Low Voltage Electricity & Water
Installations Regulations

Energy & Water
Conservation Code 2023

KAHRAMAA كهرماء

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His Highness

Sheikh Tameem Bin Hamad Al-Thani

Emir of the State of Qatar

ENERGY & WATER CONSERVATION CODE 2023

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Section 01: Definitions

Accessory: Any device, other than a lighting fitting, associated with the wiring and current using appliances of an installation, e.g., a switch, a fuse, a plug, a socket outlet, a lamp holder or a ceiling rose.

Adapter, Socket Outlet: An accessory for insertion into a socket outlet and containing metal contacts, to which may be fitted one or more plugs for the purpose of connecting to the supply, portable lighting fitting or current using appliances.

Ambient Temperature (For Cable): The temperature of the surrounding medium under normal conditions, at a suitable in which cables are installed, or are to be installed, including the effect of any artificial heating used in the building by any local source of heat.

Apparatus: Electrical apparatus, including all machines, equipment and fittings in which conductors are used or of which they form a part.

Appliance: Any device which utilize electricity for a particular purpose, excluding lighting or an independent motor.

Bonded (As Applied To Items of Metal Work): Connected together electrically, not normally for the purpose of carrying current but so as to ensure a common potential.

Bunched: Cables are said to be ‘bunched’ when two or more are contained within a single conduit or trunking or, if not separated from each other.

Caravan: Any structure designed or adapted for human habitation which is capable of being moved from one to another (whether by being towed or being transported on a motor vehicle or trailer) and any other motor vehicle so designed or adapted. The regulations apply where supply is provided by mains electricity or by generator at a voltage exceeding 50 Volts between poles.

Channel (For Cables): A groove cut or formed in part of a building and intended to receive on a more cables, the groove having removable or hinged covers to allow cables to be laid therein.

Circuit Breaker: A mechanical device for making and breaking a circuit, both under normal conditions and under abnormal conditions, such as those of an overload or short circuit being broken automatically.

Circuit Conductor: A current carrying conductor forming part a circuit or final sub circuit but excluding the earth continuity conductor.

Conductor (Of Core or Cable): The conducting portion, consisting of a single wire or of a group of wires in contact with each other. For earthed concentric wiring, the term may also denote the metal sheath of a cable.

Connector: A device intended for connection to a flexible core of flexible cable, which has protected current carrying contact tubes similar to those of a socket outlet.

Customer's Installation: Wiring and apparatus situated upon the customer's premises and controlled or installed by him, excluding any switchgear of the supply undertaking which the customer may be permitted to use.

Customer's Terminals: The point in the customer's installation at which the incoming supply of energy is delivered to that installation.

Core (Of Cable): The conductor with its insulation but not including any outer covering for mechanical or other protection.

Damp And Dust Proof: Applied to apparatus and accessories to denote that the live and other component parts are protected by an enclosure or enclosures being so protected and or fitted as to prevent the ready ingress of dust and or moisture.

Damp Situation: A situation in which moisture is either permanently present or intermittently present, to such an extent as to be likely to impair the effectiveness of an installation conforming to the requirements for ordinary situations.

Dead: At earth potential and disconnected from any live system.

Distribution Board: An assemblage of parts, including one or more fuse or circuit breakers, arranged for the distribution of electrical energy.

Duct (For Cables): A closed passageway formed underground in a structure and intended to receive one or more cables which may be drawn in.

Earth Continuity Conductor: The conductor, including any clamp, connecting to the customer's earthing terminal or to the frame terminal of a voltage operated earth leakage circuit breaker or to each other, those parts of an installation which are required to be earthed.

It may be the metal sheath and or armoring if a cable or the special earth continuity conductor of a cable or flexible cord incorporating such a conductor.

Earth Electrode: A metal rod or rods, a system of underground metal pipes or other conducting object, providing an effective connection with the general mass of the earth.

Earthed: Effectively connected to the general mass of the earth.

Earthed Concentric Wiring: A sheath return wiring system in which one or more insulated conductors carrying the line current are completely surrounded throughout their length by a conductor which acts as the earth continuity conductor.

Earthing Lead: The final conductor by which the connection to the earth electrode or other means of earthing is made.

Electric Discharge Lamp: An electric lamp comprising a hermetically sealed bulb or tube containing gas and or metal intended to be vaporized during operation and fitted with electrodes between which a discharge of electricity takes places, the useful light being emitted either by the discharge through the gas or vapor or by the fluorescence of a translucent coating which may be on the inner surface of the outer tube or bulb.

Electrode Boiler (Or Electrode Water Heater): Apparatus for the electrical heating of water by the passage of an electric current between electrodes immersed in the water.

Excess Current Protection Close: Excess current protection which will operate within Four Hours at 1.50 times the designed load current of the circuit which is protects.

CFL: Compact fluorescent lamps

Color rendering: Expression for the effect of an illuminant on the color of an object in conscious comparison with their color as seen under a reference illuminant (daylight).

Color Rendering Index (CRI): is a measure of the effect of light on the perceived color of objects. A low CRI indicates that some colors may appear unnatural when illuminated by the lamp

Coefficient Of Performance (COP): The ratio of net refrigeration effect to the rate of energy input .The numerator and denominator should be in same units.

Energy Efficiency Ratio (EER): It is the ratio of net cooling capacity in Btu/h to the total rate of electric input in Watts under designated operating conditions. The total input power shall include power input to the compressor(s) and fan(s) plus controls and other items included as part of the designated model.

Integrated Part - Load Value (IPLV): A single number figure of merit based on part load E E R, COP, or kW/ton expressing part load efficiency for air conditioning equipment on the basis of weighted operation at various load capacities of the equipment.

LED: Light Emitting diode

Lumen: Unit of luminous flux; the flux emitted within a unit solid angle by a point source with a uniform luminous intensity of one candela. One LUX is one lumen per square meter.

Lux: This is the metric unit of measure for illuminance of a surface. Average maintained illuminance is the average of LUX levels measured at various points in a defined area. One LUX is equal to one lumen per square meter.

Luminous efficacy: Quantity of light (lumen) emitted for each unit of electrical power (watt) consumed. The unit is 'lumen/watt' (lm/W).

Luminaire: A luminaire is a complete lighting unit, consisting of a lamp or lamps together with the parts designed to distribute the light, position and protect the lamps, and connect the lamps to the power supply.

Solar Heat Gain Coefficient (SHGC): It is the fraction of incident solar radiation admitted through a window both directly transmitted and absorbed and subsequently released inward.

U Value (Overall Heat Transfer Coefficient): Heat transmission in unit time through unit area of material of construction and the boundary of air films, induced by unit temperature difference between the environments on each side. Units of U are W/m2 ºC (Btu/h.ft2 ºF).

Visible Transmittance (VT): It is the fraction of visible light transmitted through the glazing material.

Window Wall Ratio (WWR): The window wall ratio is the ratio of vertical fenestration area to gross exterior wall area. The fenestration area is the rough opening ie it includes the frame, sash and other nonglazed window components. The gross exterior wall area is measured vertically from top of the floor to bottom of the roof.

Section 02 Energy Conservation Measures:

2.1 Energy Efficient Lamps

- The following types of energy efficient lamps (Some or All As Applicable) shall be used for buildings/facilities as detailed below:
    - Compact Fluorescent Lamps (CFL)
    - Light Emitting Diode (LED) type Lamps.
    - High Intensity Discharge like High Pressure Sodium Vapor Lamps and Metal Halide Lamps.

LED lighting should be the priority for lighting in all applications

1. Residential building:- LED lighting for all new buildings, CFL allowed in existing building only
2. Commercial building :LED lighting for all new and existing building
3. Governmental:- LED lighting for all new and existing building
4. Industrial:- LED lighting for all new and existing Industries
5. Flood lighting External- LED lighting for all new areas and HPS and metal halide allowed to continue in existing areas until retrofitted by LED

- LED lights shall be used in luminaires for external lighting.
- Timers or Photocells control shall be used for external lighting control.
- Under no circumstances, the external lighting shall be kept operational between 7 am to 4.30 pm during daytime.
- LED type exit lighting luminaires shall be used for egress indication illuminated signs and other feasible applications.
- For existing residential application good quality CF Lamps shall be used in order to avoid or minimize the effects of harmonic currents, better power factor and superior lamp life.

2.2 Lighting Control Systems:

For building with large built-up area, presence detectors / occupancy sensors are to be used in common areas like corridors, lobbies, Office & meeting rooms, washroom and pantry area to control switching of lighting depending on the occupancy of respective area.

- Presence detectors should not control the emergency egress illumination luminaires or egress direction indicators. All emergency lights to be switched on in the event of an emergency, as required by relevant safety regulations.
- Access key cards or key tags used for hotel rooms, also to be used for electrical control activation in respective rooms thereby the room utilities will be switched off, when the occupant leaves the room.
- Depending on the layout of large hallways and office areas, local switching of luminaires shall be provided.

2.3 AC Control Systems:

- Air Conditioners of capacity 5 TR and above used for large offices and commercial establishments, shall be controlled by programmable timers. The Air Conditioners for IT room/server rooms and their controls or any other rooms operational for 24 Hours a day, shall be segregated.

- The use of AC controls is optional for residential flats and villas.

2.4 Flood Lighting:

Areas of application of flood lighting are gymnasiums, sports arena, warehouses, large public areas, football stadiums, outdoor activity areas, roadways, parking lots and pathways.

For flood lighting applications the selection of lamps shall be strictly based on the best luminous efficacy for the prescribed color rendering properties.

For applications such as streetlights and security lighting where faithful color rendition is considered unimportant, sodium vapor lamps (HPS and LPS) can be used. For only existing facilities

For sporting event applications, the lighting level parameters to be considered for design purposes Viz. LUX level, uniformity ratio, color rendering index etc., shall be as per the relevant international norms.

2.5 Lighting Levels

For design purpose of LUX level for buildings areas and external areas, the following standards are acceptable.

1. IESNA LUX levels
2. CIBSE Standard

The standard followed for lighting design and the lux level adopted from standard shall be provided in all lighting drawings.

For sports facilities the lighting level as per clause 2.4 above. Standard adopted shall be uniform for the entire project.

Adopting any other standard shall be to the approval of **KAHRAMAA.**

Section 03: Electric Motors, Circuits and Controllers

Poly phase motors which are not part of packaged unit equipment and having continuous rating and intended for long period of usage shall be energy efficient motors, tested to international standards IEC60034 - 2 – 1:2014.The efficiency class of the motors to be used shall be of minimum IE2 (High Efficiency) as detailed in IEC 60034 – 30-1-2014.

Note: Energy efficient motors have higher performance due to key design improvements and more accurate manufacturing tolerances. Lengthening the core and using lower electrical loss steel, thinner stator laminations reduce electrical losses. Improved bearings and a smaller more aerodynamic cooling fan further increase the efficiency (2 to 8% More Efficient than Standard Motors).

Refer to Section 8 of Regulation for KAHRAMAA wiring code for more details.

Variable speed drives shall be adopted for motors in applications like air-conditioning system driver motors, water pumping systems for all applications to achieve demand-controlled operation where the output requirement is varying.

Section 04: Power Factor Correction

Every installation shall have a power factor within the range of 0.9 lagging to unity. A Lagging power factor of less than 0.9 shall be improved by the installation of suitable correction equipment.

Refer to Section 9 of KAHRAMAA wiring regulations for Electrical Installation for more details and applicable standards to be followed.

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Section 05: Thermal Insulation of Building

All Air-conditioned new buildings and addition to existing building shall be provided with insulation as mentioned in the section 05.2.

5.1 Definitions:

U Value (Overall Heat Transfer Coefficient): Heat transmission in unit time through unit area of material of construction and the boundary of air films, induced by unit temperature difference between the environments on each side. Units of U are W/m2 ºC (Btu/h.ft2 ºF).

Solar Heat Gain Coefficient:

It is the fraction of incident solar radiation admitted through a window both directly transmitted and absorbed and subsequently released inward

Window Wall Ratio (WWR): The window wall ratio is the ratio of vertical fenestration area to gross exterior wall area. The fenestration area is the rough opening i.e. it includes the frame, sash and other nonglazed window components. The gross exterior wall area is measured vertically from top of the floor to bottom of the roof.

Visible Transmittance (VT): It is the fraction of visible light transmitted through the glazing material.

5.2 Wall And Roof Assembly Maximum U Value:

Thermal insulation material used in the building external wall/roof must not exceed the following U Value.

- Roof: 0.437 W/m2 ºC (0.077 Btu/h ft2 ºF)
- External Wall : 0.568 W/m2 ºC (0.100 Btu/h ft2 ºF)

U value mentioned are maximum permitted values, designer to reduce the overall heat transfer coefficient values by properly selecting materials, in such a way that materials should be available in the State of Qatar. Building materials resistance value shall be determined as per ASHRAE Fundamentals Handbook or approved lab test result data published by the manufacturer.

5.3 Window Requirements:

The total glass area in the building shall be reasonable to minimize the heat transmission and solar gain through the glazing. For different Window Wall ratio, overall U Value and Solar Heat Gain coefficient of the glass assembly does not exceed the following values.

Window Wall Ratio (WWR)	Maximum U value- W/m2 ºC (Btu/ft²h F)	Maximum Solar Heat Gain Coefficient (SHGC)
5 - 40 %	3.30 (0.58)	0.3
Above 40 %	2.10 (0.36)	0.25
Show Room	2.10 (0.36)	0.3

For the showroom building, double glazing shall be used with maximum U value 2.10 (0.36) W/m2 ºC (Btu/ft2h F), maximum Solar Heat Gain Coefficient 0.3 and with minimum Visible Transmittance 0.3.

U value shall be calculated in summer as per ASHRAE specifications. U Value and Solar Heat Gain Coefficient shall be certified by the manufacturer or other responsible party.

5.4 Compliance:

Consultant should submit U value calculation for the walls, roof and Windows for **KAHRAMAA** approval. Sample building envelope compliance forms are provided in the Appendix 04.

Buildings failing to comply with minimum insulation requirements will not be considered for supply of electricity.

The material used for the thermal insulation shall be approved by Qatar General Electricity and Water Corporation (**KAHRAMAA**) before being installed, and as per the approval on the building permit application form.

Section 06: Heating, Ventilation and Air Conditioning

All heating, ventilation and Air conditioning equipment shall serve to new buildings and additions to existing building shall comply with following requirements.

6.1 Definitions:

Energy Efficiency Ratio (EER): It is the ratio of net cooling capacity in Btu/h to the total rate of electric input in Watts under designated operating conditions. The total input power shall include power input to the compressor(s) and fan(s) plus controls and other items included as part of the designated model.

Coefficient Of Performance (COP): The ratio of net refrigeration effect to the rate of energy input.
The numerator and denominator should be in same units.

Integrated Part - Load Value (IPLV): A single number figure of merit based on part load E E R, COP, or kW/ton expressing part load efficiency for air conditioning equipment on the basis of weighted operation at various load capacities of the equipment.

6.2 Minimum Equipment Efficiency:

Cooling equipment shall meet or exceed the minimum efficiency requirements mentioned in the table 06.1 to 06.3 Equipment not listed here shall comply with ASHRAE 90.1 - 2019, 6.4.1

The efficiency shall be verified through certification under an approved certification program or if no certification program exist the equipment efficiency ratings shall be supported by data furnished by the manufacturer.

Table No. 6.1

Room Air Conditioners (Window Type) And Split Air Conditioners Minimum Efficiency

Air Conditioner Appliances type	Cooling Capacity limit(CC) (Btu/h) At test condition (T1)	(EER) Value (Btu/h)/watt		Test Standard
		T1 (35^{0}C)	T3 (46^{0}C)	
Window Type	18000 > CC	9.8	7.06	GSO 5151
	18000 ≤ CC < 24000	9.7	6.98	
	CC ≥ 24000	8.5	6.12	
Split Type	All Capacities	11.5	8.28	GSO 13253

Table No. 6.2

Package Air Conditioners Minimum Efficiency

Equipment Type	Minimum EER (Btu/Wh)	Rating Outdoor Condition	Test Standard
Single Package Air Conditioners < 19.05 kW (5.41 Tons)	9.0	35 ˚C (95 ˚F) DB	ARI 210/240
Single Package Air Conditioners ≥19.00 and < 39.56 kW (≥5.41 and < 11.25 Tons)	8.9	35 ˚C (95 ˚F) DB	ARI 340/360
Single Package Air Conditioners ≥39.56 kW (≥11.25 Tons)	8.6	35 ˚C (95 ˚F) DB	ARI 390

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Table No. 6.3

Water Chillers Minimum Efficiency

Equipment Type	Minimum COP	Minimum IPLV	Test Standard
Air Cooled Chiller All Capacities	2.80	3.05	ARI 550/590
Centrifugal Water-Cooled Chiller < 530 kW (150 Tons)	5.00	5.25	ARI 550/590
Centrifugal Water-Cooled Chiller ≥530 and < 1050 kW (≥150 and < 300 Tons)	5.55	5.90	ARI 550/590
Centrifugal Water-Cooled Chiller ≥1050 kW (300 Tons)	6.10	6.40	ARI 550/590
Reciprocating Compressor Water Cooled Chiller All Capacities	4.20	5.05	ARI 550/590
Rotary Screw and Scroll Compressor Water Cooled Chiller < 530 kW (150 Tons)	4.45	5.20	ARI 550/590
Rotary Screw and Scroll Compressor Water Cooled Chiller ≥530 kW and < 1050 kW (≥150 and < 300 Tons)	4.90	5.60	ARI 550/590
Rotary Screw and Scroll Compressor Water Cooled Chiller ≥1050 kW (300 Tons)	5.50	6.15	ARI 550/590

Note: For centrifugal chiller operates at temperatures different from the ARI 550/590 rating condition, refer ASHRAE 90.1- 2019/6.4.1.2

6.3 Controls:

6.3.1 All Cooling Systems Shall Be Controlled by A Time Clock That :

- Can start and stop the system under different schedules for three different day types per week.
- Is capable of retaining programming and time setting during loss of power for a period of at least 10 hours.
- Include an accessible manual override that allows temporary operation of the system for up to 2 hours.

Exception to 06.3.1: Cooling system capacity < 17.5 kW (5 Ton).

6.3.2 Outside Air and Exhaust Damper Control.

Outdoor air supply and exhaust systems shall be equipped with motorized dampers that will automatically shut when the systems or spaces are not in use.

Exception to 06.3.2: Gravity dampers (non-Motorized) are acceptable in residential buildings and systems with design outdoor air intake or exhaust capacity of 141 l/s (300 cfm) or less.

6.3.3 Cooling Tower Fan Control.

All cooling towers shall have either two speed motors, pony motors or variable speed drives.

6.4 Energy Recovery:

Energy recovery ventilation systems shall be provided where individual fan systems with design supply air capacity of 2360 l/s (5000 cfm) or greater and have minimum outdoor air supply of 70% or greater of the design supply air quantity. Energy recovery systems shall have at least 50% recovery effectiveness.

Exception to 06.4:

1. Laboratory systems, systems exhaust toxic, paint or corrosive fumes or dust, commercial kitchen hoods.

2. Exhaust air flow rate is less than 75% of the design outdoor air flow.

6.5 Load Calculation:

The designer must make cooling load calculations before selecting and sizing the equipment.

Cooling load shall be calculated using “Engineering standards and handbooks acceptable to the KAHRAMAA Engineer” or any computer method utilizing ASHRAE certified computer routines.

6.6 System Selection:

The Air conditioning system for the main cooling plant shall be selected in such a way that total power input for A/C equipment should be minimum.

6.7 Compliance:

Drawings and specification shall show equipment and systems in sufficient detail to permit **KAHRAMAA** to check that building complies with the section 6. Cooling load summary sheet along with cooling equipment schedule shall be submitted to **KAHRAMAA** Engineer for checking. Sample Equipment compliance forms are given in Appendix 02.

Section 07: Energy Management System for Bulk Customers

7.1 Introduction

The Establishment of EMS by an organization is essential to define the system and processes necessary to improve the energy performance. Energy Management Systems (EMS) as per ISO 50001:2018 stipulates Energy policy, planning, and performance indicators etc. with proper monitoring and control for an installation. Implementation of Energy Management System is mandatory for all existing and new bulk customers. Residential customers within the envelope of Bulk customers are exempted from the purview of Energy Management System regulation. For all new Bulk Customers, EMS shall be defined and submitted for approval to Conservation and Energy Efficiency Department before effective operation / Energizing of the premises. The date of energization will be deemed as date of starting normal operation.

7.2 Essential Features of EMS to be implemented

- The organization shall define and document the scope of EMS for the installation and determine how it will meet the requirement of International Standard in order to achieve continual improvement of its energy performance.
- The top management of the organization shall define establish and implement the energy policy.
- A management representative shall be appointed to act as a energy manager who will oversee the implementation of the EMS.
- All retail outlets located within a parent bulk commercial customer will be governed by the EMS of the parent bulk customer. The Bulk Customer shall notify the retailers of the summary requirements of the procedures for compliance within their premises, for accomplishment of the EMS and thereby to ensure effective energy conservation.
- Energy performance indices shall be defined and the same shall be defined and the same shall be aiding the organization for long term planning.
- The energy policy shall include a commitment to comply with KM regulation requirements and to other requirements to which the organization subscribes related to energy use, consumption and efficiency.
- The procurement services of energy services, products or equipment shall be effectively defined.

7.3 Energy review and reporting

The energy review procedures shall cover the following aspects

- Analysis of energy use and consumption based on measurement & other data.
- Identify current energy sources.
- Evaluate past and present energy use and consumption.
- Analyze potential energy usage areas.

- Analyze methods for efficient operation.
- Identify potential areas for improving energy performance.

7.4 Energy base line

The organization shall establish an energy baseline. The data period for establishing energy baseline and review shall be the respective calendar year from January to December. Energy performance indicators shall be established based on any criteria selected.

Examples:-kWHr/Unit area, kWHr per unit product etc.
Energy performance indicators shall be compared to the energy base line as appropriate.

7.5 Reporting

The summary of Energy review with all relevant policy and implementation shall be reported to **KAHRAMAA** on annual basis. The report should essentially contain the full load schedule of the premises with linear and nonlinear load segregated. Consumers can refer to **KAHRAMAA** Guideline for Implementation of Energy Management System for further reference.

The report for a calendar year shall be forwarded to **KAHRAMAA** before 31st March of succeeding year and shall be send to

The Manager,
Conservation and Energy Efficiency Department,
P.O. Box number 41, KAHRAMAA Doha, Qatar

7.6 Internal Audit for EMS

The organization shall conduct internal audit at planned intervals to ensure effective implementation of the EMS, conforming to ISO 50001:2018, procedures defined normative reference etc.

The audit can be conducted by qualified internal or external auditors. The energy Manager or MR shall be the focal point for conducting audits, The rectification of non- conformities, corrective, preventive actions, Management review etc. shall be done following procedures laid down in ISO50001:2018.

Section 08: Maximum Demand and diversity

08.1 The Consultant/Contractor shall.

The Consultant/Contractor shall consider the actual load of the equipment for Air conditioner, Water heater, cooker and lighting equipment, and the same load shall be followed in construction stage as well. The actual load should reflect in all load schedules.

The demand load to be evaluated based on the above following KAHRAMAA Wiring code guidelines.

For more details, refer to Regulations for Electrical Installation.

Appendix No. 01: BUILDING ENVELOPE COMPLIANCE FORMS

PROJECT : LOCATION/AREA: PIN NUMBER: CONSULTANT: CONSULTANT CONTACT PHONE NUMBER :			**EXTERNAL WALL /ROOF-U VALUE CALCULATION**		REV : DATE :
EXTERNAL WALL					
LAYER NO	LAYER DESCRIPTION	THICKNESS(mm)	DENSITY(kg/m^3)	R VALUE(m^2 C / W)	WEIGHT(kg/m^2)
	TOTAL				
OUTSIDE COLOR (LIGHT/MEDIUM/DARK)			**OVERALL U VALUE (W/m^{2}C)**		
	MAXIMUM U VALUE(W/m2 C)MENTIONED IN KM REGULATION FOR ELEC & A/C SECTION 5.2			**0.568**	
ROOF					
LAYER NO	LAYER DESCRIPTION	THICKNESS(mm)	DENSITY(kg/m^3)	R VALUE(m^2 C / W)	WEIGHT(kg/m^2)
	TOTAL				
OUTSIDE COLOR (LIGHT/MEDIUM/DARK)			**OVERALL U VALUE (W/m^2 C)**		
	MAXIMUM U VALUE(W/m2 K)MENTIONED IN KM REGULATION FOR ELEC & A/C SECTION 5.2			**0.437**	

WINDOW SCHEDULE

PROJECT NAME	
LOCATION/AREA	
PIN NUMBER	
CONSULTANT NAME	
CONSULTANT CONTACT PHONE	
OWNER NAME :	
BUILDING TYPE	A. RESIDENTIAL o B.COMMERCIAL o C.INDUSTRIAL o
PROJECT DESCRIPTION :	

WINDOW REQUIREMENT

TOTAL GLASS OPENING AREA (m^2) **TOTAL EXTERIOR WALL AREA(m^2)** **WINDOW WALL RATIO (WWR) %**

	U Value (W/m^2 °C)	SHGC
WWR - 5 - 40 %	3.30	0.30
WWR >40 %	2.10	0.25
SHOWROOM	2.10	0.30

WINDOW SCHEDULE

WINDOW REFERENCE NUMBER	GLASS LAYERS	U VALUE	S C	COLOR	MODEL/BRAND	TYPE	REMARKS

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Appendix No. 02: AIR CONDITIONING EQUIPMENT COMPLIANCE FORMS

HVAC REQUIREMENTS

PROJECT NAME	
LOCATION/AREA PIN	
NUMBER CONSULTANT	
NAME	
CONSULTANT DETAILS	
OWNER NAME :	
BUILDING TYPE	A. RESIDENTIAL o B.COMMERCIAL o C.INDUSTRIAL o
PROJECT DESCRIPTION : Brief description about mechanical system type, features and energy conservation measures.	
EQUIPMENT SCHEDULE	

WINDOW/SPLIT AIR CONDITIONER SCHEDULE.

Equipment Tag No	Equipment Type	Selection @ outdoor temperature 35 °C				Selection @ outdoor temperature 46 °C				Manufacturer and Model No
		Cooling Capacity (Btu /H)	Power input (Watts)	E E R (Btu/h /W)	Min E E R required as per KM Regulation section 6.2	Cooling Capacity (Btu /H)	Power input (Watts)	E E R (Btu/h /W)	Min E E R required as per KM Regulation section 6.2	
	Window	18000 > CC			9.8				7.06	
		18000≤CC<24000			9.7				6.98	
		CC≥24000			8.5				6.12	
	Split	All			11.5				8.28	

HVAC REQUIREMENTS

PROJECT NAME	
LOCATION/AREA PIN	
NUMBER CONSULTANT	
NAME	
CONSULTANT DETAILS	
OWNER NAME :	
BUILDING TYPE	A. RESIDENTIAL o B.COMMERCIAL o C.INDUSTRIAL o
PROJECT DESCRIPTION : Brief description about mechanical system type, features and energy conservation measures.	
EQUIPMENT SCHEDULE	

PACKAGE AIR CONDITIONER SCHEDULE.

Equipment Tag No	Equipment Type	Rated Cooling Capacity (Btu /H)	Power input (Watts)	E E R (Btu/W h)	Minimum E E R required as per KM Regulation section 6.2Table 6.2	Test standard	Manufacturer and Model No

HVAC REQUIREMENTS

PROJECT NAME	
LOCATION/AREA PIN	
NUMBER CONSULTANT	
NAME	
CONSULTANT DETAILS	
OWNER NAME :	
BUILDING TYPE	A. RESIDENTIAL o B.COMMERCIAL o C.INDUSTRIAL o
PROJECT DESCRIPTION : Brief description about mechanical system type, features and energy conservation measures.	
EQUIPMENT SCHEDULE	

AIR COOLED CHILLER SCHEDULE.

Ref No	Model Number	Condenser Entering Air temperature °C	Entering Chilled water temperature °C	Leaving Chilled water temperature °C	Rated Equipment Capacity (ton)	Power Input (kW)	COP	IPLV	Minimum efficiency (KM Regulation section 6.2 Table 6.3)		Test Standard
									COP	IPLV	

HVAC REQUIREMENTS

PROJECT NAME	
LOCATION/AREA PIN	
NUMBER CONSULTANT	
NAME	
CONSULTANT DETAILS	
OWNER NAME :	
BUILDING TYPE	A. RESIDENTIAL o B.COMMERCIAL o C.INDUSTRIAL o
PROJECT DESCRIPTION : Brief description about mechanical system type, features and energy conservation measures.	

EQUIPMENT SCHEDULE

WATER COOLED CHILLER SCHEDULE.

Ref No	Model Number	Condenser Entering Water temperature (°C)	Condenser Water Flow rate (L/s per Kw)	Entering Chilled water temperature (°C)	Leaving Chilled water temperature (°C)	Equipment Capacity (ton)	Power Input (kW)	COP	IPLV	Minimum efficiency (KM Regulation section 6.2 Table 6.3)		Test Standard
										COP	IPLV	

Water Conservation Regulations

1.1 Water Conservation:

Considerable amount of energy is consumed to deliver and treat the water we are using every day. By reducing the water use by efficient means will reduce the water consumption and the energy required in distribution network and treatment plants. In designing plumbing systems, utilize new techniques and options that can lead to maximum water efficiency and water savings. The plumbing system for new and addition to existing buildings by all consultants, customers and developers shall comply with the requirements of section 1.1 A & B of this chapter.

Water pipe layout design to avoid using 90degree bends in water piping system, and radial bends shall be adopted in order to reduce pressure loss which in turn leads to Energy loss.

1.2 A) Maximum allowable flow rates for plumbing fixtures:

1. Water Closets:

   The flush rates of single flush Water Closets either flush tank, flushometer tank or flushometer valve operated shall not exceed 4.9 L/flush (or 1.28 gpf). In case of dual flush toilets, the flush rate shall not exceed 6 L/flush (or 1.6 gpf) for full flush and 4.2 L/flush (or 1.1 gpf) for reduced flush.

   Control valve shall be installed on the inlet line to the flush tank/flush valve in order to shutoff them in case of leakage.

   Water Closets shall conform to the applicable requirements of Section 425, International Plumbing Code 2021. The conformity shall be verified by laboratories accredited by International Institutions.

2. Urinals:

   The flush rates for all type of Urinals shall not exceed 1.9 L/flush (or 0.5 gpf). The urinal system shall be flushed only after usage.

   Urinals shall conform to the applicable requirements of Section 424, International Plumbing Code 2021. The conformity shall be verified by laboratories accredited by International Institutions.

3. Faucets:

The flow rates of faucets shall not exceed the flow rates stipulated in Table 1.1

Table 1.1 Maximum allowable flow rate for faucets

#	Plumbing Fixtures/Fixture fittings	Maximum allowable flow rate
1	Lavatory Faucet – Residential Occupancy (Residential, Hotel-Guest rooms only, Hospital-patient rooms only)	5.7 L/min (or 1.5 gpm) at an operating pressure of 4 bar (60 PSI)
2	Lavatory Faucet – Nonresidential occupancy	3.8 l/min (or 1 gpm) at an operating pressure of 4 bar (60 PSI)
3	Kitchen Sinks	8.3 L/min (or 2.2 gpm) at an operating pressure of 4 bar (60 PSI)

Exclusion: Bathtub taps or any other taps where a pre-quantified amount of water need to be filled are excluded from requirements of Table 1.1

Lavatories & Sinks shall conform to the applicable requirements of Section 419 and Section 422, International Plumbing Code 2021. The conformity shall be verified by laboratories accredited by International Institutions.

4. Showers:

The flow rate of shower head or handheld showers shall not exceed 9.5 L/min (or 2.5 gpm) at an operating pressure of 5.5 bar (80 psi).

Showers shall conform to the applicable requirements of Section 421, International Plumbing Code 2021. The conformity shall be verified by laboratories accredited by International Institutions.

1.1 B) Irrigation:

1. Type of Irrigation System

- Consumers with irrigation water requirement exceeding 1 m^3 per day and/or the irrigated area is greater than or equal to 100 m^2 shall comply with the following requirements:
- Flood irrigation is not allowed. Projects shall use irrigation systems such as drip irrigation or sprinkler systems or bubblers along with timers or weather-based controllers.

2. Separate irrigation tanks to be used.

- Restricted potable Water Usage for Irrigation
- Consumers shall not use potable water if the irrigation water requirements exceed 85 m^3 per day and/or the irrigated area is greater than or equal to 7000 m^2

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- Consumers shall use Treated Water and/or Treated Grey water and/or condensate recovery or any other non-potable water resources to meet the requirements. Treated water used for irrigation should meet applicable health and safety standards of the state of Qatar prescribed by competent authority.

3. Metering of water use for irrigation

Consumers with irrigation water demand of more than 25 m^3 per day

- Shall submit irrigation plan detailing species type and irrigation system.
- Provide a separate meter for Irrigation water consumption.
- Track the consumption on monthly basis.
- Submit water consumption data to **KAHRAMAA** when requested.

1.1 C) Water Conservation plumbing guidelines

In addition to plumbing practices stipulated in other sections of this regulation the following practices are recommended.

- Water tanks exposed to direct sun shall be insulated or shaded to reduce the heat gain.
- Water supply pipes exposed to direct sun shall be insulated.
- Minimize the length of pipes from water heaters to tap/faucets and showers in order to reduce the heat loss from the pipes.

01.1 D) Non-Conventional Energy for Plumbing applications:

Non-conventional energy sources for plumbing applications like solar water heater are encouraged.

The best practices stipulated in this section are demonstrated in the drawing CN-CNC-WA 01.