حكومة دبي
GOVERNMENT OF DUBAI

هيئة كهرباء و مياه دبي
Dubai electricity & Water Authority

بلدية دبي
DUBAI MUNICIPALITY

Green Building
Regulations & Specifications

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Green Building Regulations & Specifications

Content

In implementation of the decision of the UAE Vice President, Prime Minister and Ruler of Dubai His Highness Sheikh Mohammed bin Rashid Al Maktoum, and in line with the Dubai Strategic Plan 2015, and the directives for applying green building specifications on all buildings in the Emirate of Dubai as per the best environment-friendly international standards adapted to local conditions of the Emirate of Dubai to keep Dubai a healthy city that follows the highest standards of sustainable development and has clean pollution-free environment, the following regulations and green building specifications shall be applied on all buildings in the Emirate of Dubai.

100

Section One

Administration

101	Chapter 1: General

101.01 Title

a) These regulations shall be known and cited as Green Building Regulations and Specifications in the Emirate of Dubai.

b) Within this document, they are also referred to as "the regulations."

101.02 Purpose

a) The purpose of the regulations is to improve the performance of buildings in Dubai by reducing the consumption of energy, water and materials, improving public health, safety and general welfare and by enhancing the planning, design, construction and operation of buildings to create an excellent city that provides the essence of success and comfort of living.

b) The regulations intend to support Dubai's Strategic Plan, create a more sustainable urban environment and extend the ability of the Emirate's infrastructure to meet the needs of future development.

c) Green building is the practice of creating structures and using processes that increase the efficiency of resource use -energy, water, and materials- while reducing building impacts on human health and the environment during the building's lifecycle, through better siting, design, construction, operation, maintenance, and removal.

101.03 Revocation of existing legislation

These regulations are additional to the Dubai Municipality Regulations specially The Administrative Resolution No. 125 of the year 2001 Approving Building Regulations and Specifications. Any article or regulation in the following Administrative Resolutions and Circulars conflicts with this regulations are hereby revoked:

a) The Administrative Resolution No. 66 of the year 2003 Approving Regulations on the Technical Specifications for Thermal Insulation Systems.

b) Circular No 161 of the year 2003 issued on Implementing Green Building Regulations in the Emirate of Dubai.

c) Circular No 171 and circular No 174 of the year 2007 issued on Implementing Building Green Roofs and facades.

d) The Administrative Resolution No. 30 of the year 2007 issued on Promulgating the Implementing Regulations of the Local Order No 11 of the year 2003 On Public Health and Safety in the Emirate of Dubai.

101.04 Jurisdiction of Implementation

These regulations applied to all buildings in the Emirate of Dubai including Free Zones.

101.05

Building Typologies to which Green Building Regulations are applied

a) **Villa**: There are three types of villas:

1. Investment villas
2. Private villa
3. Arabic House

For the purposes of the Green Building Regulations, Private, Investment Villas and Arabic house as defined by DM, are grouped together as "villas."

b) Residential/Commercial: This building typology includes:

Building Typologies	
Residential	Commercial
• Apartments	• Hotels, Motels and furnished Apartments
• Labour Accommodation	• Laboratories
• Student Accommodation	• Offices
	• Resorts
	• Restaurants / Food Outlets

c) Public Building: This building typology includes:

Building Typologies	
Public Buildings	
• Banks	• Museums
• Cinema/ Theatres	• Petrol Stations
• Educational Facilities	• Post Offices
• Government buildings	• Retail Outlets
• Health Care Facilities	• Shopping Malls
• Historical/Heritage Buildings	• Masjid and Worship Houses

Cont. 101.05

d) Industrial Building: This building typology includes:

Building Typologies		
Industrial		
• Factories	• Warehouses	• Workshops

101.06

Applicability

a) The regulations apply to:
   1. All new buildings;
   2. Additions, extensions, and refurbishment of existing buildings which require a building permit from Dubai Municipality; and
   3. Existing buildings, when specified.

b) Mixed Use Buildings - When a building combines more than one use, each portion of the building must comply with the relevant regulations for that particular typology.

c) Refer to the regulations on the applicability of specific regulations to specific building typologies.

d) Change of Use – When there is a change of use for a building (for example, the change in use from a residential villa to a school); these regulations apply for the new use.

101.07

Temporary Buildings

These regulations do not apply to temporary buildings which will be removed within two years of construction.

101.08

Exemptions: Special Projects and Special Applications

Large scale projects or of a specialised nature that some articles of the Green Buildings Regulations cannot be easily applied to them are considered special projects and exempted from these articles. Examples of such projects are: extremely tall buildings, large shopping malls, hospitals and laboratories. In order to preserve the character of these buildings, it may not be possible to meet some of the requirements of the Green Buildings Regulations. For such projects, it will be possible to apply to Dubai Municipality for dispensation from specific articles of these regulations, if it can be demonstrated that compliance cannot be achieved. Dubai Municipality reserves the right to request any other reasonable measures to be taken in pursuit of the goals of the regulations.

101.09

Exemptions: Heritage Buildings

Heritage Buildings identified by Dubai Municipality that may not be possible to meet some of the requirements of the Green Buildings Regulations are exempted from these articles in order to preserve the character of these buildings. For such projects, it will be possible to apply to Dubai Municipality for dispensation from specific articles of these regulations, if it can be demonstrated that compliance cannot be achieved. Dubai Municipality reserves the right to request any other reasonable measures to be taken in pursuit of the goals of the regulations.

101.10

Additions, Extensions, or Refurbishment Details

a) Relative to 101.6, new additions, extensions or refurbishments which require a building permit must meet the requirements of the regulations.

b) Existing portions of the building which are not part of the new work will not be required to be upgraded to meet the regulations. Existing parts of a building will require upgrading if after the addition, extension or refurbishment, the existing building performs in a less energy efficient manner than previously because of the addition or extension. Any upgrading required must bring the building back to at least its minimum level of previous energy performance before the addition or extension.

101.11

Effective Dates

These Regulations will be issued by an Administrative Resolution which will determine the effective date for implementation.

101.12

Practice Guides

a) The regulations are supported by a practice guide titled "Green Building Practice Guide."

b) The practice guide has been developed to provide some understanding of the reason for the regulations, their benefit and some guidance towards compliance.

c) The practice guide is not intended to provide detailed design information or to be a substitute for the experience and expertise of building designers and contractors.

101.13

Structure of the Regulations

The following categories will be used throughout the regulations:

1. Section One, 100: Administration
2. Section Two, 200: Definitions
3. Section Three, 300: Ecology & Planning
4. Section Four, 400: Building Vitality
5. Section Five, 500: Resource Effectiveness - Energy
6. Section Six, 600: Resource Effectiveness - Water
7. Section Seven, 700: Resource Effectiveness - Materials & Waste

101.14

Referenced Codes and Standards

The codes and standards referenced in these regulations shall be considered part of the requirements of these regulations to the prescribed extent of each such reference.

101.15

Specific Provision

Where a specific provision differs from a general provision, the specific provision shall apply.

101.16

Conflicts

a) When the requirements of the regulations conflict with any other requirement of Dubai Municipality or other Authority in Dubai, the most restrictive requirement shall prevail.

b) When the requirements of the regulations differ from the requirements of standard reference documents, the requirements of the regulations shall prevail.

c) When the requirements of the regulations differ from the requirements of Dubai Civil Defence, the requirements of Dubai Civil Defence will prevail.

101.17 Alternative Materials, Designs and Methods of Construction and Equipment

The provisions of these regulations actively encourage innovation and are not intended to prevent the use of any suitable alternate material, appliance, installation, device, arrangement, design, or method of construction that is not specifically prescribed by the regulations. However, approval of the alternatives will be required by Dubai Municipality.

101.18 Use of these Regulations

The following steps explain how to use these regulations:

1. Establish the building type and applicability as described in 101.05 and 101.06;
2. Review the applicable regulations for that building type provided in Section Three (300) through Section Seven (700) of the regulations; and
3. The practice guide can be used for further information on implementation and compliance as required.

101.19 Voluntary Green Building Rating Systems

a) The Dubai Green Building Regulations are not designed as a rating system. The regulations may have similar topics and/or focus as some of the worldwide voluntary rating systems, as they all address the need for more sustainable buildings.

b) Compliance with the regulations is not intended as a substitute for any measure or credit with any of the rating systems.

102.01

Competent Authority

a) The Competent Authority for the Green Building Regulations is Dubai Municipality.

b) Dubai Municipality may choose to devolve this power to any other organisation in Dubai including Free Zone regulators and other third parties.

102.02

Energy Compliance Method

There are two compliance routes for energy performance in buildings. The standard method is referred to as the Elemental Method; the alternative method is referred to as the Performance Method.

a) Elemental Method: All buildings must comply with each of these regulations.

b) Performance Method: Alternatively, a calculation method may be employed for a building which may not comply with all the elemental requirements of those Articles listed in Table 102.2 (1).

The Performance Method, using a calculation tool such as dynamic thermal modelling, must compare the annual energy consumption of the proposed building with that of a reference building which meets all the elemental requirements listed in Table 102.2 (1). The reference building must be equal in shape, size and operational patterns to the proposed building.

Compliance with the Green Building regulations will be demonstrated if the annual energy consumption of the proposed building is equal to or lower than the annual energy consumption of the reference building.

Table 102.02 (1)

Green Buildings Regulations for Elemental Method of Energy Compliance	
304.04	Orientation of Glazed Facades
501.01	Minimum Envelope Performance Requirements
502.01	Energy Efficiency– HVAC Equipment and Systems
502.04	Lighting Power Density - Interior

102.03

Water Compliance Method

There are two compliance routes for water performance in buildings. The standard method is referred to as the Elemental Method; the alternative method is referred to as the Performance Method.

a) **Elemental Method**: All buildings must comply with each of these regulations.

b) **Performance Method**: Alternatively, a calculation method may be employed for a building which may not comply with the elemental requirements for water efficient fixtures detailed in Article 601.01.

The Performance Method, using a calculation tool, must compare the annual water consumption of the proposed building with that of a reference building which meets all the elemental requirements detailed in Article 601.01. The reference building must be equal in shape, size and operational patterns to the proposed building.

Compliance with the Green Building regulations will be demonstrated if the annual water consumption of the proposed building is equal to or lower than the annual water consumption of reference building.

102.04

Drawings, Plans and Calculation Documents

a) Construction documents shall be of sufficient clarity to indicate the location, nature and scope of the proposed Green Building feature and show that it will conform to the provisions of these regulations and other relevant laws, ordinances, rules and regulations, as determined by the Competent Authority.

b) The legibility and clarity of information is the responsibility of the applicant

c) Submissions will be made as per the Dubai Municipality approved template, available online in the website of the competent authority.

d) Submissions should include a signed and stamped Green Building Declaration.

102.05

Green Building Declaration

a) Each building permit application must have a completed the Green Building Declaration appended to it. This must be submitted at document submission stage.

b) The Green Building Declaration is an unconditional commitment from the development team to meet the requirements of the Green Building Regulations.

c) Each applicable regulation must be acknowledged with a tick in the appropriate column in the Declaration, stamped and signed by the consultant.

102.06

Verification of Implementing Green Building Regulation

a) Evidence of compliance for all applicable Green Building measures shall be provided to the Competent Authority. Specific requirements for information that demonstrates compliance are included within the practice guide and the associated implementation flow chart.

b) Alternative methods of documentation shall be acceptable (with appropriate discretion) when the Competent Authority finds that the proposed alternate documentation is satisfactory to demonstrate substantial conformance with the intent of the proposed Green Building measure.

200

Section Two

Definitions

Certain terms used in the Dubai Green Building Regulations are defined in this section. Terms that are not defined shall have their ordinary accepted meaning within the context in which they are used.

Acoustical control	Controlling noise sources, transmission path, and/or receiver in order to reach an acceptable noise environment for a particular space.
Addition	An extension or increase in floor area or height of a building outside of the existing building envelope (walls and roofs).
Adequate	Sufficient to satisfy a specific requirement or meet a specific need.
Adhesive	Material used to bond one surface to another by attachment.
Air break	A piping arrangement where a drain from an appliance or fixture discharges into an airspace and then into another fixture, receptacle, or interceptor; used to prevent back siphonage or backflow.
Air contaminants	Unwanted airborne constituent that may reduce acceptability or adequacy of the air quality
Air leakage	Air that escapes from a building through a joint, coupling, junction, or the surfaces which enclose the building. The flow of uncontrolled air within a building through cracks or openings.
Air tightness (of a building)	The property of an enclosure or barrier that precludes the passage of air.
Air volume	The amount (volume) of air delivered to a space through ventilation, typically specified in litres per second or cubic metres per minute.

Air, ventilation	The share of supply air that is outdoor air, plus any recirculated air that has been filtered or otherwise treated to maintain acceptable indoor air quality.
Airborne sound insulation	Insulation against noise originating in air, such as voices, music, motor traffic and wind.
Architecture Accent Lighting	Lighting that highlights an area or object of a building to emphasise that area or object.
Asbestos	A group of impure magnesium silicate minerals which occur in fibrous form. Asbestos has been used in a variety of building construction materials for insulation and as a fire-retardant. However, long-term exposure or big amounts of asbestos can have severe health impacts, such as chest and abdominal cancers and lung diseases. Therefore the use of asbestos products has been restricted in many countries.
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers.
Balancing (air system)	To ensure that correct volumes of air are supplied by adjusting airflow rates through air distribution system devices (such as fans and diffusers) by manually adjusting the position of dampers, splitter vanes, extractors, etc. or by using automatic control devices, such as constant air volume or variable air volume boxes.
Brightness contrast ratio	The ratio of illuminance between the highest and lowest illuminance value in a room.

Building commissioning	The process of ensuring that all building systems are designed, installed, tested, and operated in conformity with design intent.
Building completion certificate	Certificate issued by Dubai Municipality, as soon as the entire construction work has been carried out, inspected and approved by Dubai Municipality.
Building envelope	The exterior elements of a building which form a barrier between the internal and exterior spaces. For an air conditioned building, the building envelope is defined as the elements of a building that separate conditioned spaces from the exterior.
Building fabric	Refers to the ceiling, walls, windows, floors and doors of a building, which play a major role in the energy efficiency of a structure.
Building Management System (BMS)	A computer-based control system installed in buildings that controls and monitors the building's mechanical and electrical equipment, such as ventilation, lighting, power systems, fire systems, and security systems.
Building metering	The use of meters to track the use of utilities (such as water and electricity) per building unit.
Building occupants (also building users)	Persons using the building. Full-time occupants use the building for at least 8 hours most days. Part-time occupants use the building for less than 8 hours most days. Transient occupants, such as visitors, customers, students, use the building at irregular times.
Building operator	The person who has full operational control of the place (the land or building or any part thereof), whether owner or tenant or holder or any other capacity by which he is authorized to occupy the place

Building owner	The person or institution (government or private) that owns the building and/or the land on which the building work (construction, refurbishing, demolition, or removal of a building) is to be performed or their representative.
Building permit	Permit issued by the Dubai Municipality.
Building services	All necessary services required to operate the building such as plumbing, mechanical, electrical and others
Built Up Area (Total Floor Area)	The grand total of the covered area in a building or structure measured between the outer sides of the building borders, including terraces, balconies, protrusions and any other covered parts like car parking circulation passages, air wells, unloading bays, service floors, swimming pools and any other structure on the plot.
Carpet	A fixed floor covering of natural or synthetic material that is woven onto a batting. This excludes rugs and other non-permanent woven coverings
Carpool vehicles	Shared vehicle used especially for commuting to work and often by people who each have a car but travel together to save cost, to reduce driving stress and to promote other socio-environmental benefits. Vehicles must be registered with the Dubai Road and Transport Authority (RTA).
Central Business District (CBD)	The old area of Dubai defined in Building Specifications and Regulations.

Central Control and Monitoring System (CCMS)	A computer-based control system that controls and monitors the mechanical and electrical equipment, such as ventilation, lighting, power systems, fire systems, and security systems in a building or controlling and monitoring a number of buildings.
Central plant	The main equipment within a building or series of buildings which provides cooling, ventilation, heating, water, and other services to the whole building or buildings. The central plant is typically in a central location.
Certified timber	Timber certification is a process that results in a certificate (written statement) attesting to the origin of wood raw material and its status and/or qualifications, often following validation by an independent third party. Certification is intended to allow participants to measure their forest management practices against standards and to demonstrate compliance with those standards. Timber certification generally includes two main components: certification of sustainability of forest management (which occurs in the country of origin) and product certification (which covers the supply chain of domestic and export markets).
Clorofluorocarbons (CFCs)	CFCs are odourless, colourless, non-flammable non-toxic chemicals. They vaporise easily at low temperatures making them ideal coolants in refrigerators and air conditioners. CFCs are also used in foam for seat padding and insulation. Until recently, they were used extensively in aerosol spray cans. CFCs cause stratospheric ozone depletion.
Composite wood products	Products such as plywood, panel substrates, door cores, particle board, and medium density fibreboard.

Condensation	The process through which a gas or vapour changes to liquid form. Also defined as the water which is produced in this process.
Construction activity	Includes all activities that are part of new construction, alteration, repair, maintenance, refurbishing, and any other physical changes to a building.
Construction and demolition waste	Waste generated from construction, renovation, and demolition or deconstruction of structures. Land clearing debris including soil, vegetation and rocks are typically not considered construction and demolition waste.
Contractor	Natural or considerable person registered and licensed to practise contracting profession in the Emirate of Dubai.
Control systems	Controls that allow users to change/adjust the level of lighting and air conditioning in a space.
Control zone (HVAC)	A space or group of spaces with heating or cooling requirements that is sufficiently similar so that desired conditions (e.g. temperature) can be maintained throughout by using a single controller. The zone may be part of a larger space, an individual office or a small dwelling.
Cooling coil	A coiled arrangement of tubing or pipe for the transfer of heat between a cold fluid and air.
Cooling load	The amount of cooling that a building will require to meet the conditions specified by Dubai Municipality. The cooling load will be determined by the output of the Heat Load Calculation required by Dubai Municipality.

Cooling tower	Heat removal devices used to transfer process waste heat to the atmosphere. Cooling towers may either use the evaporation of water or rely solely on air to cool the working fluid. Common applications include removing heat from the water used to cool refrigeration chillers.
Corrective maintenance	Maintenance service or procedures intended to fix equipment failure or damage. This service is carried out in response to a fault and not planned in advance.
Cycles of concentration	The level of solids in the re-circulating cooling tower water in comparison to the level of solids of the original raw make up water. If the circulating water has three times the solids concentration of the make up water, then the cycles of concentration are three (3).
Daylighting	The use of natural light from the sun or sky to provide illumination in interior spaces.
Demand Controlled Ventilation (DCV)	A ventilation system that provides for the automatic reduction of outdoor air intake below design rates, when the actual occupancy of spaces served by the system is less than design occupancy. Demand is often assessed by using the measure of the amount of carbon dioxide (CO_2) in a space to reflect occupancy levels.
Designated preferred parking spaces	Parking spaces that are closest to the main entrance of a building exclusive of spaces designated for disabled parking. Alternatively, these can be parking spaces closest to the pedestrian exit leading from the parking area.

District cooling	A district cooling system distributes thermal energy, in the form of chilled water or other media, from a central source to multiple buildings or facilities through a network of underground pipes for use in space and process cooling. The cooling (or heat rejection) is usually provided from a central, dedicated cooling plant, which eliminates the need for separate systems in individual buildings. A district cooling system consists of three primary components: the central plant (which may include the cooling equipment, power generation and thermal storage), the distribution network, and the consumer system (typically comprising of air handling units and chilled water piping in the building).
Diversity factor	Relates to the thermal characteristics of the building envelope, temperature swings and occupancy load.
Drip water delivery system (drip irrigation)	A high-efficiency irrigation method where water is delivered at low pressure through buried pipes and sub-pipes, which in turn distribute water to the soil from a network of perforated tubes or emitters.
Dual plumbed	A building or structure with two sets of pipes: one for drinking water and one for recycled or greywater.
Ductwork	Air-tight devices that carry conditioned air throughout the building. This includes terminal fixtures to distribute air.
Ductwork leakage	The outcome of air conditioning ductwork that is leaking, and therefore lets air out through cracks and gaps. Ductwork leakage will result in an increase in energy consumption of supply and return air fans.
Electrical system	Permanently installed wiring, switchgear, distribution boards, transformers, controls and other devices used in distributing electricity into and through a building.

Electrical sub-metering	The installation of separate meters to allow the measurement of electricity used in specific areas or individual items of equipment.
Electronic ballast	A piece of equipment required to control the starting and operating voltages of fluorescent lights. Electronic lighting ballasts use solid state circuitry and can greatly reduce or eliminate any flicker in the lamps.
Enabled access	Project design that incorporates accessibility for disabled people to and within a building.
Environmental tobacco smoke (ETS) (second hand smoke)	Airborne particles emitted from the burning of cigarettes, pipes, cigars, or shishas and from smoker's exhaled air.
Entrance lobby	Space immediately between the entrance-door and the interior of a building which acts as a transition area into the building.
Equivalent	Measure, standard, or reference material that has been deemed to be equal or better by Dubai Municipality.
Exhaust air	Air removed from a building space and discharged to the outside of the building through a mechanical or natural ventilation system.
Facilities operator	Party responsible for the maintenance and operation of a building or facility.
Fan systems	A system of fans used to supply or exhaust air from a building space.

Fenestration	Another name for 'glazed elements'.
Fresh air	Outside air supplied to a building space through mechanical or natural ventilation to replace air in the building that has been exhausted.
Glazed Elements	All areas in the building envelope that let in light, including windows, plastic panels, clerestories, skylights, doors that are more than one half glass, and glass block walls.
Glazing area	The area of glazed elements in the exterior walls of a building.
Global Warming Potential (GWP)	Expresses contribution of greenhouse gases released to the atmosphere in the global warming phenomenon.
Green roofs	See vegetated roofs.
Greywater (grey water, graywater)	Untreated household wastewater which has not come into contact with toilet waste. Greywater includes used water from showers, wash basins, bathtubs, laundry sinks and clothes washers.
Halons	Substances used in fire suppression systems and fire extinguishers. These substances deplete the stratospheric ozone layer.

Hardscape	The area of a project site, excluding buildings, made with hard materials, including roads, car parks, patios, courtyards and walkways.
Hazardous fumes or chemicals	Fumes/gases or chemicals that can adversely impact human health when inhaled or when they come into contact with a person's skin; also includes fumes/gases and chemicals that can create a hazardous condition (such as explosive or flammable substances).
Hazardous waste	Any waste material that can cause substantial harm to humans, properties or to the environment due to its inherent hazardous characteristics. Hazardous waste takes the form of solid, liquid, sludge, gas or any combination thereof.
Heat Island Effect (HIE)	Heat Island Effect occurs when warmer temperatures are experienced in urban/developed areas compared to adjacent undeveloped areas due to solar energy retention on constructed surfaces. Some of the surfaces that contribute to the Heat Island Effect are paved streets, sidewalks, parking lots and buildings.
Heat load calculation	Calculations which must be submitted to Dubai Municipality for approval. These calculations must be based on the design of the building to be constructed and follow the form and use the parameters required by Dubai Municipality.
Heat load calculation parameters	The design parameters used in Heat Load calculation according to Dubai Municipality requirements.
Heating, ventilation, and air conditioning (HVAC) system	The equipment, distribution systems, and terminals that provide either individually or collectively, the processes of heating, ventilating, or air conditioning to a building or a portion of a building.

Heat Rejection Equipment	Equipment which is used to disperse the heat produced in the air conditioning process. Heat rejection equipment, such as cooling towers, may be located outside of the building envelope; however it may also be a component of the air conditioning equipment, such as with window or split systems.
Heavy metals	Heavy metals include: cadmium, chromium, mercury, and arsenic.
Heritage building	A building having historical architectural elements, situated inside a Dubai historical area. No demolition or variation works shall be carried out on a Heritage building except after obtaining approval from the Competent Authority.
Hydraulic elevator	An elevator operated using liquid pressure.
Hydroclorofluoro-carbons (HCFC)	Refrigerants used in building equipment that deplete the stratospheric ozone layer, but to a lesser extent than CFCs.
Hydrofluorocarbons (HFCs)	Refrigerants that do not deplete the stratospheric ozone layer. However, some HFCs have a high Global Warming Potential.
Industrial building	An industrial building is any building directly used in manufacturing, processing, technically productive enterprises or storage. This includes workshops, factories and warehouses.
Land clearing debris	Solid waste generated solely from land-clearing activities, including brush, stumps, soil material and rocks.

Land disturbance	Any project that changes the physical conditions of land form, vegetation and hydrology, creates bare soil, or otherwise may cause erosion or sedimentation. The activities include, but are not limited to, clearing of land, removal of vegetation, stripping, grading, excavating, filling and storing of materials.
Legionella bacteria	Legionella bacteria are the causative agent of Legionnaires' disease and its lesser form, Pontiac fever. The bacteria grow in water between 20 and 45 degrees Celsius and can be spread by water droplets.
Light fixture	The component of a luminaire that houses the lamp(s), positions the lamp, shields it from view, and distributes the light. The fixture also provides for connection to the power supply, which may require the use of ballast.
Lighting Power Density (LPD)	The maximum lighting power per unit area.
Light Reflective Value (LRV)	A measure of the total quantity of useable and visible light reflected by a surface in all directions on a scale from 0% to 100%. Zero percent is assumed to be an absolute black and 100% represents an assumed perfectly reflective white. The blackest achievable wall finish has a LRV of approximately 5% and the whitest available finish approximately 85%.
Light Transmittance	The percentage of incident light that passes through the glazing elements. When this percentage increases the day light amount into the building will increase.
Line of sight	An imaginary line from the eye to a perceived object or view.

Local Species	Local plants and adapted plants to the local environment.
Low emitting and fuel efficient vehicle	A vehicle approved by Dubai Road Transport Authority (RTA) as being low emitting or fuel efficient.
Lux	The international system unit of illumination, equal to one lumen per square metre.
Mechanical system	Those systems within a building which include components of mechanical plant or machinery. These systems include, but are not limited to, the HVAC system of a building.
Mechanical ventilation (active ventilation)	Ventilation provided by mechanically powered equipment, such as fans.
Minimum Efficiency Reporting Value (MERV)	Air Filter Minimum Efficiency Reporting Value (MERV) is an expression of the filtering efficiency of an air filter that has been evaluated using the ASHRAE Standard 52.2 Test Procedure. An air filter's performance is determined by comparing airborne particle counts upstream and downstream of the air filter (or other air cleaning device) under test conditions. A higher MERV rating equates to higher air filtration efficiency.
Mixed mode ventilation	A combination of mechanical and natural ventilation.

Monitoring equipment	Equipment used to measure and record status or conditions related to a building or to verify pre-set conditions and provide control or alarm functions if conditions vary.
Natural ventilation (passive ventilation)	Ventilation provided by thermal, wind or diffusion effects through windows, doors, or other openings in the building.
Negative pressure	Pressure less than that in adjoining spaces.
Occupancy sensor	A device that detects the presence or absence of people within an area and causes lighting, equipment, or appliances to be regulated accordingly.
Occupant Lighting Controls	A means of controlling the level of lighting which is easily accessible to a building occupant. Includes on/off switches.
Office	A building in which business, clerical, or professional activities are conducted.
Opaque	All areas of a building envelope which do not transmit light. Fenestration and building service openings, such as vents and grilles, are not opaque.
Open grid pavement	Pavement surfaces composed of structural units with void areas that are filled with pervious materials, such as sand or grass turf.
Outdoor environment	The environment outside of buildings, not enclosed by walls.
Ozone Depletion Potential (ODP)	Expresses contribution to the deterioration of the stratospheric ozone layer.

Parking area – Enclosed	Area of a building which is used for parking of motor vehicles but is not an open parking area. As it does not meet the criteria for open parking areas and is considered enclosed, mechanical ventilation is required to compensate for the lack of natural ventilation.
Parking area – Open	Area of a building which is used for parking of motor vehicles and which requires uniformly distributed openings on two or more sides for natural ventilation on every level of parking. The total area of openings to the atmosphere must be at least 20% of the total perimeter wall areas for each level of parking. Although openings on a third side are not required, openings on opposing sides are preferred for cross ventilation.
Parking ventilation	Ventilation which is required to maintain a satisfactory level of air quality within a vehicle parking facility.
Perimeter zone	The interior space adjacent to the perimeter walls of a building.
Plumbing system	Permanently installed piping, pumps, valves, tanks, taps, controls and other devices used in distributing water into, within and away from a building.
Positive pressure	Pressure greater than that in adjoining spaces.
Potable water	Water that is suitable for human consumption.
Pressure differential	The difference in pressure between two points of a system, or two different spaces of a building.
Preventative maintenance	Maintenance service or procedures intended to prevent or reduce equipment failure or damage.

Primer	Material applied to a surface to improve adhesion of a subsequently applied paint or adhesive.
Public building	A building which provides access to the general public. This building typology includes healthcare facilities, educational facilities, governmental buildings, worship houses, petrol stations, shopping malls, retail outlets, post offices, banks, museums, cinema/theatres, and historical/heritage buildings.
Radiant heat/temperature	Thermal radiation is the heat that radiates from a warm object. Radiant heat may be present if there are heat sources in an environment. Examples of radiant heat sources include: the sun, fire, ovens, driers, hot surfaces and machinery, etc.
Recycling	Processing used materials into new products in order to prevent the waste of potentially useful materials, reduce the consumption of fresh raw materials, reduce energy usage, reduce air pollution and water pollution by reducing the need for "conventional" waste disposal.
Reflectivity (solar reflectance)	Reflectivity measures how well a material bounces back solar radiation.
Refrigerants	Working fluids of refrigeration cycles, which absorb heat at low temperatures and reject heat at higher temperatures.
Refurbish (Retrofit)	The substantial alteration of a building or building services to replace or improve the quality of the building. This may occur when a new tenant occupies the building or part of the building.
Regional materials	Materials that were extracted, processed, and/or manufactured within the Gulf Cooperation Council (GCC) area. GCC member countries are: United Arab Emirates, the Kingdom of Bahrain, the Kingdom of Saudi Arabia, the Sultanate of Oman, Qatar, and Kuwait.

Regularly occupied areas (non-residential buildings)	Those areas within non-residential buildings where building users are seating or standing, as they work inside of a building or use the building space.
Relative humidity	Ratio of partial density of water vapour in the air to the saturation density of water vapour at the same temperature and the same total pressure.
Residential/ Commercial Building	This building typology includes: apartments, labour accommodations, student accommodations, offices, hotels, resorts, restaurants/ food outlets and laboratories.
Retail	Business dedicated to the sale of goods or commodities in small quantities directly to consumers.
Reuse	Any activity that lengthens the life of an item, typically consisting of returning the item to active use in the same or related capacity.
Safety factor	An allowance to cover any heating or cooling load greater than the design conditions.
Sealants	Material with adhesive properties that is used for the general purpose of filling, sealing, or waterproofing gaps or joints between two surfaces.
Secure bicycle racks or storage areas	Structures where individual bicycles can be locked and/or stored. Such structures should be inside or shaded if outdoors.
Service log book	A book where all maintenance works for a specific site or piece of equipment is recorded in detail (including dates and specific information regarding what service was performed and who carried out the work).

Shading Coefficient (SC)	A measure of the amount of heat passing through glazing compared with the heat passing through a single clear glass. It is the ratio of solar heat gain at normal incidence through glazing to that occurring through an approximately 3 millimetre (1/8th inch) thick clear, double-strength glass.
Showroom	Any space allocated for conducting a commercial business such as displaying commodities for purpose of wholesale or retail sale, and has a road front façade not less than nine (9) metres wide.
Solar Reflectance Index (SRI)	The SRI is an index that combines reflectivity and emissivity, measuring a material's ability to reject solar heat. SRI is defined so that a standard black (reflectance 0.05 and emittance 0.90) is 0 and a standard white (reflectance 0.80 and emittance 0.90) is 100. Materials with higher SRI absorb less heat and can reduce the heat island effect.
Substrate	The base material to which a process, such as painting, is applied to produce new films or layers of a different material.
Thermal bridges	Component, or assembly of components, in a building envelope, where the insulation is not continuous and through which heat is transferred at a substantially higher rate than through the surrounding envelope area; such as a metal fastener, concrete beam, slab or column.
Thermal comfort	A condition experienced by building occupants which is satisfied with the thermal environment.
Thermal insulation	Materials, or the methods and processes used to reduce heat transfer. Heat energy can be transferred by conduction, convection or radiation. The flow of heat can be delayed by addressing one or more of these mechanisms and is dependent on the physical properties of the material employed to do this.

Thermal transmittance	Also known as U-value is the rate of transfer of heat (in watts) through one square metre of a structure divided by the difference in temperature across the structure. It is expressed in watts per square metre per degree kelvin, or W/m^2K. Well-insulated parts of a building have a low thermal transmittance whereas poorly-insulated parts of a building have a high thermal transmittance.
Total planted area	The total external landscaped area of a building plot, including landscaped areas on roofs (vegetated roofs).
Total vehicle parking capacity	Total number of parking spaces within the site as specified by Dubai Municipality.
Totalising meter	Measures the flow and provides a total of the quantity which has passed through the meter. This is indicated in the form of a numeric readout.
Toxic waste	Waste containing poisonous substances. These substances may have acute effects (causing death or violent illness) or chronic effects (slowly causing irreparable harm) even in very small or trace amounts.
Treated sewage effluent (TSE)	The product of the process of removing physical, chemical and biological contaminants from wastewater. The process produces treated effluent suitable for reuse or discharge into the environment and solid waste (or sludge).
U-value	Refer to Thermal transmittance.
Urea formaldehyde	Combination of urea and formaldehyde, used in some glues. Formaldehyde is a naturally occurring VOC that is irritating to most people when found in high concentrations, and is also carcinogenic. Urea-formaldehyde may emit formaldehyde at room temperature.

Variable air volume system	An air handling system that conditions the air to a constant temperature and varies the outside airflow to ensure thermal comfort.
Vegetated roof (green roof)	A vegetated roof consists of vegetation and soil or a growing medium, planted over a waterproofing membrane on rooftops. Vegetated roofs may also include additional layers, such as a root barrier and drainage and irrigation systems. The use of vegetated roofs may have different purposes, from energy savings to stormwater management and aesthetics benefits.
Ventilation	The process of supplying air to or removing air from a space in order to control air contaminant levels, humidity, or temperature within the space.
Villa	Refer to Building Specifications and Regulations issued by Dubai Municipality
Volatile Organic Compound (VOC)	Organic chemicals that have a high vapour pressure and easily form vapours at normal temperature and pressure. The term is generally applied to organic solvents, certain paint additives, aerosol spray can propellants, fuels (such as gasoline, and kerosene), petroleum distillates, dry cleaning products and many other industrial and consumer products ranging from office supplies to building materials.
Wall Washing Light	Light fixture used for architectural or aesthetic purposes transmitting variable colour light or flash (with the possibility of modifying the speed of movement) and be programmed to operate automatically and can work to direct the light down for long distances and can be used inside or outside the building
Warehouse	A place in which goods or merchandise are stored; a storehouse.
Water feature	Features within a range of man-made fountains, ponds, cascades, waterfalls, and streams, not intended for human contact with the water. Therefore, for these regulations, the definition of water features excludes swimming pools and spas.

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Section Three

Econlogy And Planning

301 Chapter 1: Access and Mobility

301.01 Preferred Parking

For all new buildings, other than villas, which have more than 20 parking spaces, designated preferred parking must be provided for a combination of low-emitting, fuel-efficient and carpool vehicles for at least five percent (5%) of the total vehicle parking spaces required for the building by Dubai Municipality (DM) Building Regulations, Administrative Resolution No.125-2001. Preferred parking must be included in addition to any spaces designated for parking for people with special needs as required by DM Building Regulations.

301.02 Enabled Access

All new buildings, other than villas, must comply with Dubai Municipality Building Regulations, Administrative Resolution No.125-2001with regard to Special Needs users. They must be enabled in their access, internal movement and ability to engage with the building functions.

301.03 Bicycle Storage and Changing Rooms

For all new buildings, other than villas, secure and covered racks or storage areas for bicycles must be provided within the building or within a shaded area located no more than thirty (30) metres from a building entrance within the plot limit. Secure racks or storage areas must be provided for a number of bicycles equal to at least fifteen percent (15%) of the number of car parking spaces required for the building as per the Dubai Municipality (DM) Building Regulations, Administrative Resolution No.125-2001.

For Student accommodation and Labor accommodation, secure racks or storage areas must be provided for bicycles for at least 15% of building occupants with the same above conditions.

302 Chapter 2: Ecology and Landscaping

302.01 Local Species

For all new buildings, a minimum of twenty five percent (25%) of the total planted area of a building plot, including vegetated roofs, must utilise plant and tree species indigenous or adapted to Dubai's climate and region.

For all new villas at least one palm tree must be planted.

303 Chapter 3: Neighbourhood Pollution

303.01 Exterior Light Pollution and Controls

For all new buildings, permanently installed exterior lighting must comply with the following:

1. All exterior light fixtures on the building site, other than architectural accent lighting and Civil Aviation safety lighting, must be shielded so that all of the light emitted by the fixture, either directly or indirectly by reflection or refraction from any part of the fixture, is projected below the horizontal plane passing through the lowest part of the fixture;
2. Architectural accent lighting must be aimed or shielded to prevent the lighting of the night sky. Wall washing lights must spill no more than 10% of the lighting past the building façade;
3. Downward directed lighting must be used for lighting of signage; and
4. All exterior lighting must be fitted with automatic controls to ensure that lights do not operate during daylight hours.

304 Chapter 4: Microclimate and Outdoor Comfort

304.01 Urban Heat Island Effect

For all new buildings:

1. All opaque external roofing surfaces must comply with a minimum Roof Solar Reflective Index (SRI) value according to Table 304.01(1) for a minimum of seventy five percent (75%) of the roof area:

Table 304.01 (1) – Roof SRI Requirements

Type of Roof	Minimum Roof SRI
Steep Sloped Roofs (slopes steeper than 1:6)	≥ 29
Flat and Low Sloped Roofs	≥ 78

2. Individual heat rejection equipment, with a power rating greater than 4.0 kilowatt (kW), and which exhausts externally, must be installed not less than 3.0 meters above the ground level of the building.

304.02 Green Roofs

For all new buildings, the requirements of Part 1 of Regulation 304.1 are waived, if the roof of the building provided with vegetated roof (green roof) for at least thirty percent (30%) of the total roof area.

304.03 Light Colours on the Outside of Buildings

For all new buildings, at least seventy five percent (75%) of the area of externally painted walls must have a minimum Light Reflective Value of forty-five percent (45%).

304.04 Orientation of Glazed Façades

For new buildings, other than villas and industrial buildings, one of the following must be achieved:

1. At least fifty percent (50%) of the total glazed surface area of the building, (excluding glazed areas with back insulated panels), must have a north orientation which includes 150 degree angle started from east toward North West.
2. South and west glazed areas, excluding glazed areas with back insulated panels, must be treated environmentally.

304.05 Hardscape

For all new buildings, fifty percent (50%) of the hardscape of the development must:

1. Demonstrate a Solar Reflective Index (SRI) of at least twenty nine (29), or
2. Use an open grid pavement system, or
3. Be shaded by vegetation or
4. Be shaded by materials with an SRI equal to or greater than those specified in Table 304.01 (1), or
5. A combination of the above.

304.06 Shading of Public Access Areas

For all new buildings, other than villas, all pedestrian linkages within the plot area must be shaded using materials with a Solar Reflectance Index (SRI) equal to or greater than those specified in Table 304.01 (1).

305 Chapter 5: Responsible Construction

305.01 Impact of Construction, Demolition and Operational Activities

All new buildings must comply with all related regulations, local orders and their executive orders, technical guidelines and guides applied in the emirate and the following is required:

1. Neither the construction activity nor the operation of the building may cause land disturbances, surface runoff, soil erosion or sedimentation on any other property beyond the boundary of the plot.
2. Drainage must avoid pollution of watercourses and groundwater. Discharges made directly to ground, storm or marine waters must comply with the requirements of Dubai Municipality
3. Dust suppression techniques must ensure that dust generated by construction and demolition activities must meet the requirements of Code of Construction Safety Practice issued by Dubai Municipality.
4. Construction waste materials generated on site must be segregated and stored on site prior to collection. Segregation must, at a minimum, include labelled storage for inert aggregates, metals, timber, dry recyclables and hazard material.
5. For the disposal of hazardous waste, permit must be prepared and obtained from Dubai Municipality Environment Department . The hazardous waste must be transported in accordance with the requirements of DM Technical Guidelines and DM Code of Construction Safety Practice.
6. With the exclusion of drinking, toilet activities and concrete works, potable water cannot be used for construction activities on any project site
7. Construction and demolition noise must be no greater than that detailed in DM Technical Guidelines and DM Code of Construction Safety Practice.
8. Chemicals, fuels, solvents or hazardous wastes must be stored in accordance DM Technical Guidelines and DM Code of Construction Safety Practice.
9. Light pollution from the construction site must be minimised by ensuring that light sources are directed inwards and angled down so that no light is emitted above the horizontal plane. Lux levels should meet the DM Code of Construction Safety Practice.

306 Chapter 6: Environmental Impact Assessment

306.01 Environmental Impact Assessment

For all new buildings, an Environmental Impact Assessment (EIA) and/or a Construction Environmental Management Plan (CEMP) is required to be submitted to Environment Department of Dubai Municipality and obtain approval, if one of the following criteria is applicable:

1. If the building is intended as industrial building;
2. If the building has the potential to generate hazardous or toxic wastes such as laboratories, waste recycling or waste treatment.

The Dubai Municipality Environment Department's relevant Technical Guidelines for the Environmental Impact Assessment Procedure must be followed

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Section Four

Building Vitality

401 Chapter 1: Ventilation and Air Quality

401.01 Minimum Ventilation Requirements for Adequate Indoor Air Quality

All new and existing air conditioned buildings must be mechanically or mixed mode ventilated and must comply with the minimum requirements of ASHRAE Standard 62-2007.

Occupancy density for each space is determined based on its activity in accordance with the requirements of Dubai Municipality if available or using the default occupancy density values in ASHRAE 62-2007

401.02 Air Quality during Construction, Renovation or Decoration

For all buildings under construction or renovation, building occupant and systems must be protected from airborne contaminants which are generated or spread during construction or renovation inside the buildings. Including toxic substances or substances harmful to the human body, such as asbestos, lead, pesticides, heavy metals, mold, dust, fumes, paint, ...etc

Unless it is required to provide ventilation during construction, the supply and return heating, ventilation, and air conditioning (HVAC) system openings must be closed and protected from contamination. All duct and other related air distribution component openings must be covered with tape, plastic, sheet metal or other methods to prevent dust or debris from collecting in the system.

If the HVAC system is used during construction or renovation, temporary return air filters must be installed with a Minimum Efficiency Reporting Value (MERV) in accordance with ASHRAE Standard 52.2-2007 or an equivalent standard.

Immediately prior to occupancy, the temporary return air filters must be removed and replaced with permanent filters having Minimum Efficiency Reporting Value (MERV) in accordance with ASHRAE Standard 52.2-2007 or an equivalent standard.

401.03 Air Inlets and Exhausts

For all new and existing buildings:

All ventilation system outdoor air intakes, including doors and operable windows, that are part of a mixed mode ventilation system, must be located at suitable distance from potential sources of contamination to reduce the possibility of odor, smoke or other air contaminants entering the ventilation system as required by Dubai Municipality, if any, or refer to ASHRAE Standard 62-2007 Table (5.1)

Exhausted air must be discharged in a manner to avoid it being drawn back into the building or the building ventilation system and to ensure that it does not become a nuisance to the building occupants or other buildings occupants or pedestrians.

401.04 Isolation of Pollutant Sources

For all new and existing buildings, where activities produce hazardous fumes or chemicals, spaces must be provided with separate air extraction systems to create negative pressure and exhaust the fumes or chemicals to ensure they do not enter adjacent rooms.

Dangerous Goods must be stored in accordance with Dubai Municipality Requirements.

401.05 Openable Windows

For all new buildings, opening windows must be provided in accordance with Dubai Municipality Building Regulations unless there is safety requirements restricting opening these windows.

401.06 Indoor Air Quality Compliance - New Buildings

For all new buildings, suitable ventilation for the building occupants and ensure the air quality in accordance with the technical guidelines issued by Dubai Municipality.

The buildings which optionally apply the following procedures will be awarded indoor air quality certificate by Dubai municipality.

A. Indoor air quality testing must be carried out prior to occupancy. The maximum limit for indoor air contaminants included in Table 401.6(1) must not be exceeded. A report which shows compliance with these requirements must be submitted to Dubai Municipality.

Table 401.6(1) - Schedule, Duration of Sampling, and Maximum Limit for Contaminants

Sampling Schedule	Type of Samples	Maximum Acceptable	Sampling Duration
Pre-Occupancy	Formaldehyde	< 0.08 parts per million (ppm)	8- hour continuous monitoring (8 hour time-weighted average [TWA])
	Total Volatile Organic Compound (TVOC)	< 300 micrograms/m^3	
	Suspended Particulates (<10 microns)	< 150 micrograms/m^3	

B. Air Quality testing must be carried out by an air testing company or laboratory accredited by Dubai Municipality (DM), and the Compliant test results must be submitted to DM.

C. Air quality testing equipment must have initial and periodical calibration certificate as per manufacturer requirement from an external calibration facility accredited by DM or at least annual calibration certificate. The initial and periodical calibration certificates must be saved in a special register to be checked by DM in order to ensure the accuracy of the readings as condition of renewal the indoor air quality certificate.

401.07 Indoor Air Quality Compliance - Existing Buildings

For all existing hotels, shopping mall, educational, health and government buildings, buildings which are used to provide health care, mosques and worship buildings, theatres, cinemas or any other existing buildings to be determined by DM later, suitable ventilation for the building occupants and ensure the air quality in accordance with the technical guidelines issued by Dubai Municipality.

The buildings which optionally apply the following procedures will be awarded indoor air quality certificate by Dubai municipality.

A. Indoor air testing for the contaminants listed in Table 401.7 (1) must be carried out to ensure the air quality in a building is suitable for occupation, the maximum limit for indoor air contaminants included in Table 401.7 (1) must not be exceeded.

Table 102.02 (1)

Sampling Schedule	Type of Samples	Maximum Acceptable	Sampling Duration
Initial test completed by 31 December 2011. Further testing within 5 years of last compliant test.	Formaldehyde	< 0.08 ppm	8- hour continuous monitoring (8 hour time-weighted average [TWA])
	Total Volatile Organic Compound (TVOC)	< 300 micrograms/ m^3	
	Respirable Dust (<10 microns)	< 150 micrograms/ m^3	
	Ozone	0.06 ppm (120 micrograms/ m^3)	
	Carbon Dioxide	800 ppm (1440 microgram/ m^3)	
	Carbon Monoxide	9 ppm (10 micrograms/ m^3)	
	Bacteria	500 CFU/ m^3 (Algar plate)	
	Fungi	500 CFU/ m^3 (Algar plate)	

B. Air Quality testing must be carried out by an air testing company or laboratory accredited by Dubai Municipality (DM) and the Compliant result must be submitted to DM.

C. Air quality testing equipment must have initial and periodical calibration certificates as per manufacturer requirement from an external calibration facility accredited by DM or at least annual calibration certificate. The initial and periodical calibration certificates must be saved in a special register to be checked by DM in order to ensure the accuracy of the readings as condition of renewal the indoor air quality certificate.

401.08 Inspection and Cleaning of HVAC Equipment

For all new and existing buildings, the cleanness of HVAC equipment and systems must be maintained and all its parts must be inspected and cleaned in accordance with the standard specifications approved by Dubai Municipality and in accordance with the technical guidelines issued by Dubai Municipality. While specialized maintenance companies approved by Dubai Municipality must carry out Inspection and cleaning or provide a proof that maintenance shall be done by building operator if he has a qualified personnel and equipment to do the job.

401.09 Parking Ventilation

For all buildings with enclosed parking:

A. Mechanical ventilation must be provided to ensure that the Carbon Monoxide (CO) concentration in the enclosed parking area is maintained below fifty (50) parts per million (ppm) by:

- Providing a minimum of six (6) outside air changes per hour, or
- Installing a variable volume ventilation system controlled in response to input from a minimum of one CO sensor per four hundred square meters (400 m^2) floor area of parking.

B. A supply of outdoor air must be provided to each parking level.

C. Occupied areas such as offices, shopping centres, hotels, waiting rooms, and ticket booths connected to enclosed parking, must be supplied with conditioned air under positive pressure compared with adjoining parking area

D. Ventilation systems must be capable of providing ten (10) air changes per hour for smoke clearance purposes in case of a fire incident.

E. CO monitoring equipment must be installed with a minimum of one CO sensor per four hundred square meters (400 m^2) floor area of parking. Sound alarm triggers when the CO concentration reaches or exceeds seventy five (75) ppm in, at least, five percent (5%) of the monitored locations.

F. Where a Building Management System (BMS) or Central Control and Monitoring System (CCMS) is installed, the CO concentration must be monitored to allow real-time profiling and management of air quality.

G. CO monitoring equipment must be checked and recalibrated every six (6) months or according to manufacturer specification by a specialized calibration company certified by Dubai Municipality. Test results and calibration certificates must be kept onsite and be readily available for inspection by DM staff.

401.08 Environmental Tobacco Smoke

A. Smoking is strictly prohibited in all public in accordance with Local Order No 11 – 2003 including but not limited to shopping centres, hotels, restaurants, government buildings, hospitals, healthcare facilities, commercial buildings, common accommodation, coffee shops and amusement and entertainment or any other places determined by Dubai Municipality except for places in which smoking is permitted

B. Places in which smoking is permitted are determined in accordance with the conditions listed in the Manual of Regulating Smoking in Public Places issued by Dubai Municipality by administrative resolution no 92 for the year 2009 in which public places where smoking is strictly prohibited and places where smoking is permitted are determined according to specific conditions.

C. Smoking designated areas must be at least twenty five (25) feet away from the building entrances of the building, doors and operable windows and ventilation system outdoor air intakes

D. An annual permit is issued from the Public Health and Safety Department of Dubai Municipality for all places in which smoking is permitted after providing all required documents and drawings mentioned in the guide

402 Chapter 2: Thermal Comfort

402.01 Thermal Comfort

For all new and existing buildings, the heating, ventilation and air conditioning (HVAC) system must be capable of providing the following range of conditions for ninety five percent (95%) of the year:

	Lower Limit	Upper Limit
Dry bulb temperature	DB: 22.5 °C	DB: 25.5 °C
Relative humidity	RH: 30% (min)	RH: 60% (max)

For occupant comfort, normal occupied spaces should have an average air velocity between (0.2 – 0.3) m/s.

403 Chapter 3: Acoustic Comfort

403.01 Acoustical Control

For all new buildings, the acoustic performance relating to Internal Noise Criteria from External Noise Sources, Internal Noise Criteria from Mechanical Services Noise, Internal Airborne Sound Insulation Guidance Values, and Internal Impact Sound Pressure Levels meet the control requirements set out in Table 403.01 (1).

Table 403.01(1) – Acoustical Control requirements

Building Type	Document Reference
Villas / Residential* Buildings	Building Regulations Approved Document E (revised 2003) (UK)
Healthcare Facilities	Health Technical Memorandum 08-01 (UK)
Educational Facilities**	Building Bulletin 93: Acoustic Design of Schools – A design Guide (UK)
Commercial Buildings	BS8233:1999 "Sound insulation and noise reduction for buildings – code of practice". (UK)
Industrial	BS8233:1999 "Sound insulation and noise reduction for buildings – code of practice". (UK)
Public	BS8233:1999 "Sound insulation and noise reduction for buildings – code of practice". (UK)

* Residential buildings include Villas, Apartments, Labour Accommodations and Student Accommodations.

** Educational Facilities include Nursery Schools, Primary Schools, Secondary Schools, Colleges and Universities.

404 Chapter 4: Hazardous Materials

404.01 Low Emitting Material: Paints and Coatings

For all buildings, including new applications in existing buildings, all paints and coatings used in the building should not exceed allowed limits of Volatile Organic Compound (VOC), these paints and coatings must be accredited/certified from Dubai Central Lab or any source approved by Dubai Municipality.

404.02 Low Emitting Material: Adhesives and Sealants

For all buildings, including new applications in existing buildings, all adhesives, adhesive bonding primers, adhesive primers, sealants and sealant primers used in the building should not exceed allowed limits of Volatile Organic Compound (VOC), these materials must be accredited/certified from Dubai Central Lab or any source approved by Dubai Municipality.

404.03 Carpet Systems

For all new and existing public and commercial buildings, each new carpet system used must be certified / accredited from Dubai Central Lab or any other source approved by Dubai Municipality (DM).

Carpet are not allowed to be used in labor accommodation, educational facilities or any other places determined by DM.

405 Chapter 5: Day lighting and Visual Comfort

405.01 Provision of Natural Daylight

For all new buildings, other than industrial buildings, provision for adequate natural daylight must be made in order to reduce their reliance on electrical lighting and to improve conditions for the building occupants and provide lighting openings in accordance with Dubai municipality building regulation and specification.

405.02 Views

All new office, residential and public buildings must provide direct line of sight (views) to the outdoor environment in accordance with Dubai municipality building regulation and specification.

406 Chapter 6: Water Quality

406.01 Legionella Bacteria and Building Water Systems

For all new and existing buildings must apply the technical guidelines issued by Dubai Municipality which includes:

A. All water systems and networks which creates a water spray or aerosol including but not limited to cooling towers, evaporative condensers, hot and cold water systems, showers, evaporative air coolers, spas, fountains, misters, ..etc must be periodically maintained, cleaned, disinfected and checked periodically to minimize the risk of Legionella bacteria or germs contamination in accordance with the technical guidelines issued by Dubai Municipality regarding the control of Legionella bacteria in water systems.

B. All water systems equipments and accessories including but not limited to potable water network, hot and cold water systems, water tanks, pumps, pipes and fittings, must be maintained, cleaned and disinfected.

C. Sampling and testing must be carried out for the presence of bacteria/germs and Legionella bacteria

D. All equipments and devices of swimming pools, spa pools, whirlpool baths, hydrotherapy pools and Jacuzzi must be maintained, cleaned, disinfected and checked periodically.

D. All equipment's and devices of irrigation system must be maintained, cleaned, disinfected and checked periodically

Specialized companies approved by Dubai Municipality must do water tests and sampling. All test results must be recorded and kept along with the records of maintenance and remedial works at site to be checked by Dubai Municipality.

406.02 Water Quality of Water Features

For all new and existing buildings, all Water Features with a water storage volume of over 1,000 liters and which creates a water spray or aerosol including but not limited to waterfalls, ponds, streams, ...etc must be maintained, cleaned, disinfected and checked periodically to minimize the risk of Legionella bacteria or germs contamination and not exceed the maximum limits outlined in the technical guidelines issued by Dubai Municipality.

500

Section Five

Resource Effectiveness: Energy

501 Chapter 1: Conservation and Efficiency: Building Fabric

501.01 Minimum Envelope Performance Requirements

For all new air conditioned buildings, exterior building elements must have average thermal transmittance (also known as U Value) and Shading Coefficients (SC) that does not exceed the values specified and Light Transmittance greater than or equal to the values specified.

A. External Walls, Roofs, and Floors:

Building elements forming the external walls, roofs, and floors (where one side of the floor is exposed to ambient conditions) must have an average thermal transmittance (U Value) which does not exceed the following values:

Roof	U= 0.3 W/m^{2}K
External Wall	U= 0.57 W/m^{2}K

If the floor is in contact with the ground, the insulation should only be applied to one meter (1m) in from the perimeter of the building.
Glazed elements with back insulated panels must be treated as walls (and therefore must meet the performance requirement for walls).

B. Glazed Elements - Fenestration:

1. If the total area of external walls that let in light is forty per cent (40%) or less of the external wall area, then the glazing elements must meet the following performance criteria:

Thermal Transmittance (Summer U value)	U= 2.1 W/m^{2}K (max)
Shading Coefficient (SC)	0.4 (max)
Light Transmittance	0.25 (min)

2. If the total area of external walls that let in light is between forty percent (40%) and sixty percent (60%) of the external wall area, then the glazing elements must meet the following performance criteria:

Thermal Transmittance (Summer U value)	U= 1.9 W/m^{2}K (max)
Shading Coefficient (SC)	0.32 (max)
Light Transmittance	0.1 (min)

3. If the total area of external walls that let in light is sixty percent (60%) or greater of the external wall area, then the glazing elements must meet the following performance criteria:

Thermal Transmittance (Summer U value)	U= 1.9 W/m²K (max)
Shading Coefficient (SC)	0.25 (max)
Light Transmittance	0.1 (min)

4. For shopfronts and showrooms, other than those at ground floor level, glazing elements must meet the following performance criteria:

Thermal Transmittance (Summer U value)	U= 1.9 W/m²K (max)
Shading Coefficient (SC)	0.76 (max)

5. If the glazing portion of a roof is ten percent (10%) or less of the roof area, then the glazing elements must meet the following performance criteria:

Thermal Transmittance (Summer U value)	U= 1.9 W/m²K (max)
Shading Coefficient (SC)	0.32 (max)
Light Transmittance	0.4 (min)

6. If the glazing portion of a roof is greater than ten percent (10%) of the roof area, then the glazing elements must meet the following performance criteria:

Thermal Transmittance (Summer U value)	U= 1.9 W/m²K (max)
Shading Coefficient (SC)	0.25 (max)
Light Transmittance	0.3 (min)

501.02 Thermal Bridging

For all new air conditioned buildings, Thermal Bridges, such as connection points between concrete or steel beams, external walls and columns and around doors and windows, which enable the flow of heat from outside into the building, must be eliminated or insulated to reduce the amount of heat transfer.

501.03 Air Conditioning Design Parameters

For all new air conditioned buildings, the heat load must be calculated in accordance with the following design parameters.

A) Outdoor Condition of the Building

Dry bulb temperature	46° C (115° F)
Wet bulb temperature	29° C (85° F)
Dubai City location latitude	(North Latitude) 25° N
Extent of variation in the temperature on the day of design (Outdoor Daily Range)	13.8° C (25° F)

B) Indoor Condition of the Building

Dry bulb temperature	24° C (75° F)
Relative humidity	50% +/- 5%

• The heat transfer coefficients to be used in the calculations for roofs, walls, and glazed areas must be the actual design coefficients, or as set out in Regulation 501.01 Minimum Envelope Performance Requirements.

• When diversity factors to be used in the calculation of heat load are not known, the coefficients set out in the 2005 ASHRAE Handbook – Fundamentals must be used.

C) The safety factor applied must be no greater than:

Sensible Heat	10%
Latent Heat	5%

• Heat loads for buildings must be calculated for each air-conditioned space at the hour of peak load incidence in that space, using software registered in Dubai Municipality.

501.04 Air Loss from Entrance and Exit

For all new air conditioned buildings other than villas, all regularly used air conditioned entrance lobbies must be protected by a door design which acts as a barrier to the loss of conditioned air.

501.05 Air Leakage

All new air conditioned buildings with a cooling load of 1 megawatt (MW) or greater must be tested to demonstrate that air leakage does not exceed ten (10) cubic metres of air per hour for each square metre of building envelope (10m3/hr/m^2) into or out of the building, at an applied pressure difference of fifty (50) Pascal (Pa).

Testing must be carried out in accordance with a method approved by Dubai Municipality (DM).

Work must be carried out by a company approved by Dubai Municipality (DM).

502 Chapter 2: Conservation and Efficiency: Building Systems

502.01 Energy Efficiency – HVAC Equipment and Systems

For all new air conditioned buildings, heating, ventilating and air conditioning equipment and systems must comply with the minimum energy efficiency requirements and test procedures listed in Reference Tables 502.01(1) and 502.01(2) or any test procedure approved by Dubai Municipality.

REFERENCE TABLE 502.01 (1)

Minimum Efficiency Requirements for Unitary Air Conditioners and Condensing Units

Equipment Type	Size Category	Heating Section Type	Subcategory or Rating Condition	Minimum Efficiency (T1)	Minimum Efficiency (T3)	Test Procedure
Air Conditioners, air cooled	<65,000 Btu/h	All	Spilt System	9.5 EER	6.6 EER	T1-ARI 210/240
			Single Package	9.5 EER	6.6 EER	T3-ISO 5151
Through-the-wall, air cooled	<=30,000 Bth/h	All	Single Package	8.0 EER	5.7 EER	
Small-duct high-velocity air cooled	<65,000 Bth/h	All	Split System	9.2 EER	6.4 EER	
Air Conditioners, air cooled	>=65,000 Btu/h and <135,000 Btu/h	Electric resistance (or none)	Split System and Single Package	9.5 EER	6.6 EER	T1-ARI 340/360
		All other	Split System and Single Package	9.5 EER	6.6 EER	T3-ISO 5151
	>=135,000 Btu/h and <240,000 Btu/h	Electric resistance (or none)	Split System and Single Package	9.5 EER	6.6 EER	
		All other	Split System and Single Package	9.5 EER	6.6 EER	
	>=240,000 Btu/h and <760,000 Btu/h	Electric resistance (or none)	Split System and Single Package	9.5 EER	6.6 EER	
		All other	Split System and Single Package	9.5 EER	6.6 EER	
	>=760,000 Btu/h	Electric resistance (or none)	Split System and Single Package	9.0 EER	6.3 EER	
		All other	Split System and Single Package	9.0 EER	6.3 EER	

Air conditioners, water and evaporatively cooled	<65,000 Btu/h	All other	Split System and Single Package	14.0 EER		ARI 210/240

Continue: REFERENCE TABLE 502.01 (1)

Air conditioners, water and evaporatively cooled	≥65,000 Btu/h and <135,000 Btu/h	Electric resistance (or none)	Split System and Single Package	14.0 EER		ARI 340/260
		All other	Split System and Single Package	14.0 EER		
	≥135,000 Btu/h and <240,000 Btu/h	Electric resistance (or none)	Split System and Single Package	14.0 EER		
		All other	Split System and Single Package	14.0 EER		
	≥240,000 Btu/h	Electric resistance (or none)	Split System and Single Package	14.0 EER 12.4 PLV		
		All other	Split System and Single Package	14.0 EER		
Condensing units, air cooled	≥135,000 Btu/h			11.5 EER	7.8 EER	T1- ARI 365 T3- ISO 5151

a) Integrated Part Load Values (IPLVs) and part rating conditions are only applicable to equipment with capacity modulation.

b) Test Procedure (T3) in accordance with ISO5151

REFERENCE TABLE 502.01 (2)

Water Chilling Packages - Minimum Efficiency Requirements				
Equipment Type	**Size Category**	**Minimum Efficiency (T1)**	**Minimum Efficiency (T3)**	**Test procedure**
Air cooled, with condenser, electrically operated	All capacities	2.8 COP 3.05 IPLV	1.9 COP	T1- ARI 210/240
Air cooled, without condenser, electrically operated	All capacities	3.1 COP 3.45 IPLV	2.1 COP	
Water cooled, electrically operated, positive displacement (reciprocating)	All capacities	4.2 COP 5.05 IPLV	2.75 COP	T1 - ARI 550/590 T3-ISO 5151

Water cooled, electrically operated, positive displacement (rotary screw and scroll)	<150 tons	4.45 COP	2.9 COP	T1 - ARI 550/590 T3-ISO 5151
	>=150 tons and <300 tons	4.9 COP	3.2 COP	
	>= 300 tons	5.6 COP	3.6 COP	

Continue: REFERENCE TABLE 502.01 (2)

Water cooled, electrically operated, centrifugal	<150 tons	6.0 COP		ARI 550/590
	>=150 tons and <300 tons	6.5 COP 7.1 IPLV		
	>=300 tons	6.5 COP 7.68 IPLV		
Air-cooled absorption single effect	All capacities	0.7 COP		ARI 560
Water-cooled absorption single effect	All capacities	0.7 COP		
Absorption double effect, indirect-fired	All capacities	1.1 COP 1.1 IPLV		
Absorption double effect, direct-fired	All capacities	1.2 COP 1.2 IPLV		

* The chiller equipment requirements applies to all chillers, including where the design leaving fluid temperature is <4.5°C.

502.02 Demand Controlled Ventilation

For all new air conditioned buildings with mechanical ventilation and existing building types determined by Dubai Municipality, Demand Controlled Ventilation (DCV) using a concentration of Carbon Dioxide (CO_2), or other means to measure occupancy, must be used in spaces larger than one hundred (100) square metres (m2) and having a maximum design occupancy density greater than or equal to twenty five (25) people per hundred meter squares (100m2). The default occupancy density values in ASHRAE 62.2-2007 Table 6.1 should be used when the actual occupancy is not known.

The CO_2 concentration should be kept below eight hundred (800) parts per million (ppm).

An alarm must be triggered if CO_2 concentration rises above hundred (1000) ppm. This alarm is to be either automatically monitored by a central control system, if available, or give a local audible or visual indication when activated.

For all buildings, including existing with DCV, the CO_2 sensors and systems must be checked and recalibrated as per manufacturer recommendations but not to exceed twelve (12) months by a contractor approved by Dubai Municipality.

502.03 Elevators and Escalators

For all new buildings:

A. Escalators - Escalators must be fitted with controls to reduce speed or to stop when no traffic is detected. Escalators shall be designed with energy savings features as described below:

1. Reduced speed control: The escalator shall change to a slower speed when no activity has been detected for a period of a maximum of three (3) minutes. Detection shall be by photocell activation at the top and bottom landing areas.
2. Use on demand: The escalator shall shut down when no activity has been detected for a period of a maximum of fifteen (15) minutes. Use on demand escalators must be designed with energy efficient soft start technology. The escalator shall start automatically when required; the activation shall be by photocells installed in the top and bottom landing areas.

B. Elevators (lifts) - Elevators (lifts) must be provided with controls to reduce the energy demand. To meet this requirement, the following features must be incorporated in traction drive elevators:

1. Use of AC Variable-Voltage and Variable-Frequency (VVVF) drives on non-hydraulic elevators.
2. Energy efficient lighting inside the elevator including controls to turn lights off when the elevator has been inactive for a period of a maximum of five (5) minutes.

502.04 Lighting Power Density - Interior

For new buildings, the average Lighting Power Density for the interior connected lighting load for specific building types must be no more than the watts per square metre of gross floor area given in Table 502.04 (1).

Table 502.04(1) – Interior Lighting Power Density

Building Type	Maximum average Watts per square metre (W/m^2) across total building area
Commercial/Public: Offices, Hotels, Resorts, Restaurants	10
Educational Facilities	12
Manufacturing Facility	13
Retail Outlets, Shopping Malls , Workshop	14
Warehouses	8

Lighting Power Densities for building types not listed in Table 502.04 (1) should be no greater than those values given in ASHRAE 90.1-2007 Table 9.5.1.or equivalent as approved by DEWA.

502.05 Lighting Power Density - Exterior

For all new buildings, the average Lighting Power Density for the exterior connected lighting load must be no more than the values given in Table 502.05 (1).

Building Area	Maximum Watts per square metre or linear metre
Uncovered parking lots and drives	1.6 W/m^2
Walkways less than 3 metres wide	3.3 W/linear metre
Walkways 3 metres wide or greater	2.2 W/m^2
Outdoor Stairways	10.8 W/m^2
Main entries	98 W/linear metre of door width
Other doors	66 W/linear meter of door width
Open sales areas (including vehicle sales lots)	5.4 W/m^2
Building Facades	2.2 W/m^2 for each illuminated wall or surface or 16.4 W/linear metre for each illuminated wall or surface length
Entrances and gatehouse inspection stations at guarded facilities	13.5 W/m^2
Drive-up windows at fast food restaurants	400 W per drive-through

Lighting Power Densities for exterior areas not listed in Table 502.05 (1) should be no greater than those values given in ASHRAE 90.1-2007 Table 9.4.5or equivalent as approved by DEWA.

502.06 Lighting Controls

For all new buildings other than villas and industrial buildings:

A. Occupant Lighting Controls must be provided so as to allow lighting to be switched off when daylight levels are adequate or when spaces are unoccupied and to allow occupants control over lighting levels.

B. Common areas which are not regularly occupied, such as corridors and lobbies, should reduce lighting levels to no more than twenty five percent (25%) of normal when unoccupied.

C. In offices and education facilities all lighting zones must be fitted with occupant sensor controls capable of switching the electrical lights on and off, according to occupancy unless lighting is required for safety purposes.

D. In offices, if the average design lighting power density is less than six (6) Watts per square meter of gross floor area (GFA), the control requirements of parts C and D of this regulation need not apply.

E. It is recommended (optional) that, in offices, the artificial lighting in spaces within six (6) meters in depth from exterior windows must be fitted with lighting controls incorporating photocell sensors capable of adjusting the level of electric lighting to supplement natural daylight only when required. The combined artificial and daylight must provide an illumination level at the working plane between four hundred (400) and five hundred (500) lux. When there is a hundred percent (100%) daylight, the lux levels may exceed five hundred (500) lux.

502.07 Electronic Ballasts

For all new buildings, high frequency electronic ballasts must be used with fluorescent lights and metal halide of 150 W and less.

High frequency electronic ballasts must be labelled as conforming to an international standard approved by the DEWA / Dubai Municipality

502.08 Control Systems for Heating, Ventilation and Air Conditioning (HVAC) Systems

For all new buildings other than villas, all Heating, Ventilation, and Air Conditioning (HVAC) systems must be provided with controls to guarantee the achievement of energy efficiency in use in accordance with the American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) 90.1-2007, Section 6.4.3.or equivalent as approved by DM/DEWA.

As a minimum, the following control features must be incorporated:

1. Sub-division of systems into separate control zones to correspond with each area of the building that has a significantly different solar exposure, or cooling load, or type of use.
2. All separate control zones must be capable of:
   - Independent temperature control;
   - Inactivation when the building, or part of building served by the system, is not occupied.
3. The operation of central plant only when the zone systems require it.

502.09 Control Systems for Hotel Rooms

For all new hotels, guest rooms must incorporate, in each room, controls systems which are able to turn off the lighting, air conditioning and power when the room is not occupied.

In addition, it is recommended (optional) that each guest room should incorporate control system to enable to turn off the air conditioning when the balcony door / window is kept open.

502.10 Exhaust Air Energy Recovery Systems

For all new buildings with a requirement of treated outdoor air of over one thousand (1,000) litres per second (l/s), energy recovery systems must be provided to handle at least fifty percent (50%) of the total exhausted air. The energy recovery systems must have at least seventy percent (70%) sensible load recovery efficiency.

502.11 Pipe and Duct Insulation

For all new buildings, all pipes carrying refrigerant, hot water or chilled water and ducts, including prefabricated ducts, supplying conditioned air must be insulated to minimise heat loss and prevent condensation.

1. Pipes and ducts passing through conditioned spaces must be insulated in accordance with BSI British Standard BS 5422:2009 or other insulation standards approved by Dubai Municipality.

2. Pipes passing through outside or unconditioned spaces must be insulated with the minimum insulation thickness specified in Table 502.11 (1).

Table 502.11 (1) Minimum insulation thickness for pipes passing through unconditioned spaces

Steel pipe nominal pipe size (mm)	Temperature of contents (°C)					
	10° C		5° C		Ø° C	
	Minimum Insulation thickness (mm)					
	λ = 0.018 W/mK	λ = 0.038 W/mK	λ = 0.018 W/mK	λ = 0.038 W/mK	λ = 0.018 W/mK	λ = 0.038 W/mK
15	5Ø	3Ø	45	3Ø	45	3Ø
2Ø	6Ø	3Ø	55	3Ø	45	3Ø
25	6Ø	4Ø	55	35	55	3Ø
32	65	4Ø	55	35	55	3Ø
4Ø	65	4Ø	6Ø	35	55	3Ø
5Ø	7Ø	45	6Ø	4Ø	6Ø	3Ø
65	7Ø	45	6Ø	4Ø	6Ø	4Ø
8Ø	75	45	65	4Ø	6Ø	4Ø
1ØØ	75	45	65	4Ø	7Ø	4Ø
15Ø	9Ø	5Ø	8Ø	45	75	4Ø
2ØØ	9Ø	55	8Ø	45	75	45
25Ø	1ØØ	55	8Ø	55	75	45
3ØØ+	1ØØ	8Ø	1ØØ	75	8Ø	7Ø

• λ = thermal conductivity of insulating materials at a mean temperature of 10°C.

3. Ducts passing through outside or unconditioned spaces must be insulated with the minimum insulation thickness specified in Table 502.11 (2).

Table 502.11 (2) Minimum insulation thickness for pipes passing through unconditioned spaces

Minimum air temperature inside duct (°C)							
15° C		10° C		5° C		Ø° C	
Minimum thickness of insulating material (mm)							
λ = 0.018 W/mK	λ = 0.038 W/mK	λ = 0.018 W/mK	λ = 0.038 W/mK	λ = 0.018 W/mK	λ = 0.038 W/mK	λ = 0.018 W/mK	λ = 0.038 W/mK
42	61	48	84	57	107	66	127

• λ = thermal conductivity of insulating materials at a mean temperature of 10° C.

Insulation materials used must meet the requirements of regulation 701.01, Thermal and Acoustical Insulation Materials or BS 5422:2009, whichever is the more stringent.

All insulation installations must have a suitable vapour barrier and protection from Ultra Violet (UV) light.

502.12 Thermal Storage for District Cooling

All new district cooling plants must incorporate a Thermal Energy Storage (TES) facility with a capacity of, at least, twenty percent (20%) of the design capacity of the plant.

502.13 Ductwork Air Leakage

For all buildings, air ductwork must be designed, built and installed to ensure that air leakage is minimised.

Ductwork, with equipment attached to it, with an external static pressure exceeding two hundred and fifty (250) Pascal (Pa) and all ductwork exposed to external ambient conditions or within unconditioned spaces must be pressure tested prior to occupancy in accordance with a method approved by Dubai Municipality (DM) and a compliant amount of air leakage achieved.

Ductwork leakage testing must be carried out by a company approved by DM to conduct commissioning of buildings.

502.14 Maintenance of Mechanical Systems

For all new and existing air conditioned buildings, the mechanical-electrical and plumbing systems in buildings must be serviced and maintained regularly.

1. To allow the mechanical services to be maintained, they must be installed so that adequate access is available to allow regular inspection, maintenance and cleaning of the equipment without the need to remove or dismantle any building components.
2. The building owner must ensure that a maintenance manual and schedule is developed for the building based on the instructions for preventative maintenance or service from the manufacturers or suppliers of equipment or according to the American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) 62.1 – 2007 or equivalent as approved by DM.
3. The building owner must enter into a service contract with a maintenance company approved by Dubai Municipality (DM) or provide evidence that equipment will be properly maintained by competent members of their own staff.
4. Service records in the form of a service log book including details of both preventative and corrective maintenance must be kept onsite and be readily available for inspection by DM.

503 Chapter 3: Commissioning and Management

503.01 Commissioning of Building Services – New Buildings

For all new air conditioned buildings, with a cooling load of one (1) megawatt (MW) or greater, other than villas the commissioning of air distribution systems, water distribution systems, lighting, central control and building management systems, refrigeration systems and boilers must be carried out before a completion certificate will be issued.

1. Commissioning must be carried out in accordance with the CIBSE Codes listed below or any other commissioning Standard or Code approved by Dubai Municipality (DM).
   - 1.1. 'The Chartered Institution of Building Services Engineers (CIBSE) Commissioning Code, Air Distribution Systems, Code A-2006'
   - 1.2. 'CIBSE Commissioning Code, Water Distribution Systems, Code W-2003'
   - 1.3. 'CIBSE Commissioning Code, Lighting, Code L-2003'
   - 1.4. 'CIBSE Commissioning Code, Automatic Controls, Code C-2001' for central control and Building Management System (BMS);
   - 1.5. 'CIBSE Commissioning Code R: 2002 Refrigeration Systems; and
   - 1.6. 'CIBSE Commissioning Code B: 2002 Boilers'.
2. Work must be carried out by a company approved by DM to conduct commissioning of buildings.
3. Commissioning results must be recorded and available for inspection by DM
4. A systems manual, documenting the information required to allow future operations staff to understand and optimally operate the commissioned services, must be developed and provided to the building owner or facilities operator following commissioning.

503.02 Re-Commissioning of Building Services – Existing Buildings

For all existing air conditioned buildings, with a cooling load of two (2) megawatt (MW) or greater, other than villas the re-commissioning of ventilation, water systems central plant, lighting and control systems must be carried out at least once every five (5) years. Where possible the re-commissioning should be carried out in accordance with the requirements of Regulation 503.01 but at a minimum, systems are required to be re-commissioned to ensure that:

1. The amount of fresh air supplied from each ventilation outlet is within plus or minus five percent (5%) of the design volume;
2. The volume of the chilled water supplied to any cooling coil is within plus or minus five percent (5%) of the design volume;
3. All mechanical devices, including but not limited to dampers, valves, fans, pumps, motors and actuators, operate freely and as required;
4. Filters and filter housings are sound and secure and that no unfiltered air bypasses the filter assembly;
5. Heat recovery systems are operating as designed;
6. Central plant equipment is tested to ensure that it operates through the full range of its capacity and that all design parameters are achieved;
7. All lighting systems and their controls operate as designed and that required levels of illumination are provided;
8. Controls are checked and re-calibrated for operation as designed and to ensure that any remote devices respond as required; and
9. Pipe and ducts are inspected to ensure there is no air or liquid leakage.

Commissioning results must be recorded and available for inspection by Dubai Municipality.

Work must be carried out by a contractor certified by Dubai Municipality to conduct commissioning of building services.

Where original design requirements are not available, the contractor is to certify that, following re-commissioning, the systems are installed and operating correctly based on their experience and understanding of the systems.

503.03 Electricity Metering

For all new buildings, meters must be fitted to measure and record electricity demand and consumption of the facility as a whole and to provide accurate records of consumption,

A. For all buildings with a cooling load of at least one (1) megawatt (MW) or gross floor area of 5,000 sq.M or greater , additional electrical sub-metering (of tariff class accuracy) must be installed to record demand and consumption data for each major energy-consuming system in the building. At a minimum, all major energy consuming systems with a load of hundred (100) kilowatts (kW) or greater must be sub-metered.

B. The building operator shall be responsible for recording details of the energy consumption for the building and ensuring that major electricity uses are sub-metered. Records must be kept for five years.

C. Each individual tenancy in the building must have a sub-meter installed when a building tariff meter is not present. These sub-meters should only be for demand management and electricity cost allocation purposes.

D. Where a Building Management System (BMS) or Central Control and Monitoring System (CCMS) is installed, metering must be connected to allow real-time profiling and management of energy consumption.

E. All meters must be capable of remote data access and must have data logging capability and complying with DEWA specifications. All meters should be approved by DEWA.

F. Virtual meters using run-hours are not acceptable as sub-meters.

503.04 Air Conditioning Metering

For all new buildings other than villas, which are supplied by a central air conditioning source (such as a chiller plant or district cooling), and where cooling energy is delivered individually to several consumers, meters must be fitted to measure and record chilled water supply to air conditioning units and to provide accurate records of consumption:

A. Energy meters designed to measure the supply of chilled water must be installed for each dwelling unit, office, or tenant. The measuring device must measure the water flow and supply and return temperatures to determine the temperature differential and calculate the amount of cooling energy consumed.

B. Where a Building Management System (BMS) or Central Control and Monitoring System (CCMS) is installed, metering must be connected to allow real-time profiling and management of energy consumption.

C. Meters used must be specifically designed for the measurement of chilled water rather than for hot water.

D. All meters must be capable of remote data access and must have data logging capability.

E. Virtual meters using run-hours are not acceptable as sub-meters.

F. The meter readings and actual consumption details should only be for demand management and cost allocation purposes.

503.05 Central Control and Monitoring System

For all new buildings with a cooling load of one (1) megawatt (MW) or gross floor area of 5,000 sq.M or greater, the building must have a central control and monitoring system capable of ensuring that the building's technical systems operate as designed and as required during all operating conditions, and that the system provides full control and monitoring of system operations, as well as diagnostic reporting.

At a minimum, the system must control the chiller plant, heating, ventilation and air conditioning (HVAC) equipment, record energy and water consumption and monitor and record the performance of these items.

504 Chapter 4: Onsite Systems: Generation & Renewable Energy

504.01 On-Site Renewable Energy – Small to Medium Scale Embedded Generators

For all new buildings:

Where a building incorporates on-site generation of electricity from small or medium scale embedded generators using renewable energy sources; the equipment, installation and maintenance of the system must be stand-alone (off-grid) and therefore not connected to the Dubai Electricity and Water Authority (DEWA) network and DEWA will provide electricity supply to the building when needed without parallel connection.

504.02 Outdoor Lighting

For all new buildings:

Where the light power density of external lighting exceeds that specified in Regulation 502.05, Lighting Power Density – Exterior, any additional lighting load must be powered entirely through renewable electricity sources such as photovoltaic systems.

504.03 On-Site Renewable Energy – Solar Water Heating System

For all new villas and labour accommodations, a solar water heating system must be installed to provide seventy five (75%) of domestic hot water requirements. Solar water heating installations must be fitted with insulated storage tanks and pipes, sized and fitted in accordance with the solar panel manufacturer's requirements for each specific application. The supplementary heating system shall be controlled so as to obtain maximum benefit from the solar heater before operating.

Where solar water heaters are being installed, the equipment, installation, operation and maintenance of the system must be:

A. Designed and installed by an installation company approved by Dubai Municipality (DM);

B. Equipment must be approved by DM; and

C. Regularly cleaned and maintained to ensure continuous efficient operation.

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Section Six

Resource Effectiveness: Water

601 Chapter 1: Conservation and Efficiency

601.01 Water Efficient Fittings

For all new buildings:

A. Water-conserving fixtures must be installed meeting the criteria in Table 601.01 (1):

Table 601.01 (1)

Fixture Type	Maximum Flow Rate
Showerheads	8 Liters Per Minute
Hand wash basins	6 Liters Per Minute
Kitchen sinks	7 Lliters per minute
Dual Flush Toilets	6 Liters Full flush, 3 Liters Part flush
Urinal	1 Liter per flush or waterless

B. Dual Flush toilets must be used.

C. Automatic (proximity detection) / push button faucets must be installed in all public facilities.

D. Cisterns serving single or multiple urinals in public, commercial, and industrial buildings must be fitted with manual or automatic flush controls that are responsive to usage patterns. Only sanitary flushing is acceptable during building closure or shutdown (including overnight); and

E. Faucets installed as a component of a specialized application may be exempt from the flow rates upon application to Dubai Municipality.

601.02 Condensate Drainage

For all buildings, including existing buildings, at all points where condensate is produced by the operation of air conditioning equipment, there must be a means of collecting and disposing of the water. Condensate collection pans and drainage pipes must be installed to prevent standing water and to provide drainage. A minimum air break of twenty five (25) mm must be provided between the condensate piping and the wastewater pipe. If the condensate is not to be reused, it must be discharged to the wastewater system through a properly sized water trap.

601.03 Condensate Recovery

For all new buildings with a cooling load equal to or greater than three fifty (350) kilowatt (kW), condensate water from all air conditioning equipment units handling outside air, or a mixture of return air and outside air where the outside air is not preconditioned, must be recovered and used for irrigation, toilet flushing, or other onsite purpose where it will not come into contact with the human body.

601.04 Water Efficient Irrigation

For all new buildings, one hundred percent (100%) of the total exterior landscaping must be irrigated using non-potable water or drip or subsoil water delivery systems. The landscaping includes green roofs.

All irrigation systems must incorporate, at any point that they connect to a portable water supply, backflow prevention devices which must be checked every twelve (12) months. Testing must be in line with the manufacturer's recommended practice for field testing or any other testing regime approved by Dubai Municipality.

602 Chapter 2: Commissioning and Management

602.01 Water Metering

For all new buildings, meters must be fitted to measure and record water demand and consumption of the facility as a whole and to provide accurate records of consumption (tariff class meters):

A. For all buildings with a cooling load of at least 1 megawatt (MW) or gross floor area of 5,000 sq m or greater , additional water metering must be installed to record consumption data for major water use of the building and major water uses in and around the building.

B. The building operator shall be responsible for recording water consumption for each individual meter. Records must be kept for five (5) years.

C. Each individual tenancy in the building must have a sub-meter installed when a building tariff meter is not present.

D. Where a Building Management System (BMS) or Central Control and Monitoring System (CCMS) is installed, metering must be integrated into the system to allow real time profiling and management of water demand and consumption.

E. All meters must be capable of remote data access and must have data logging capability and complying with DEWA specifications. All meters should be approved by DEWA.

F. Virtual meters using run-hours are not acceptable as sub-meters.

G. The sub-meters should be used for demand management and cost allocation purposes.

603 Chapter 3: Onsite Systems: Recovery and Treatment

603.01 Wastewater Reuse

For all buildings, if a system is installed for the collection and reuse of greywater produced within the building or for the use of Treated Sewage Effluent (TSE) from an external source, the following is required:

A. The building must be dual-plumbed for the collection and recycled use of drainage water (greywater). Any pipes which transport greywater must be colour-coded differently from pipes that are used for potable (drinking standard) water and be labelled 'Not Suitable for Drinking.'

B. There must be a minimum air break of twenty five (25) mm between any potable water sources and greywater collection systems.

C. Greywater must not be used for purposes where it will come into contact with the human body. It must be treated to the standard required by Dubai Municipality

For all new commercial car washing facilities, they must recover and reuse at least fifty percent (50%) of their wastewater.

603.02 Water Consumption for Heat Rejection Including Cooling Towers

For all new buildings:

Potable water supplied by Dubai Electricity and Water Authority (DEWA) must not be used for heat rejection purposes.

Where cooling towers are used, Treated Sewage Effluent (TSE), seawater or recycled water must be used to meet the water demand for all heat rejection purposes. Secondary water sources must be approved by Dubai Municipality or DEWA.

A separate totalizing meter must be fitted on the water supply to individual cooling towers and a daily log of water use must be kept.

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Section Seven

Resource Effectiveness: Materials and Waste

701 Chapter 1: Materials and Resources

701.01 Thermal and Acoustical Insulation Materials

For all new buildings, insulation materials to be incorporated into the building must:

1. Be manufactured without the use of Chlorofluorocarbons (CFC's);
2. Be non-toxic and not release toxic fumes during combustion;
3. Have 0.05 parts per million (ppm) or less of added formaldehyde
4. Have a Threshold Limit Value (TLV) of 0.1 or less of Individual Volatile Organic Compounds
5. Be fire resistant in accordance with the requirements of Dubai Civil Defence
6. Be accredited / certified from Dubai Central Lab
7. Achieve all the requirements of the approved specifications by Dubai Municipality

All thermal and acoustical insulation must be installed as per the manufacturer's instructions after approval from Dubai Municipality.

701.02 Certified / Accredited Timber

For all new buildings, at least twenty five percent (25%) by volume of the timber and timber-based products used during construction and permanently installed in the building must be from certified / accredited sources approved by Dubai Municipality.

701.03 Asbestos Containing Materials

For all new buildings and for the maintenance, addition or alteration of existing buildings, materials containing asbestos must not be used.

701.04 Lead or Heavy Metals Containing Materials

For all new buildings and for the maintenance, addition or alteration of existing buildings, paints, or other materials, containing lead or other heavy metals with percentage more than the approved specifications by Dubai Municipality must not be used unless the metal is encapsulated in a system such as a photovoltaic cell.

All paints and materials containing lead or other heavy metals must be accredited / certified from Dubai Central Lab or any source approved by Dubai Municipality.

701.05 Ozone Depletion Potential (ODP) Material Management:

For all new buildings:

A. Installations of heating, ventilation, and air conditioning (HVAC) and refrigeration equipment must contain refrigerants with zero ozone depletion potential (ODP) or with global warming potential (GWP) less than 100, with the exception of equipment containing less than 0.23 kilograms (kg) of refrigerant;

B. Fire suppression systems must not contain any ozone-depleting substances (Chlorofluorocarbons [CFCs], Hydrochlorofluorocarbons [HCFCs] or Halons).

For existing equipment:

A. CFC and halon-based materials are not to be used for any purposes;

B. From 1 January 2030, HCFC based materials or any other material having any ODP are not to be used for any purposes;

C. The venting or direct discharging of any refrigerants during equipment maintenance is strictly prohibited; and

D. The recovery, reclamation, recycling and reuse of refrigerants must be practiced at all times.

701.06 Recycled Content

For all new buildings, recycled content must account for at least five percent (5%) of the total volume of materials used in the construction of the building.

701.07 Regional Materials

For all new buildings, building materials available regionally must comprise at least five percent (5%) of the total volume of materials used in the construction of the building.

701.08 Composite Wood Products

For all new buildings, composite wood products used in the interior of the building must not contain added urea-formaldehyde resins.

702 Chapter 2: Waste Management

702.01 Construction and Demolition Waste

For all new buildings except buildings in CBD area, at least fifty percent (50%) by volume or weight of waste material generated during the construction and/or demolition of buildings must be diverted from disposal in landfills. Diverted materials must be recycled or reused.

This should be done through the following three paths:

1. Concrete waste must be diverted to Construction Waste Treatment Plant
2. Excavated soil, land-clearing debris and hazardous waste must be diverted to places designated by the Concern Department of Dubai Municipality
3. Other recyclable materials such as woods plastics and metals can be used at site.

The following materials are exempt from the calculation of the percentage of waste diverted from disposal at landfill facilities:

- Excavated soil and land-clearing debris; and
- Hazardous waste.

702.02 Bulk Waste Collection

For all new residential apartment buildings, an area must be provided for residents to place items of bulky waste such as furniture, electrical appliances and sanitary ware. The area provided must cover an area of approximately ten square meters (10 m^2). The area does not have to be designated solely for the purpose of bulky waste collection (e.g. set aside area to the car park).

The bulky waste storage area must be reachable, must not restrict access to the building and comply with safety and fire requirement.

702.03 Waste Storage

For all new villas and apartments, domestic kitchens must be provided with a minimum storage facility of two ten (10) litre waste receptacles clearly labeled for 'recyclable' and 'non-recyclable'. The storage facility should be in a proper place within the kitchen.

702.04 Waste Collection

All new buildings which require chute for general waste, in accordance with Dubai Municipality Building Regulation, one of the following must be provided:

1. A second chute must be provided to handle recyclable material and discharge into a separate receptacle within the waste management area; or
2. The garbage room on each floor must have a minimum floor area of two square meters (2 m^2) where recyclable waste can be stored until collected daily by the building operator. Waste must be transported in a service left discharge into a designated receptacle within the waste management

All new buildings which does not require chute for general waste, in accordance with Dubai Municipality Building Regulation, the garbage room on each floor must have a minimum floor area of three square meters (3 m^2) where non-recyclable and recyclable waste can be stored until collected daily by the building operator. Waste must be transported in a service left discharge into a designated receptacle within the waste management.

702.05 Recyclable Waste Management Facilities

For all new buildings other than villas, a sorting and storage facility for recyclable materials must be provided.
This facility must be easily accessible and comply with the requirements of the location, access and specifications of general waste areas in accordance with Dubai Municipality Building Regulations.
The sorting and storage facility may be part of the general waste management facility or a separate facility.

A. Recycled waste facility incorporated into the general waste collection:
   The size of the room must be increased by 10% and not less than 5 m^2, to allow additional room to sort and store the recyclable waste.

B. Recycled waste facility separated from the general waste collection:
   The recycled waste facility must be sized as a percentage from the total Built Up Area (BUA) of the building in accordance with Table 702.05 (1).
   Where the Total Built Up Area (BUA) of the building falls between the figures outlined in the Table, linear interpolation must be used to determine an appropriate percentage area for the recyclable storage space

Table 702.05 (1) – Sizing Requirements

Built Up Area (BUA)	Minimum Space for Storage of Recyclables
Less than 500 m2	7.5m^2
500 m^2	1.5% of BUA
1,000 m^2	0.8% of BUA
5,000 m^2	0.35% of BUA
10,000 m^2 or greater	0.25% of BUA