) The fan shall be designed for ceiling-mounted application.

(b) The fan motor shall have sealed-for-life roller bearings or bushes.

(c) The fan shall have adequate mechanical strength and be so constructed as to withstand such rough usage as may be expected in normal use.

(d) The material of the fan shall be fire-resistant and non-flame propagating.

(e) The fan shall be of domestic type with smooth, safe edges and 'easy-to-disassemble' design for cleaning.

(f) The fan blades shall be enclosed in a chromed and closely meshed metal guard. The gap of the guard slots shall not be greater than 13 mm.

(g) The fan shall equip with a thermal cut-out device to protect the fan from abnormal operation.

(h) The fan shall include a separate fan regulator which shall comprise of three speed settings and a switching-off function.

(i) The fan shall equip with a control device for adjustment of its angle of oscillation.

(j) The fan shall be designed with shock-proof device for quiet operation.

(k) The fan shall be finished to manufacturer's standard light colour to be approved by the Supervising Officer.

(l) The construction of the fan shall be so designed that end-user does not need any tools to assemble/disassemble the fan guard and fan blade for cleaning.

(m) The fan shall be subject to function test for not less than 72 hours of continuous running and shall show no abnormal conditions such as overheat, failing to oscillate and, etc. during the testing period.

C10.4 400 MM SWEEP WALL FAN

C10.4.1 General Requirements

(a) The fan shall be fitted with a 0.75 mm^2 3-core PVC insulated and sheathed flexible cord of approximately 1.5 m in length; and a suitably fused 13 A plug.

(b) The power factor of the fan shall be not less than 0.8.

(c) The fan shall comply with the latest edition of safety standards for household electric fans and regulators as follows:

(i) IEC 60335-2-80:2015; and

(ii) JIS C 9601:2011 issued by Japan Standards Association.

C10.4.2 Performance Requirements

(a) The fan blades of the fan shall have a sweep diameter ranging from 385 to 415 mm.

(b) The air delivery rate of the fan shall not be less than 1 m^3/s.

(c) The noise level of the fan at all operating speeds shall not exceed 58 dBA measured at 1 m from the fan.

C10.4.3 Construction

(a) The fan shall be designed for wall-mounted application. Fans converted from desk type fan will NOT be accepted.

(b) The fan motor shall have sealed-for-life roller bearings or bushes.

(c) The fan shall have adequate mechanical strength and be so constructed as to withstand such rough usage as may be expected in normal use.

(d) The material of the fan shall be fire-resistant and non-flame propagating.

(e) The fan shall be of domestic type with smooth, safe edges and 'easy-to-disassemble' design for cleaning.

(f) The fan blades shall be enclosed in a chromed and closely meshed metal guard. The gap of the guard slots shall be not greater than 13 mm.

(g) The fan shall equip with a thermal cut-out device to protect the fan from abnormal operation.

(h) The fan shall equip with an integral regulator comprising three speed settings and a switching-off function.

(i) The fan regulator shall be of push-cord type.

(j) The fan shall be provided with oscillating and tilting mechanism for horizontal swing and vertical adjustment respectively.

(k) The fan head shall be capable of being clamped or locked at any desired position within a range of tilting angle.

(l) The tilting mechanism shall be of robust and durable construction. If plastic stand is used, a U-shape sheet steel of suitable thickness shall be inserted into the pivot spring chamber as a reinforcement of supporting strength of the tilting mechanism, otherwise the design of the tilting mechanism shall be approved by the Supervising Officer.

(m) The oscillating mechanism shall have a reinforced and reliable clutch that will slip or disengage the steering-gear of the oscillating mechanism if the fan meets an obstruction as it swings. The oscillating mechanism shall be easily disengaged when not required.

(n) An oscillation switch for controlling of 'oscillation' and 'not oscillating', must be provided in a hand-touch position and easily accessible by the operator at floor level.

(o) The fan shall be finished to manufacturer's standard light colour approved by the Supervising Officer.

(p) The construction of the fan shall be designed that end-user does not need any tools to assemble/disassemble the fan guard and fan blade for cleaning.

(q) The fan shall be subject to function test for not less than 72 hours of continuous running and shall show no abnormal conditions such as overheat, failing to oscillate and, etc. during the testing period.

C10.5 400 MM SWEEP DESK FAN

C10.5.1 General Requirements

(a) The fan shall be fitted with a 0.75 mm^2 3-core PVC insulated and sheathed flexible cord of approximately 1.5 m in length; and a suitably fused 13 A plug.

(b) The power factor of the fan shall be not less than 0.8.

(c) The fan shall comply with the latest edition of safety standards for household electric fans and regulators as follows:

(i) IEC 60335-2-80:2015; and

(ii) JIS C 9601:2011 issued by Japan Standards Association or other equivalent standards.

C10.5.2 Performance Requirements

(a) The fan blades of the fan shall have a sweep diameter ranging from 385 to 415 mm.

(b) The air delivery rate of the fan shall not be less than 1 m^3/s.

(c) The noise level of the fan at all operating speeds shall not exceed 58 dBA measured at 1 m from the fan.

C10.5.3 Construction

(a) The fan shall be free-standing type and portable.

(b) The fan motor shall have sealed-for-life roller bearings or bushes.

(c) The fan shall have adequate mechanical strength and be so constructed as to withstand such rough usage as may be expected in normal use.

(d) The material of the fan shall be fire-resistant and non-flame propagating.

(e) The fan shall be of domestic type with smooth, safe edges and 'easy-to-disassemble' design for cleaning.

(f) The fan blades shall be enclosed in a chromed and closely meshed metal guard. The gap of the guard slots shall be not greater than 13 mm.

(g) The fan shall equip with a thermal cut-out device to protect the fan from abnormal operation.

(h) The fan regulator shall comprise three speed settings and shall provide a switching-off function, complete with a timer switch for controlling of continuous operation and at least providing of time setting of 1 hour.

(i) The fan shall be provided with oscillating and tilting mechanism for horizontal swing and vertical adjustment respectively.

(j) The fan head shall be capable of being clamped or locked at any desired position within a range of tilting angle.

(k) The construction of the tilting mechanism shall be of robust and durable construction.

(l) The oscillating mechanism shall be easily disengaged when not required.

(m) The oscillating mechanism shall have a reinforced and reliable clutch which will slip or disengage for avoiding overturning when meeting an obstruction, otherwise a mechanism shall be incorporated into the fan which can automatically swing to opposite direction when the fan meets an obstruction.

(n) The fan shall have sufficient degree of mechanical stability that it shall not overturn during operation in any normal position on a plane inclined at an angle of 10° to the horizontal.

(o) The fan shall be finished to manufacturer's standard light colour approved by the Supervising Officer.

(p) The construction of the fan shall be so designed that end-user does not need any tools to assemble/disassemble the fan guard and fan blade for cleaning.

(q) The fan shall be subject to function test for not less than 72 hours of continuous running and shall show no abnormal conditions such as overheat, failing to oscillate and, etc. during the testing period.

C10.6 400 MM SWEEP PEDESTAL FAN

C10.6.1 General Requirements

(a) The fan shall be fitted with a 0.75 mm^2 3-core PVC insulated and sheathed flexible cord of approximately 1.5 m in length; and a suitably fused 13 A plug.

(b) The power factor of the fan shall be not less than 0.8.

(c) The fan shall comply with the latest edition of safety standards for household electric fans and regulators as follows:

(i) IEC 60335-2-80:2015; and

(ii) JIS C 9601:2011 issued by Japan Standards Association or other equivalent standards.

C10.6.2 Performance Requirements

(a) The fan blades shall have a sweep diameter ranging from 385 to 415 mm.

(b) The air delivery rate of the fan shall not be less than 1 m^3/s.

(c) The noise level of the fan at all operating speeds shall not exceed 58 dBA measured at 1 m from the fan.

C10.6.3 Construction

(a) The fan shall be of free-standing type complete with a vertical supporting rod of adjustable working height.

(b) The maximum working height of the fan shall be 1.5 m ± 10% above the floor.

(c) The fan motor shall have sealed-for-life roller bearings or bushes.

(d) The fan shall be statically and dynamically balanced and shall not have abnormal vibration or creeping on the floor during operation.

(e) The fan shall have adequate mechanical strength and be so constructed as to withstand such rough usage as may be expected in normal use.

(f) The material of the fan shall be fire-resistant and non-flame propagating.

(g) The fan shall be of domestic type with smooth, safe edges and 'easy-to-disassemble' design for cleaning.

(h) The fan blades shall be enclosed in a chromed and closely meshed metal guard. The gap of the guard slots shall be not greater than 13 mm.

(i) The fan shall equip with a thermal cut-out device to protect the fan from abnormal operation.

(j) The fan regulator shall comprise three speed settings and shall provide a switching-off function, complete with a timer switch for controlling of continuous operation and at least providing of time setting of 1 hour.

(k) The fan shall be provided with oscillating and tilting mechanism for horizontal swing and vertical adjustment respectively.

(l) The fan head shall be capable of being clamped or locked at any desired position within a range of tilting angle.

(m) The construction of the tilting mechanism shall be of robust and durable construction.

(n) The oscillating mechanism shall have a reinforced and reliable clutch that will slip or disengage for avoiding overturning when meeting an obstruction, otherwise a mechanism shall be incorporated into the fan which can automatically swing to opposite direction when the fan meets an obstruction.

(o) The fan shall be fitted with adjustable height pedestal with positive locking arrangement. The extended part of the pedestal shall be chromium-plated and incorporated with a stopper at the end. The base weight shall be sufficiently heavy to hold the fan in a stable manner when the fan is extended to its maximum height of approximately 1.5 m above the floor. At the maximum working height the fan shall not overturn when operated in any normal position on a plane inclined at an angle of 10° to the horizontal.

(p) The fan shall be finished to manufacturer's standard light colour to be approved by the Supervising Officer.

(q) The construction of the fan shall be so designed that end-user does not need any tools to assemble/dissemble the fan guard and fan blade for cleaning.

(r) The fan shall be subject to function test for not less than 72 hours of continuous running and shall show no abnormal conditions such as overheat, failing to oscillate and, etc. during the testing period.

C10.7 DOMESTIC EXHAUST FAN

C10.7.1 General Requirements

(a) The design, construction, and testing of the fan shall be in compliance with the requirements of IEC 60335-2-80:2015.

(b) All electrical components, parts and accessories shall be manufactured conforming to the relevant IEC standards.

(c) The fan shall be fitted with a 0.75 mm² 3-core PVC insulated and sheathed flexible cord of approximately 2 m in length. 2-core cord is allowed only for double insulated appliances classified as Class II.

(d) The power factor of the fan shall not be less than 0.8.

C10.7.2 Performance Requirements

(a) The fan diameters of the respectively exhaust fans shall be:

Fan Size (mm)	Fan Diameters (mm)
150	150 ± 5%
230	230 ± 5%
300	300 ± 5%

(b) The exhaust fans shall be capable of providing the following air extraction rate:

Fan Size (mm)	Air Extraction Rate (m^3/s)
150	0.06
230	0.15
300	0.3

(c) The noise level of the fan during operation shall not exceed 65 dBA measured at 1 m from the fan.

(d) Maximum overall height and width:

Fan Size (mm)	Maximum Height (mm)	Maximum Width (mm)
150	232	230
230	323	305
300	413	391

C10.7.3 Construction

(a) The exhaust fan shall be designed of robust construction. The exhaust fan shall be suitable for mounting on windows and partitions which shall have a opening of the following diameter:

Fan Size (mm)	Diameter of Opening (mm)
150	175 to 185
230	250 to 260
300	315 to 325

(b) The impeller, fan duct, outlet grille and shutter assembly shall be constructed of high quality flame retardant plastic material.

(c) The motor winding shall have Class B insulation and protected by a thermal cut-out. The fan motor shall be totally enclosed in an aluminium alloy casing.

(d) Motor bearings shall be of self-aligning, oil impregnated porous bronze brushes.

(e) The exhaust fan shall comprise an electrically operated back draught shutter assembly.

(f) The inner and outer clamp plate/grille assembly shall have rubber gasket.

(g) The exhaust fan impeller shall be fully balanced to avoid vibration during operation.

(h) The exhaust fan shall be designed for easy assembling/dismantling to facilitate servicing and maintenance work.

C10.8 PROPELLER FAN – RING MOUNTED TYPE

C10.8.1 General Requirements

(a) The fan shall be rated for continuous operation under ambient temperature up to 50°C.

(b) The motor shall have Class E insulation to IEC 60085:2007. The power factor of the fan motor shall not be less than 0.85 under any operating condition.

(c) The fan shall be fitted with a 0.75 mm² 3-core PVC insulated and sheathed flexible cord of approximately 2 m in length. 2-core cord is allowed only for double insulated appliances classified as Class II.

C10.8.2 Performance Requirements

(a) The fan diameters of the respectively propeller fans shall be:

Fan Size (mm)	Fan Diameters (mm)
241	241 ± 5%
305	305 ± 5%
381	381 ± 5%
457	457 ± 5%
610	610 ± 5%

(b) The air flow rate of the propeller fan of respective sizes shall be not less than the following:

Fan Diameter	Fan Speed	Air Flow Rate	
(mm)	(rpm)	(m³/min)	(cfm)
241	1,300	12	440
305	900	19	700
381	900	39	1350
457	900	70	2,500
610	700	129	4,600

(c) The sound pressure level emitted by the fan shall not exceed 65 dBA measured at 1 m from the fan outlet.

C10.8.3 Construction

(a) The fan impeller shall be mounted on the same shaft as the driving motor and constructed of heavy gauge pressed steel blades fitted to cast aluminium alloy hubs, fully balanced after assembly.

(b) The motor shall be of squirrel cage induction type, with capacitor start and run, and of totally enclosed construction with dust seals.

(c) Ball or roller bearings shall be provided and shall be filled with lithium based grease suitable for operating temperature between -30°C and 120°C.

(d) The fan and motor assembly shall have heavy duty and robust steel mounting arms.

(e) The mounting arms shall be fixed to the mounting ring through a rubber or neoprene resilient cushion to reduce the transmission of vibration to the fixing surface.

(f) The mounting rings shall be constructed of steel pressing and have sufficient flexibility to prevent fracture when fixed to slightly uneven surfaces.

(g) The fan shall be suitable for both vertical and horizontal mounting.

(h) The fan shall be supplied for air discharge away from the motor.

(i) The fan assembly shall be protected with corrosion resistant resin based paints. All bolts and nuts and washers shall be hot dip galvanised. The finishing coat shall be in grey colour unless otherwise specified.

(j) All exposed metal parts shall be effectively bonded together and connected to a common earthing terminal.

(k) If screws and nuts are fitted onto the fan blades for balancing purpose, spring washer should be provided to avoid loosening. Other securing mechanism such as welding shall be subject to the approval of the Supervising Officer.

C10.9 FUME CUPBOARD EXHAUST FAN

C10.9.1 General Requirements

(a) The equipment shall be of axial flow design composed of durable materials and quiet in operation.

(b) Duct connector, cupboard adaptor, clamp ring, Jubilee clips shall be provided. All of them shall be highly resistant to corrosive gases and chemical fumes emitted during chemical reactions as resulted from laboratory experiments and shall be capable of handling gases and fumes of from 0°C to 40°C.

C10.9.2 Performance Requirements

(a) The fan shall cover the range from 240 to 300 mm in nominal diameter.

(b) The revolution speed of the fan shall be not less than 2,700 rpm.

(c) The air volume flow rate shall be not less than 0.35 m^3/s in static pressure of 100 N/m^2.

(d) The noise level of the fan at all operating speeds shall not exceed 58 dBA measured at 1 m from the fan.

C10.9.3 Construction

(a) Motor

(i) The fan shall be driven by a totally enclosed but externally cooled single phase induction motor of metric design to the latest edition of IEC 60034-1:2014.

(ii) Insulation shall be not lower than Class E as defined in IEC 60085:2007.

(iii) The motor shall be rated for continuous running at ambient temperature of up to 40°C.

(iv) The motor shall be protected by a sealing coat of polyurethane compound or equivalent material.

(b) The impellers shall be moulded in phenolic resin or equivalent material.

(c) Circular fan casing shall be made from rigid PVC or galvanised steel coated with epoxy resin or equivalent material. Ends of the casing shall be spigotted for attachment of duct and fume cupboard connectors respectively.

(d) Terminal box

(i) Terminal box shall be made of the same material as the casing and shall be located outside air stream and affixed to the casing.

(ii) Terminal box shall be suitable for reception of a 2 m long, 3-core 1.25 mm² flexible cable to BS EN50525-2-11:2011. The cable shall be fitted with the fan. 2-core cord is allowed only for double insulated appliances classified as Class II.

(iii) Duct/cupboard connectors and accessories shall be made from corrosion resistant material such as neoprene, epoxy resin or other approved material.

(iv) The fan shall be suitable for mounting vertically, horizontally or at an inclined angle. Normally, the duct/cupboard connectors will support the fan when fitted to the duct work. Extra supporting facilities in the form of two extended ribs shall be provided on the casing and shall be drilled for fixing supporting brackets.

C10.10 1 kW ELECTRIC FIRE, WALL MOUNTED TYPE

C10.10.1 General Requirements

(a) The electric fire shall comply with IEC 60335-2-30:2009.

(b) The electric fire shall be fitted with a 1.25 mm² 3-core PVC insulated and sheathed flexible cord of approximately 1.5 m in length.

C10.10.2 Performance Requirements

The electric fire shall be fitted with one replaceable infra-red heating element of 1 kW rating.

C10.10.3 Construction

(a) The electric fire shall be of wall mounted type.

(b) The electric fire shall be of all metal construction incorporating an attractive chromium plated reflector which can be swiveled for directional adjustment of the reflected heat beam.

(c) A close mesh chromium plated fire guard shall be provided over the entire length of the heating element and over the major

portion of the reflector. The gap of the guard slots shall be not greater than 13 mm.

(d) The electric fire shall have adequate mechanical strength and stability to withstand rough handling as may be expected in normal use.

(e) The electric fire shall be fitted with a pull cord "ON/OFF" switch.

C10.11 2 kW CONVECTOR FIRE

C10.11.1 General Requirements

(a) The convector fire shall comply with IEC 60335-2-30:2009.

(b) The convector fire shall be fitted with a 1.25 mm² 3-core PVC insulated and sheathed flexible cord of approximately 3 m in length; and a suitably fused 13 A plug.

C10.11.2 Performance Requirements

The power rating shall range from 2 kW to 2.5 kW.

C10.11.3 Construction

(a) The convector fire shall be of vertical floor-standing type.

(b) The convector fire shall be of robust and all steel construction with no sharp edges, non-marking feet if applicable and suitably finished and protected with corrosion and heat resistant paints of approved type.

(c) The convector fire shall have an on-off switch incorporating an indicating lamp showing that power is available.

(d) The convector fire shall have an adjustable thermostat for room temperature control.

(e) The convector fire shall be fitted with a close mesh chromium plated front grille. The gap of the grille slots shall be not greater than 13 mm.

C10.12 2 kW OIL-FILLED ELECTRIC RADIATOR

C10.12.1 General Requirements

(a) The radiator shall comply with IEC 60335-2-30:2009.

(b) The radiator shall be fitted with a 1.25 mm² 3-core PVC insulated and sheathed flexible cord of approximately 3 m in length; and a suitably fused 13 A plug.

C10.12.2 Performance Requirements

The power rating shall range from 2 kW to 2.5 kW.

C10.12.3 Construction

(a) The radiator shall be of vertical floor-standing type.

(b) The casing of the radiator shall be constructed of sheet steel, or equivalent. The casing shall be leak-proof and robust in construction and complete with castor wheels.

(c) The external of casing shall be finished with white or grey stove enamel paints.

(d) All fins shall be rounded and free from sharp edges.

(e) The radiator shall have a selector switch providing at least 2 stages of heating.

(f) The radiator shall have an on-off switch incorporating an indicating lamp showing that power is available.

(g) The radiator shall have an adjustable thermostat for room temperature control.

(h) The heating element shall be totally immersed in non flammable oil.

C10.13 300 MM AND 1,200 MM SINGLE TUBULAR HEATER COMPLETE WITH WIRE GUARD

C10.13.1 General Requirements

(a) The design and the construction of the heater shall comply with IEC 60335-1:2013 and IEC 60335-2-30:2009.

(b) The heater shall be designed for use as wardrobe heater.

(c) The heater shall be of robust construction, durable and maintenance free under normal operating condition.

(d) The hottest accessible part of the heater shall not exceed 80°C.

C10.13.2 Performance Requirements

The maximum power rating of the heaters shall be:

Size (mm)	Maximum Power Rating (W)
300	60
1,200	240

C10.13.3 Construction

(a) The heating element shall be totally enclosed in an enclosure of such material that must be heat resistant, non-combustible and non-corrosive.

(b) A built-in automatic on/off thermostat of preset temperature 80°C shall be fitted.

(c) Wiring terminal shall be made of heat-resistance terminal block, preferably in porcelain, capable of withstanding the design working temperature.

(d) The heater shall be provided with mounting brackets.

(e) The heater shall be protected from causing heat-burns to persons.

(f) The heater shall be free from any potential fire hazards.

(g) The diameter of the heater enclosure shall not exceed 50 mm.

(h) The heater shall be fitted with a 0.75 mm^2 3-core PVC insulated and sheathed flexible cord of approximately 3 m in length; and a 13 A plug fused at 5 A or less.

(i) The heater shall be effectively bonded to earth through the flexible cord.

(j) An adhesive label of safety instruction in both English (in letter not less than 3 mm) and Chinese (in letter not less than 5 mm) written as below: "Do not use without fitting the wire guard. Do not cover."

(k) A recommended installation instruction sheet with diagram shall be provided with each heater.

(l) The wire guard shall consist of a frame of 1 mm thick steel sheet or equivalent material to which an 1 mm thick 12 x 12 mm wire mesh is welded.

(m) The wire guard complete with the end plate and accessories shall be hot-dip galvanised to ISO 1461:2009 or constructed of equivalent material.

(n) The clearance between the heater and the wire guard shall be not less than 20 mm.

C10.14 10-Litre OPEN-OUTLET TYPE, ELECTRIC SINK WATER HEATER

C10.14.1 General Requirements

(a) The hot water capacity shall not be less than 10 litres.

(b) The sink water heater shall be suitable for installing above the water sink.

(c) The sink water heater shall be of wall-mounted type.

(d) The sink water heater shall comply with IEC 60335-2-21:2012.

C10.14.2 Performance Requirements

(a) The sink water heater shall be capable of maintaining water temperature in the container between 55°C and 78°C irrespective of the water inlet temperature and ambient air conditions.

(b) The water container shall be suitable for connection to a mains water supply having a pressure of not less than 205 kPa. A pressure test certificate shall be provided for each sink water heater quoting the manufacturer's serial number and confirming that a pressure test to manufacturer's standard or 50 kPa, whichever is greater, has been successfully applied.

(c) The nominal power rating of the sink water heater shall be 3 kW.

C10.14.3 Construction

(a) The sink water heater shall be provided with an adjustable thermostat with ample current rating to maintain water temperature from 55°C to 78°C.

(b) The sink water heater shall be provided with a non-resettable thermal cut-out to protect the water temperature inside the container from exceeding 90°C in order to provide additional safety protection.

(c) Earthing terminal shall be provided.

(d) The inner hot water container shall be suitable for local installation.

(e) The construction material of the inner hot water container shall be designed and chosen by the combined merits on

expandability, thermal conductivity, susceptibility to surface fouling, reaction to water acidity and alkalinity on boiler applications, such as tinned copper, or equivalent.

(f) The outer casing shall be drip-proof and constructed from heavy gauge sheet steel properly treated to prevent corrosion or equivalent material.

(g) The outer casing shall be in white colour.

(h) The thermal insulating material shall be of non-combustible and non-CFC type.

(i) A swivel spout at outlet of 300 mm approx. in radius shall be provided.

(j) The sink water heater shall be provided with a permanent warning label in English and Chinese characters as follows: "The outlet from the water heater must not be blocked or connected to any form of fitting with an isolating valve".

(k) The following pipe fittings shall be provided at inlet side:

(i) A water control valve

(ii) A non-return valve

(iii) A water strainer

C10.15 90-Litre AND 135-Litre THERMAL STORAGE ELECTRIC WATER HEATER

C10.15.1 General Requirements

(a) The water heater shall comply with the relevant requirements of Electrical Products (Safety) Regulation, (Cap.406G), Laws of Hong Kong.

(b) The water heater shall comply with the relevant requirements of Waterworks Ordinance, (Cap.102), Laws of Hong Kong.

(c) The water heater shall comply with Code of Practice for the Electricity (Wiring) Regulations issued by the EMSD .

(d) The water heater shall comply with the relevant requirements of Boilers and Pressure Vessels Ordinance, (Cap.56), Laws of Hong Kong.

(e) The power rating of the product shall range from 2.5 kW to 3 kW.

(f) The water heater shall comply with the latest edition of the following standards:

(i) For unvented thermal storage type electric water heater

IEC 60335-2-21:2012 Household and similar electrical appliances – Safety – Part 2-21 : Particular requirements for storage water heaters; and

BS EN 12897:2006 Specification for unvented hot water storage units and packages;

(ii) For thermal cut out

BS EN 60730-2-15:2010 Specification for electrical controls for household and similar general purposes; and

(iii) For temperature and pressure relief valve

BS 6283-2:1991 Safety and control devices for use in hot water systems. Specification for temperature relief valves for pressures from 1 bar to 10 bar.

C10.15.2 Performance Requirements

(a) The hot water cylinder shall be suitable for a working pressure of 10 bar or below. A test certificate shall be provided for each water heater quoting the manufacturer's serial number and confirming that a pressure test to manufacturer's standard or 1.5 times the working pressure, whichever is greater, has been successfully applied.

(b) The hot water storage capacity shall be:

Size of water heater (litres)	Hot Water Storage Capacity (litres)
90	From 90 litres to 100 litres
135	From 135 litres to 155 litres

(c) The water heater shall have obtained a Grade 1 Energy Label under the Energy Efficiency Labelling Scheme of Electrical and Mechanical Services Department.

C10.15.3 Specific Safety Requirements

(a) The safety standard to which the product conforms and the storage capacity in litres (l) should be clearly and permanently marked on the body of the product in additional to the marking requirements stipulated in the essential safety requirements for electrical products in Electrical Products (Safety) Regulation, (Cap. 406G), Laws of Hong Kong.

(b) Manufacturer's installation instructions including recommendations and warnings to users and installers, etc., should also be provided and clearly marked.

(c) The construction material of the hot water cylinder shall be corrosion resistance, such as copper, stainless steel or other equivalent material. The cylinder shall be capable of withstanding 1.5 times the working pressure.

(d) The water heater shall be fitted with a thermostat (with a maximum setting temperature of 80°C) to control the heating of the stored water.

(e) The water heater shall be fitted with a thermal cut-out (complying with BS EN 60730-2-15:2010 and with a temperature setting of 85°C) to cut off the supply of electricity if the stored water is heated above the temperature setting of the thermostat and before the operation of the temperature and pressure relief valve is initiated. The thermal cut-out should be connected in series with the thermostat and should be reset manually after dismantling of the enclosure of the product.

(f) The water heater shall be fitted with

EITHER

(i) a non-resettable temperature relief valve (complying with BS 6283-2:1991), having a setting of 90°C, and complete with manual test easing gear; AND
a pressure relief valve (complying with BS 6283-2:1991), having a set pressure of not greater than the maximum design pressure of the water heater or 10 bar, and complete with manual test easing gear;

OR

(ii) a non-resettable temperature and pressure relief valve complying with the requirements of BS 6283-2:1991, having a set temperature of 90°C and a set pressure of the water heater or 10 bar, and complete with manual test easing gear.

C10.15.4 Construction

(a) The hot water cylinder shall be suitable for local installation.

(b) The water heater shall be provided with an anti-vacuum valve complying with BS EN 13959:2004 or other relevant Parts to prevent heated water from being siphoned back to supply pipe during water shortage period.

(c) A draining device shall be provided to discharge water and shall be arranged so as to be clear of all the electrical connections and terminals.

(d) The outer casing shall be drip-proof and constructed from heavy gauge sheet steel properly treated to prevent corrosion or equivalent material.

(e) The outer casing shall be in white colour.

(f) The thermal insulating material shall be of non-combustible and non-CFC type.

(g) The water heater shall be suitable for vertical floor or wall mounting. It shall be completed with water inlet and outlet suitable for connection to standard water pipe. The inlet and outlet pipes shall be clearly marked on the product and the British Standard Pipe (BSP) sizes shall be clearly stated in installation instructions.

(h) Material used in the connection to the hot water cylinder shall be of corrosion resistant type, especially on the water side.

(i) The electric terminal box with cover and suitable for fitting with waterproof metallic flexible conduit shall be provided.

C10.16 ELECTRIC TEA URN

C10.16.1 General Requirements

(a) The tea urn shall be suitable for providing boiling water for tea.

(b) The tea urn shall comply with the standard IEC 60335-2-75:2015.

(c) All electrical components shall comply with the relevant IEC Standards, or of fully equivalent quality and capacity.

C10.16.2 Performance Requirements

(a) The capacity of the tea urn shall be 14-20 litres.

(b) The power rating shall range from 2.5 kW to 2.8 kW.

C10.16.3 Construction

(a) The water container of the tea urn shall be constructed from stainless sheet steel or material of equivalent quality.

(b) The tea urn shall be of circular table standing model complete with a full size detachable top cover and two heat-insulated handles.

(c) The tea urn shall be provided with either a simmerstat temperature control or 3 heat rotary switch.

(d) The tea urn shall be provided with a self-resettable thermal cut-out against failure due to boiling dry.

(e) The tea urn shall be provided with rapid draw off tap with heat-insulated handle.

(f) The tea urn shall be fitted with a flexible power supply cable and a suitably fused 13 A plug complying with the Electrical Products (Safety) Regulation, (Cap.406G), Laws of Hong Kong. The minimum length of the flexible cable shall be 1.5 m.

(g) Internal wiring of the tea urn shall be suitable for high temperature operation.

C10.17 ELECTRIC KETTLE 3.5-4.5 Litres

C10.17.1 General Requirements

(a) The kettle shall comply with the latest edition of IEC 60335-2-15:2012.

(b) The kettle shall be fitted with a 0.75 mm^2 3-core PVC insulated and sheathed flexible cord of approximately 1.5 m in length complete with an “appliance connector” and a suitably fused 13 A plug.

C10.17.2 Performance Requirements

(a) The water capacity of the kettle shall be ranged from 3.5 to 4.5 litres.

(b) The electrical power capacity of the kettle shall range from 2 kW to 2.6 kW.

C10.17.3 Construction

(a) The kettle shall be designed for providing boiling water for drinking.

(b) The construction material shall be made from heavy gauge chromium plated copper; or high quality heavy gauge polished aluminium; or stainless steel.

(c) The kettle shall be fitted with a safety cut-out to keep the kettle from boiling dry.

C10.18 MAINS-SUPPLY DRINKING WATER DISPENSER FOR "COLD" WATER

C10.18.1 General Requirements

(a) The water dispenser shall be suitable for local installation and must comply with the statutory requirements of the Waterworks Regulation 24, (Cap.102A) , Laws of Hong Kong.

(b) The water dispenser shall comply with the Telecommunication (Control of Interference) Regulations, (Cap.106B), Laws of Hong Kong.

(c) The water dispenser shall comply with the latest edition of IEC 60335-2-24:2012.

C10.18.2 Performance Requirements

The water dispenser shall provide not less than 45.5 litres per hour of chilled drinking water at a temperature of between 10°C and 13°C from a water inlet temperature of 27°C under ambient air conditions of 32°C and 85% relative humidity.

C10.18.3 Construction

(a) The water dispenser shall be designed to receive water supply from the standard premises water mains and shall be provided with a single ½ inch BSP male threaded connection located at the back and protruding by not more than 25 mm.

(b) The water dispenser shall be designed for heavy duty application.

(c) The water dispenser shall be provided with an automatic thermostat to control the "cold" water delivery at the above specified temperatures, irrespective of water inlet temperature and ambient air conditions, within the range specified above.

(d) The cabinet shall be constructed, of brushed finished stainless steel, of minimum 1 mm thickness to ensure complete rigidity and to resist "in-use" denting, or equivalent.

(e) The drip pan below the tap(s) shall be of a suitable grade of stainless steel to ensure that no rusting will occur during the expected service life of the unit. It shall be connected to a drain pipe terminating at the back of the unit and shall have a 1" BSP male thread for connection to the premises drainage system.

(f) The cold water reservoir shall be manufactured from a suitable grade of stainless steel or copper, fitted with an external copper pipe refrigerant coil and foamed in place with high efficiency insulation of appropriate thickness.

(g) The base plate shall be at least 20 mm above the ground level.

(h) The faucet(s) shall be manufactured from polypropylene or chromium plated steel, and either the push-button or swivel type, self-closing, easy to operate and suitably positioned for filling cups, glasses, etc.

(i) The refrigeration system shall be of the hermetically sealed type, suitably rated to meet the above specified duty. The condenser shall be air cooled with either natural, or, forced circulation.

(j) The refrigerant used shall be non-toxic, non-explosive, odourless and non-CFC type.

(k) The water dispenser shall be fitted with the following devices:

(i) A "power ON" indicator light; and

(ii) An indicator light for the refrigeration unit to indicate its operation.

(l) The water dispenser shall be fitted with a 3-core PVC insulated and sheathed flexible cable conforming to BS EN50525-2-11:2011 or equivalent standards, and complete with a suitably fused 13 A plug conforming to the Electrical Products (Safety) Regulation, (Cap.406G), Laws of Hong Kong. The supply cable shall be approx. 2 m long.

C10.19 DOMESTIC ELECTRIC COOKER (TABLE MODEL)

C10.19.1 General Requirements

(a) The cooker shall be designed for table top use.

(b) The cooker shall have two radiant rings, grill and oven.

(c) The cooker shall comply with IEC 60335-2-6:2014.

(d) The overall dimensions of the cooker shall be 390 mm (height) x 470 mm (width) x 420 mm (depth) approximately.

C10.19.2 Performance Requirements

The total electrical loading shall be made up with the components having the ratings as below:

(a) Radiant rings (total) : not less than 2 kW;

(b) Grill : not less than 1 kW; and

(c) Oven : not less than 1 kW.

C10.19.3 Construction

(a) The diameter of the two radiant rings shall be as follows:

(i) one radiant ring of diameter 145 mm approximately; and

(ii) one radiant ring of diameter 170 mm approximately.

(b) The dimensions of the grille shall be 310 mm (width) x 155 mm (depth) approximately.

(c) The dimensions of the oven shall be 200 mm (height) x 380 mm (width) x 290 mm (depth) approximately and the volume of the oven shall be 20 litres approximately.

(d) All radiant rings, grill, and oven shall be simmerstat controlled with power-on and oven indicator lamps.

(e) All screws, nuts and bolts shall be rust-proof or manufactured from non-ferrous metal.

(f) The main terminals shall be mounted on the base at the back and accessible for mains connections by removing the exterior back panel.

(g) The cooker shall have adequate mechanical strength and be so constructed as to withstand such rough usage as may be expected in normal use.

(h) Radiant rings and oven shall be easily removable to facilitate cleaning.

(i) The cooker shall be finished in white or cream vitreous enamel paint.

(j) Internal wiring of the cooker shall be suitable for high temperature operation.

(k) The cooker shall be fitted with a 3-core, 2 m long approximately power supply cable conformed to BS EN50525-2-11:2011; and controlled by a 20 A D.P. switch.

(l) The cooker shall be fitted with overload protection switch.

C10.20 DOMESTIC ELECTRIC COOKER (FOUR RADIANT PLATES TYPE)

C10.20.1 General Requirements

The cooker shall comply IEC 60335-2-6:2014.

C10.20.2 Performance Requirements

The total electrical loading shall be made up with the components having the ratings as below:

(a) Radiant Plates (total) : not less than 5.8 kW;

(b) Grilling Compartment : not less than 2.5 kW; and

(c) Oven : not less than 2.5 kW.

C10.20.3 Construction

(a) The overall dimensions shall be:

(i) Total Height : approximately 1,300 mm;

(ii) Height to Hob : approximately 900 mm;

(iii) Width : approximately 550 mm; and

(iv) Depth : approximately 600 mm.

(b) The capacity shall be:

(i) Grilling Compartment

Grilling Usable Area : not less than 850 cm^2; and

(ii) Oven Compartment

Oven Volume : not less than 55 litres.

(c) The cooker shall consist of four radiant plates on the hob, an oven compartment and an individual grille compartment.

(d) The cooker shall be constructed basically from mild steel or material of equivalent strength and quality, and shall be finished externally white with vitreous enamel paint.

(e) The oven components shall be removable to facilitate cleaning. All screws, nuts and bolts in the oven compartment and grilling compartment shall be rust-proof or manufactured from non-ferrous metal.

(f) Each radiant plate and the grilling compartment shall be equipped with an adjustable control to obtain variable heat output.

(g) The radiant plate shall <u>not</u> be of the sealed plate type.

(h) The hob could be lifted up for replacement of the radiant plates and cleaning purpose. When the hob is raised, a supporting device shall be provided to prevent the falling down of the hob.

(i) The temperature inside the oven compartment shall be thermostatically controlled with adjusting knobs on the front panel.

(j) The heater of the oven shall be suitably guarded off so as to protect the user from heat burn.

(k) The oven door shall be of glass pull out type hinged at the bottom.

(l) The oven shall be provided with an interior light.

(m) Internal wiring of the cooker shall be suitable for high temperature operation.

(n) The supply cable of the cooker shall conform to BS EN50525-2-11:2011 or other equivalent standards and the cooker shall be controlled by a 60 A D.P. cooker control unit.

C10.21 ELECTRIC HOT PLATE

C10.21.1 General Requirements

The hot plate shall comply with IEC 60335-2-6:2014.

C10.21.2 Performance Requirements

The capacity shall range from 2 kW to 2.6 kW.

C10.21.3 Construction

(a) The hot plate shall be designed for use on the table top.

(b) The heating element shall be metal sheathed.

(c) The diameter of the heating surface shall range from 180 mm to 200 mm approximately.

(d) The top plate shall be constructed of steel plate of minimum thickness 3 mm, or equivalent material.

(e) The top plate shall be protected with heat resisting coating to prevent thermal oxidation of the steel plate during operation.

(f) The level of top plate shall range from 120 to 130 mm above the table top.

(g) The casing/stand of the hot plate shall be constructed of chrome plated sheet or stoved with heat resisting enamel.

(h) The hot plate shall have integral power and temperature control switch which shall have at least 3 temperature settings.

(i) All bare metal conductors except the top plate shall properly be heat insulated.

(j) Internal wiring of the hot plate shall be suitable for high temperature operation.

(k) The hot plate shall be provided with a 3-core flexible power supply cable of approximately 1.5 m in length complete with a suitably fused 13 A plug.

C10.22 10-PERSONS AND 15-PERSONS ELECTRIC RICE COOKER

C10.22.1 General Requirements

(a) The rice cooker shall comply with IEC-60335-2-15:2012.

(b) The rice cooker shall be provided with a detachable 0.75 mm² 3-core circular cotton braided, rubber sheathed or PVC insulated and sheathed flexible cord of approximately 1 m in length and complete with an "appliance connector" and a suitably fused 13 A plug.

C10.22.2 Performance Requirements

The capacities of the rice cookers shall be:

Size (Persons)	Capacity (Persons)
10	From 7 to 10 persons
15	From 11 to 16 persons

C10.22.3 Construction

(a) The rice cooker shall be finished with heat resisting paint in white or a manufacturer's standard colour approved by the Supervising Officer.

(b) The rice cooker shall be fitted with automatic heat preservation mechanism and overheating protection.

(c) Internal wiring of the rice cooker shall be suitable for high temperature operation.

C10.23 2 kW ELECTRIC TOASTER

C10.23.1 General Requirements

The toaster shall comply with IEC 60335-2-9:2012.

C10.23.2 Performance Requirements

The total power rating of the heating elements shall not exceed 2 kW.

C10.23.3 Construction

(a) The toaster shall have two separate chambers for toasting two slices of bread simultaneously.

(b) The toaster shall have an automatic pop-up mechanism that shall be controlled by a damper to eliminate excessive shock and vibration during operation of the mechanism.

(c) A selector switch shall be provided for selection of the degree of toasting.

(d) The casing shall be constructed of stainless steel or chromium plated steel.

(e) The toaster shall be designed for easy operation and maintenance.

(f) The supply cable shall conform to BS EN50525-2-11:2011 and complete with a suitably fused 13 A plug conforming to the Electrical Products (Safety) Regulation, (Cap.406G), Laws of Hong Kong. The length of the supply cable shall be not less than 1.5 m.

C10.24 ELECTRIC HAND/FACE DRYER

C10.24.1 General Requirements

(a) The hand/face dryer shall comply with IEC 60335-2-23:2012.

(b) The hand/face dryer shall be designed of wall-mounting type.

(c) The hand/face dryer shall be provided with a detachable 1.25 mm^2 3-core PVC insulated and sheathed flexible cord of approximately 1 m in length.

C10.24.2 Performance Requirements

(a) The front cover shall withstand a static force of not less than 111 N for 1 minute and an impact of not less than 6.8 J for 1 minute.

(b) The power rating of the heating element shall not be less than 2 kW.

C10.24.3 Construction

(a) The front cover shall be manufactured from a fully developing one piece metal or approved high strength plastic.

(b) The thickness of the front cover shall not be less than 3 mm.

(c) The starting method of the dryer shall be any of the following as specified in the Particular Specification:

(i) capacitive touch switch;

(ii) insulated metal push button; and

(iii) automatic sensing device.

(d) Metallic covers shall be finished with acid resistant porcelain enamel or equivalent.

(e) The front cover shall be firmly secured to the base of the product by recessed Allen head or similar type bolts.

(f) The base shall be designed so that it can be secured to the wall by at least three mounting bolts.

(g) The air inlet shall be at the bottom and protected by metal vanes inside.

(h) The air outlet shall be similarly protected by metal vanes inside the nozzle.

(i) The air outlet shall be fixed with downward air discharge for hand dryer, but shall be movable to an upward direction when used as face dryer.

(j) All metal parts shall be made of corrosion resistant materials such as stainless steel or equivalent.

(k) The hand/face dryer shall be suitable for back and side cable entry with an insulated bushing.

(l) The hand/face dryer shall be completed with internal electrical overload protection for the fan motor and thermal cut-out protection for the heater unit.

(m) The hand/face dryer shall be marked with the symbol for drip-proof or splash-proof construction.

C10.25 (NOT USED)

C10.26 WALL CLOCK BATTERY-OPERATED

C10.26.1 General Requirements

The clock shall be accompanied with the necessary battery adequate for operating the clock for at least 1 month.

C10.26.2 Performance Requirements

(a) The clock shall be tropicalised and dust-proof.

(b) The accuracy of timekeeping shall not exceed ±20 sec/month at room temperature (25°C).

C10.26.3 Construction

(a) The clock-face shall either be round or square in shape as specified in the Particular Specification.

(b) For round clock-face clock, the nominal clock-face diameter shall range between 300 mm and 350 mm.

(c) For square clock-face clock, the nominal clock-face side length shall range between 300 mm and 350 mm.

(d) The clock shall be flush mounted design on the wall and is to be free of any projections on the rear surface.

(e) The clock dial shall be white with large Arabic Numerals in black and graduated in minutes. Alternative colour and design shall be subject to the approval of the Supervising Officer.

(f) The hour, minute and second full sweep hands shall be of distinct colour.

(g) The clock shall be completed with a clear glass or plastic front cover.

(h) The voltage rating of the battery powering the product shall not exceed 1.5 V.

C10.27 ELECTRIC DRY IRON

C10.27.1 General Requirements

(a) The dry iron shall be designed for household and domestic application.

(b) The dry iron shall comply with IEC 60335-2-3:2015.

(c) The dry iron shall have adequate mechanical strength and stability to withstand rough handling as may be expected in normal use.

(d) The dry iron shall be fitted with a 1.25 mm² 3-core PVC insulated and sheathed flexible cord of approximately 2 m in length and a suitably fused 13 A plug.

C10.27.2 Performance Requirements

The rated input power of the dry iron shall be 1,000 W.

C10.27.3 Construction

(a) The dry iron shall have an adjustable, self-resetting thermostat control complete with indication lamp for power ON/OFF indication.

(b) The power cord shall be connected to the iron body in such a manner that no part of the power cord or any accessories associated thereto shall be in contact with the hand of the operator during the normal ironing operation.

(c) The non-stick coated plate of the dry iron shall be constructed of chromium plated or heat resistant aluminium alloy.

(d) The dry iron shall have the appropriate degree of protection against moisture.

C10.28 VACUUM CLEANER

C10.28.1 General Requirements

(a) The vacuum cleaner shall comply with IEC 60335-2-2:2012.

(b) The vacuum cleaner shall be suppressed against radio interference in compliance with the Telecommunication (Control of Interference) Regulations, (Cap.106B), Laws of Hong Kong.

(c) The vacuum cleaner shall be designed of domestic type and for dry load.

(d) The vacuum cleaner shall be fitted with a 1.25 mm² 3-core PVC insulated and sheathed flexible cord of approximately 5 m in length; and a suitably fused 13 A plug.

C10.28.2 Performance Requirements

(a) The minimum dust capacity shall be 3.4 litres.

(b) The suction capacity shall be not less than 13.7 kPa.

(c) The minimum air flow rate shall be 1.8 m^3/min.

(d) The operating noise level shall not exceed 80 dBA measured at one (1) m from the vacuum cleaner under a background noise level of 55 dBA.

C10.28.3 Construction

(a) The vacuum cleaner shall be a double insulated product (Class II appliance) and shall have the symbol for Class II construction marked on its body.

(b) The following accessories shall be supplied with the vacuum cleaner as standard fittings:

(i) Joint pipe;

(ii) Flexible hose;

(iii) Curved joint pipe;

(iv) Extension pipes;

(v) Combination rug and floor tool;

(vi) Crevice nozzle;

(vii) Dusting brush; and

(viii) Fabric nozzle.

C10.29 FLOOR POLISHER

C10.29.1 General Requirements

(a) The floor polisher shall comply with IEC 60335-2-40:2013.

(b) The floor polisher shall be suppressed against radio interference in compliance with the Telecommunication (Control of Interference) Regulations, (Cap.106B), Laws of Hong Kong.

(c) The floor polisher shall be fitted with a 1.25 mm^2 3-core PVC insulated and sheathed flexible cord of approximately 6 m in length; and a suitably fused 13 A plug.

C10.29.2 Performance Requirements

(a) The power rating shall not be less than 400 watts.

(b) The dust bag volume shall not be less than 2.7 litres.

C10.29.3 Construction

(a) The floor polisher shall be a double insulated product (Class II appliance) and shall have the symbol for Class II construction marked on its body.

(b) The floor polisher shall be of the suction type with interchangeable 3 sets of brush of three pieces each, comprising 3 hard texture brushes, 3 soft brushes and 3 felt pads, suitable for household and similar purposes.

C10.30 7-Litres AND 9-Litres DEHUMIDIFIER

C10.30.1 General Requirements

(a) The dehumidifier shall comply with IEC 60335-2-40:2013.

(b) The dehumidifier shall be fitted with a 1.25 mm² 3-core PVC insulated and sheathed flexible cord of approximately 2 m in length; and a suitably fused 13 A plug.

C10.30.2 Performance Requirements

(a) The moisture removal capacity, when measured under the operating conditions at 27°C, 60% R.H. shall be as follows:

Size (litres)	Minimum Moisture Removal Capacity
7	7 litres per 24 hours
9	9 litres per 24 hours

(b) The power factor of the dehumidifier shall be not less than 0.85.

(c) The noise level generated whilst in operation shall not exceed 60 dBA measured at 1.5 m from the product under a background noise level of not exceeding 50 dBA.

(d) The dehumidifier shall have obtained a Grade 1 Energy Label under the Energy Efficiency Labelling Scheme of Electrical and Mechanical Services Department.

C10.30.3 Construction

No “Controlled Refrigerant”, as defined under the Ozone Layer

Protection (Controlled Refrigerants) Regulation, (Cap.403B), Laws of Hong Kong, shall be used.

C10.31 ROOM COOLER

C10.31.1 Type of Room Cooler

(a) 12 types of room cooler are under this specification, their Schedule of References are:

Schedule Reference	
'C' Type	'R' Type
C26	R26
C29	R29
C32	R32
C40	R40
C49	R49
C58	R58

(b) The Schedule Reference composes of three characters.

(i) The first character is an alphabet of either "C" or "R", where:

C - Room cooler provides cooling air only; and
R - Room cooler provides cooling with reversed cycle heating.

(ii) The last two characters are numerals indicate the cooling capacity of the room cooler with details shown below:

Last Two Characters	Cooling Capacity	
	Watt	Btu/hr
26	2,638 – 2,931	9,000 – 9,999
29	2,931 – 3,224	10,000 – 10,999
32	3,224 – 3,517	11,000 – 11,999
40	4,103 – 4,396	14,000 – 14,999
49	4,982 – 5,275	17,000 – 17,999
58	5,861 – 6,154	20,000 – 20,999

C10.31.2 General Requirements

(a) The room air cooler supplied shall conform to the safety standard IEC 60335-2-40:2013, in accordance with Electrical Products (Safety) Regulation, (Cap.406G), Laws of Hong Kong.

(b) The room cooler shall be supplied with appropriate radio interference suppression device to meet the requirements prescribed in Telecommunications (Control of Interference) Regulations of the Telecommunications Ordinance (Cap.106).

(c) The room cooler shall be fitted with a 3-core PVC insulated and sheathed flexible cord of approximately 2 m in length which shall be connected to a connection unit and controlled by a D.P. switch with pilot light. Size of the 3-core flexible cord shall have current carrying capacity not less than that of the circuit breaker protecting the room cooler.

C10.31.3 Performance Requirements

(a) All room coolers shall have a power factor of not less than 0.85 at full load.

(b) All room coolers shall achieve the ratings as stated above.

(c) The capacity of rating shall be proved by the production of printed manufacturer's rating sheets showing also the test condition.

(d) All the ratings quoted shall conform to ISO 5151:2010.

(e) The maximum noise level generated by the room coolers operating at high cool and high fan setting shall be in accordance with the table below. The noise level shall be measured at a distance of 1.5 m from the cool air discharge and at 1.2 m above the ground under a background noise level of less than 50 dBA.

Schedule Reference	Noise Level
C26, R26, C29, R29, C32, R32, C40, R40,	Not exceeding 60 dBA
C49, R49, C58, R58.	Not exceeding 65 dBA

(f) Room cooler shall have obtained a Grade 1 Energy Label under the Energy Efficiency Labelling Scheme of Electrical and Mechanical Services Department.

C10.31.4 Construction

(a) The refrigerant used in the room coolers shall be of non-CFC type.

(b) An adjustable thermostat control shall be provided for each room cooler. The thermostat shall be built into the case of the unit and not fixed on the outside. Only the adjusting knob or dial is to protrude.

C10.32 REFRIGERATOR

C10.32.1 Type of Refrigerator

6 types of refrigerator are under this specification, they are:

Type	Description
1	170 litres
2	170 litres, not exceeding 1,600 mm in height
3	270 litres
4	270 litres, not exceeding 1,600 mm in height
5	345 litres
6	345 litres, not exceeding 1,600 mm in height

C10.32.2 General Requirements

(a) The refrigerator shall comply with the safety standard IEC 60335-2-24:2012 Household and similar electrical appliances – Safety – Part 2-24 : Particular requirements for refrigerators and food freezers.

(b) All the ratings quoted, characteristics and test methods shall conform to ISO 8187:1991.

(c) The overall dimensions of the refrigerators shall comply with the following requirements:

Type	Maximum depth (mm)	Maximum width (mm)	Maximum height (mm)
1	660	620	N/A
2	660	620	1,600
3	720	700	N/A
4	720	700	1,600
5	750	750	N/A
6	750	750	1,600

(d) The corresponding food storage capacities shall be:

Type	Minimum Total Storage Capacity (litres)	Storage Capacity of Frozen Food Storage Compartment (litres)
1	170	35 to 70
2		
3	270	50 to 85
4		
5	345	70 to 110
6		

(e) The refrigerator shall at least comprise two separate compartments, i.e. Fresh Food Storage Compartment and Frozen Food Storage Compartment.

(f) For Types 3 to 6, the Fresh Food Storage Compartment shall have a chiller compartment (chilled room) with transparent front opening door.

(g) The refrigerator shall be of the 'Frost-free' or 'Automatic defrost' type.

(h) The refrigerator shall be fitted with a 0.75 mm² 3-core PVC insulated and sheathed flexible cord of approximately 2 m in length; and a suitably fused 13 A plug.

C10.32.3 Performance Requirements

(a) The refrigerator shall be completely suitable for operation under sub-tropical climate class. The range of ambient temperatures in which the equipment are intended to be used, and for which the required storage temperatures shall be fulfilled is between 18°C to 38°C. No condensation shall be present on the exterior of the refrigerator at all times.

(b) The Fresh Food Storage Compartment and Frozen Food Storage Compartment shall be equipped with separate temperature control.

(i) Fresh Food Storage Compartment
The refrigeration system shall be designed to maintain the temperature between 0°C to 10°C and the mean temperature shall be 5°C within the compartment at all operating conditions.

(ii) Frozen Food Storage Compartment
The storage temperature of the Frozen Food Storage Compartment shall be maintained at a temperature not warmer than -18°C at all operating conditions. The Compartment shall be labelled with a "***" mark as defined in ISO 8187:1991.

(c) The refrigerator shall have obtained a Grade 1 Energy Label under the Energy Efficiency Labelling Scheme of Electrical and Mechanical Services Department.

C10.32.4 Construction

(a) The cabinet shall be of all steel construction designed for maximum rigidity and robustness to form an assembly sufficiently rigid to prevent distortion during handling, transportation, etc. In addition, concealed adjustable feet shall be fitted to ensure that the cabinet will stand firm on uneven floor. High quality steel panel work treated with a suitable rust preventive primer and anti-corrosion undercoat and finished with white hard finish material giving maximum resistance to abrasion and corrosion.

(b) Doors:

(i) The refrigerator shall be fitted with flush-fitting door(s). The door shall be fitted with chromium plated/ matching coloured fasteners and semi-concealed door hinges. The interior of the door shall be complete with bottle racks, cheese and butter storage section;

(ii) The design and construction of the door shall withstand heavy usage and suitably braced or otherwise constructed to prevent distortion in usage;

(iii) The plastic door liner must be of uniform thickness (gauge) throughout particularly in relation to all inner radiused corners and be sufficiently rigid to prevent sagging when fully loaded with bottles, etc. The bottle retainer strips shall be robustly constructed and secured; and

(iv) If the refrigerator is designed with only one door, the Fresh Food Storage Compartment and the Frozen Food Storage Compartment shall be separated well according to appropriate temperatures.

(c) Insulation Material:

No “Controlled Product”, as defined under the Ozone Layer Protection (Products Containing Scheduled Substances) (Import Banning) Regulation, (Cap.403C), Laws of Hong Kong, shall be used as insulation material in the refrigerator.

(d) Internal Lighting:

The Fresh Food Storage Compartment of the refrigerators shall be supplied with an interior light of sufficient capacity to illuminate the entire interior. This light complete with air-tight

flame retardant lamp guard shall be activated by a door operated switch. The light and switch shall be protected from condensate drip.

(e) Refrigeration Unit:

(i) The refrigeration unit shall be hermetically sealed in a steel housing and fitted with an automatic self-resetting motor overload device; and

(ii) The refrigeration unit shall be designed to be free from radio or TV reception interference or if necessary shall be fitted with an appropriate suppression system as laid down in the Telecommunication (Control of Interference) Regulations, (Cap.106B), Laws of Hong Kong.

(f) Door Gasket:

(i) The door gasket shall be robust and manufactured from a rubber base material;

(ii) It shall contain a fungoid inhibitor to prevent fungoid growth and discolouration; and

(iii) In the case of a magnetic gasket, the magnetic ceramic insert must be full length on all sides so fitted, with absence of gaps at the corners.

(g) Shelves and Internal Fittings:

(i) The shelves made of either wire or bar shall be adequately protected against rusting and corrosion and must be sufficiently rigid to prevent distortion under full load conditions. The mesh of the wires shall be closely enough to prevent small based containers from toppling and spilling their contents; and

(ii) Shelves shall preferably be supported from full height adjustable supports, all must be of ample strength, easily adjustable and designed to prevent the accidental tilting or release, of one end of a shelf.

(h) Refrigerant:

No “Controlled Refrigerant”, as defined under the Ozone Layer Protection (Controlled Refrigerants) Regulation, (Cap.403B), Laws of Hong Kong, shall be used.

(i) Accessories:

The refrigerator shall be supplied with all manufacturer’s

standard accessories which shall include the following:

Description of Accessories	Quantity (No.)
Shelves in refrigerator compartment	3
Large full-width egg racks	1
or half-width egg racks	2
Ice cube trays	2
Butter tray plastic crisper with see through plastic cover	1

(j) Labelling:

The refrigerator shall bear a label showing serial number, power consumption, voltage, amperes and frequency. The label shall be fixed rigidly at a conspicuous position on the equipment.

C10.33 LED TABLE LAMP

C10.33.1 General Requirements

The LED table lamp shall be the lighting fitting including the driver, lamp source, diffuser, flexible cord and all necessary accessories.

(a) The design of the LED table lamp should be aesthetically pleasing, contemporary stylish appearance, user friendly, electrically/mechanically sound and appropriate for office environment. It shall be designed for use on working desk in offices as task lighting to provide localised lighting.

(b) The LED table lamp shall be free standing type or clamp-mounted type and the LED lamp shall be either integral or built-in LED module or self-ballasted LED lamp as specified in the Particular Specification.

(c) The LED table lamp shall be rated for continuous service at an ambient temperature of 40°C without affecting the performance requirements as stated in this specification.

(d) The LED table lamp shall be manufactured in a process conforming to the relevant quality assurance standard ISO 9000: 2005.

(e) The LED table lamp shall be fully assembled and tested to required standards before delivery.

C10.33.2 Safety Requirements

(a) The LED table lamp shall comply with IEC 60598-2-4:1997.

(b) The LED table lamp shall be 'Restriction of Hazardous Substances (RoHS)' compliance.

(c) The LED table lamp shall comply with the risk group 'Exempt Group (RG 0)' of IEC 62471:2006 – Photobiological safety of lamps and lamp system.

(d) The LED table lamp shall be suitably protected from electric shock and shall comply with the latest edition of the Guidance Notes for the Electrical Product (Safety) Regulation.

C10.33.3 Performance Requirements

(a) The LED table lamp shall have locally on/off or dimmable on/off switch that is easily reachable by user. For the light output to be dimmable as specified in the Particular Specification, the light output shall be continuous dimmable or at least 3-step discrete dimmable settings ranging from 40-100% without flickering.

(b) The LED table lamp shall comply with the following performance requirements:

(i) Luminaire efficacy not lower than 30 lumen/watt including the ballast, thermal and lighting fixture losses.

(ii) Colour Rendering Index (CRI) not lower than 80.

(iii) For lumen maintenance requirements of the LED table lamp, it shall comply with clause C9.4.1(b).

(iv) The nominal Correlated Colour Temperature (CCT) shall be 4,000K.

(v) Power factor not lower than 0.85 and 0.6 for built-in LED module and self-ballasted LED lamp respectively.

(c) The LED table lamp source shall have suitable cover and/or diffuser built-in for glare control. The LED lamp source shall not be directly visible to the user when it is positioned at 600 mm above desk level.

C10.33.4 Electrical Requirements

(a) The LED table lamp, including the electronic driver and LED module, shall be suitable for operation at 220 V±6%, 50 Hz±2%, single phase, AC supply.

(b) Where the offered LED table lamp is to receive extra low voltage DC input by using external driver, provision of an electrical switch at convenient position that can readily accessible from the desk chair shall be provided to switch off the luminaire.

(c) The LED table lamp shall have minimum 2 metres of ordinary duty rubber insulated and sheathed flexible cord, 3-core with minimum cross sectional area of 0.75 mm^2, in conformance with B.S. 6500 or IEC 60245.

(d) Suitable rated fuse protection shall be provided in the 13 Ampere socket plug to B.S. 1363-1:1995/ A4:2012 which shall be permanently connected to each of the LED table lamp.

(e) The LED driver and the extra low voltage DC driver shall comply with the following standards where applicable:

(i) IEC 61347-1:2015 Lamp controlgear – Part 1: General and safety requirements;

(ii) IEC 61347-2-13:2014 Lamp controlgear – Part 2-13: Particular requirements for DC or AC supplied electronic controlgear for LED modules;

(iii) IEC 62384:2011 DC or AC supplied electronic control gear for LED modules – Performance requirements;

(iv) IEC 61000-3-2:2014/ Corr 1:2009 Electromagnetic compatibility (EMC) – Part 3-2: Limits – Limits for harmonic current emissions (equipment input current $\leqq$ 16 A per phase);

(v) IEC 61547:2009 Equipment for general lighting purposes – EMC immunity requirements; and

(vi) BS EN 55015:2013/A1:2015 Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment.

(f) The Light Emitted Diode (LED) module shall comply IEC 62031:2014 LED modules for general lighting – Safety specifications, for the part of "LED modules without integral control gear for operation under constant voltage, constant current or constant power".

C10.33.5 Mechanical Requirements

(a) The LED table lamp shall have adjustable outreach arm for free adjustment of lighting angle by the user such that the LED lamp head can tilt and swivel in two axes to achieve an optimal ergonomic position.

(b) The design of the outreach arm should have suitable length and flexibility to suit the intended application without obstruction to the user.

(c) The hinges and/or springs for adjustment of outreach arm and/or angle of lamp head shall be robust for frequent adjustment and can hold the lamp head in sturdy position after adjustment.

(d) The materials of the adjustable arm shall be mechanically sound and durable. No sharp edges shall be present.

(e) The LED table lamp shall be self-balanced with the out reaching arm fully extended.

C10.33.6 Testing Standards for Compliance

The relevant requirements as stated in clause C10.33.1 – C10.33.4 of the LED table lamp shall be tested and certified by the accredited laboratories. The test reports shall be submitted for approval.