حكومة دبي
GOVERNMENT OF DUBAI

بلدية دبي
DUBAI MUNICIPALITY

AL SA'FAT
Dubai Green Building System

السعفات
نظام دبي للمباني الخضراء

Dubai Green Building System

Version 2.0 - 2020

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Index
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): Energy Efficiency
6. Section Six (600): Resource Effectiveness - Water
7. Section Seven (700): Resource Effectiveness - Materials & Waste

The practice guide can be used for further information on implementation and compliance as required.

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Section One

101: Chapter One: Administration

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Chapter 1

Compliance Requirements and Documents

101.01 Energy Compliance Method

There are two compliance routes for energy performance in these regulations. 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 101.01 (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 101.01 (1). The reference building must be equal in shape, size and operational patterns to the proposed building. This shall be done as per ASHRAE 90.1 appendix G, except for the minimum requirements for building envelope, equipment efficiencies and other parameters and conditions that are already set in Al Sa'fat.

Compliance with Al Sa'fat - Dubai Green Building System 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 (1) 101.01 - List of Regulations to be complied with for Energy Compliance

Al Sa'fat - Dubai Green Building System for Elemental Method of Energy Compliance	
304.05	Orientation of Glazed Facades
501.01	Minimum Envelope Performance Requirements
502.01	Energy Efficiency - HVAC Equipment and Systems
502.04	Lighting Power Density - Interior

101.02 Water Compliance Method

There are two compliance routes for water performance in these regulations. 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.

Table no. (1) 101.02 Silver Sa'fa Requirements

Sr.	Section	Chapter	Regulation No.	Regulation Title
1	Ecology and Planning: (300)	Chapter 1 - 301: Access and Mobility	301.01	Enabled Access
2			301.02	Preferred Parking **
3		Chapter 2 - 302: Ecology and Landscaping	302.01	Local Species
4		Chapter 3 - 303: Neighbourhood Pollution	303.01	Exterior Light Pollution and Controls *
5		Chapter 4 -304: Microclimate and Outdoor Comfort	304.01	Urban Heat Island Effect *
6			304.02	Heat Rejection Equipment Installation
7			304.04	Colours on the Outside of Buildings
8			304.05	Orientation of Glazed Facades **
9			304.06	Hardscape *
10			304.07	Shading of Public Access Areas **
11		Chapter 5 - 305: Environmental Impact Assessment	305.01	Environmental Impact Assessment
12	Building Vitality: (400)	Chapter 1 - 401: Ventilation and Air Quality	401.01	Minimum Ventilation Requirements for Adequate Indoor air quality
13			401.02	Indoor Air Quality During Construction, Renovation and or Decoration
14			401.03	Air Inlets and Exhausts
15			401.04	Isolation of Pollutant Sources
16			401.05	Openable Windows
17			401.06	Indoor Air Quality Compliance - New Buildings
18			401.07	Indoor Air Quality Compliance - Existing Buildings
19			401.08	Sealing Doors and Window Frames
20			401.09	Inspection and Cleaning of HVAC Equipment
21			401.10	Parking Ventilation
22			401.11	Environmental Tobacco Smoke

Table no. (1) 101.02 Silver Sa'fa Requirements				
Sr.	**Section**	**Chapter**	**Regulation No.**	**Regulation Title**
23	Building Vitality: (400)	Chapter 2 - 402: Thermal Comfort	402.01	Thermal Comfort
24		Chapter 3 - 403: Acoustic Comfort	403.01	Acoustical Control
25			403.02	Silencers
26			403.03	Expansion joints and vibration prevention
27		Chapter 4 - 404: Hazardous Materials	404.01	Low Emitting Materials: Paints and Coatings
28			404.02	Low Emitting Materials: Adhesives and Sealants
29			404.03	Carpet Systems
30		Chapter 5 - 405: Day lighting and Visual Comfort	405.01	Provision of Natural Daylight
31			405.02	Views
32		Chapter 6 - 406: Water Quality	406.01	Legionella Bacteria and Building Water Systems
33			406.02	Water Quality of Water Features
34		Chapter 7 - 407: Responsible Construction	407.01	Impact of Construction, Demolition and Operational Activities
35	Energy Efficiency: (500)	Chapter 1 - 501: Conservation and Efficiency: Building Fabric	501.01	Minimum Building Envelope Performance Requirements
36			501.02	Thermal Bridges
37			501.03	Air Conditioning Design Parameters
38			501.04	Air Loss from Entrances and Exits **
39			501.05	Air Leakage *
40			501.06	Shade Effect Calculations **
41		Chapter 2 - 502: Conservation and Efficiency: Building Systems	502.01	Energy Efficiency - HVAC Equipment and Systems
42			502.02	Demand Controlled Ventilation *
43			502.03	Elevators and Escalators
44			502.04	Lighting Power Density - Interior

Table no. (1) 101.02 Silver Sa'fa Requirements				
Sr.	**Section**	**Chapter**	**Regulation No.**	**Regulation Title**
45	Energy Efficiency: (500)	Chapter 2 - 502: Conservation and Efficiency: Building Systems	502.05	Lighting Power Density - Exterior
46			502.06	Lighting Controls **
47			502.07	Electronic Ballasts
48			502.08	Control Systems for Heating, Ventilation and Air Conditioning (HVAC) Systems **
49			502.09	Control Systems for Hotel Rooms
50			502.10	Exhaust Air Energy Recovery Systems and Condensation of water
51			502.11	Pipe and Duct Insulation *
52			502.12	Thermal Storage for District Cooling *
53			502.13	Ductwork Air Leakage *
54			502.14	Maintenance of Mechanical Systems
55			502.20	Air Conditioning of Industrial Buildings
56			502.21	Cooling Water Purification to Enhance Cooling Efficiency
57		Chapter 3 - 503: Commissioning and Management	503.01	Commissioning of Building Services - New Buildings **
58			503.02	Re-Commissioning of Building Services - Existing Buildings **
59			503.03	Electricity Metering *
60			503.04	Air Conditioning - Metering **
61			503.05	Central Control and Monitoring System (CCMS) *
62		Chapter 4 - 504: Onsite Systems: Generation & Renewable Energy	504.01	On-Site Renewable Energy - Small to Medium Scale Embedded Generators
63			504.02	On-Site Renewable Energy - Sustainable Water Heating System
64	Resource Effectiveness - Water (600)	Chapter 1 - 601: Conservation and Efficiency	601.01	Water Efficient Fittings
65			601.02	Condensate Drainage *
66			601.03	Condensate Reuse *

Table no. (1) 101.02 Silver Sa'fa Requirements

Sr.	Section	Chapter	Regulation No.	Regulation Title
67	Resource Effectiveness - Water (600)	Chapter 1 - 601: Conservation and Efficiency	601.04	Water Efficient Irrigation *
68		Chapter 2 - 602: Commissioning and Management	602.01	Water Metering *
69		Chapter 3 - 603: Onsite Systems: Recovery and Treatment	603.01	Wastewater Reuse *
70			603.02	Water Consumption for Heat Rejection Including Cooling Towers
71	Resource Effectiveness: Materials and Waste (700)	Chapter 1 - 701: Materials and Resources	701.01	Thermal and Acoustical Insulation Materials
72			701.02	Certified / Accredited Timber *
73			701.03	Asbestos Containing Materials
74			701.04	Lead or Heavy Metals Containing Materials
75			701.05	Ozone Depletion Potential (ODP) Material Management
76			701.06	Recycled Content *
77			701.07	Regional Materials *
78			701.08	Composite Wood Products *
79		Chapter 2 - 702: Waste Management	702.01	Construction and Demolition Waste *
80			702.02	Bulk Waste Collection *
81			702.03	Waste Storage
82			702.04	Waste Collection *
83			702.05	Recyclable Waste Management Facilities **

(*) Optional requirements for private villas and industrial buildings
(**) Optional requirements for private villas, investment villas and industrial buildings

Note:
* In case of Grey-water use inside the building or Treated Sewage Effluent, all requirements of Article No. 603.01 are mandatory.
* If the green roof provides 30% of the total surface area of the building, it will be exempted from the requirements of Article No. 304.01.

Table no. (2) 101.02 - Golden Sa'fa Requirements

Sr.	Section	Chapter	Regulation No.	Regulation Title
Requirements of Silver Sa'fa				
1	Ecology and Planning: (300)	Chapter 1 - 301: Access and Mobility	301.03	Charging equipment for electrical vehicles
2			301.04	Bicycle Storage
3	Building Vitality: (400)	Chapter 7 - 407: Responsible Construction	407.02	Ensuring Quality and Safety for construction Activities
4			407.03	Sustainable Concrete
5	Energy Efficiency: (500)	Chapter 2 - 502: Conservation and Efficiency: Building Systems	502.15	Control of Air Flow
6			502.16	Control of Chilled Water
7			502.19	Air Conditioning of Parking Areas
8			502.22	Heat Exchangers
9		Chapter 3 - 503: Commissioning and Management	503.06	Cost of the Expected Performance Assessment
10			503.07	Performance and Commissioning Reports
11			503.08	Sustainable Awareness
12		Chapter 4 - 504: Onsite Systems: Generation & Renewable Energy	504.03	On-Site Renewable Energy - Electrical Power Generation
13		Chapter 5 - 505: Energy Demand	505.01	Reduction of Energy Demand
14			505.03	Efficiency of Building Performance

Table no. (3) 101.02 - Platinum Sa'fa Requirements
Required in addition to Silver and Golden Sa'fa requirements

Sr.	Section	Chapter	Regulation No.	Regulation Title
Requirements of Golden Sa'fa				
1	Ecology and Planning (300)	Chapter 4 - 304: Microclimate and Outdoor Comfort	304.03	Green Roof
2	Energy Efficiency (500)	Chapter 2 - 502: Conservation and Efficiency: Building Systems	502.17	Control of Air Conditioning Zones
3			502.18	Cooling of Corridors and Public Areas
4		Chapter 5 - 505: Energy Demand	505.02	Smart Building

Definitions

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Section Two

Certain terms used in these 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 or to 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 establishment (government or private) that owns the building and/or the land on which the building works (construction, refurbishing, demolition, or removal of a building) is to be performed or their representative.

Building Works Permit

Permit issued by authorized department from the Dubai Municipality to permit building permits on specific land as per drawings, specifications, and regulations.

Building services

All necessary services required to operate the building such as plumbing, mechanical, electrical and others.

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 as defined on the Land Use and Classification System or any other area classified by Permitting Authorities that has special requirements.

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).

Chlorofluorocarbons (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 licenced 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 the People of Determination 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 term 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

Untreated household wastewater which has not come into contact with toilet waste. Greywater includes used water from showers, washbasins, 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

The heat load calculations are the process of calculating the total heat generated inside the building by various sources. These calculations 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 Parameter

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.

Hybrid Vehicle

A hybrid vehicle is a vehicle using two different forms of power, such as an electric motor and an internal combustion engine, or an electric motor with a battery and fuel cells for energy storage.

Hydraulic Elevator

An elevator operated using liquid pressure.

Hydrochlorofluorocarbons (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 landform, 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° C and 45° C 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 Reflectance 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 reflectance 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.

Lux

The international system unit of illumination, equal to one lumen/m².

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 and having an area of 50 m² at a minimum.

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 that 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, exhibitions and festival centres, gymnasium and sports complex and sports and entertainment complexes.

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 sitting or standing, while working 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 (Heating/Cooling)

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 mm ($^1/_8$ 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 9 m wide, and its area 80 m^2 at a minimum.

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 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 satisfied condition experienced by building occupants with the thermal environment. Level of indoor conditions that occupants experienced and live satisfactorily.

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 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 that 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 an irritant 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.

Villa

Private Villa: Separate or semi-detached building with ground entrance and independent parking in addition to independent outdoor spaces.

Investment Villa: A complex of separate, connected or semi-connected private villas in which outdoor spaces and recreational services can be shared, and ownership is not allowed to be split unless there are legal repercussions between them.

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.

Ecology and Planning

300
Section Three

301: Chapter One: Access and Mobility

302: Chapter Two: Ecology & Landscaping

303: Chapter Three: Neighbourhood Pollution

304: Chapter Four: Microclimate & Outdoor Comfort

305: Chapter Five: Environmental Impact Assessment

301 Chapter 1

Access and Mobility

301.01 Enabled Access

All new buildings, other than villas, must comply with Dubai Municipality Building Regulations, with regards to the People of Determination. They must be enabled for their access, internal movement and ability to engage with the building functions.

301.02 Preferred Parking

For all new buildings, other than villas, that have more than 20 parking spaces, designated preferred parking must be provided for a combination of hybrid vehicles, electrical vehicles and carpool vehicles. The percentage required for preferred parking spaces shall be calculated based on the total vehicle parking spaces required for the building, as defined in the Dubai Municipality (DM) Building Regulations. The percentages required for preferred parking are as follows:

- **5% For Silver Sa'fa**
- **7% For Golden Sa'fa**
- **10% For Platinum Sa'fa**

The above percentages, does not include the spaces provided for People of Determination.

301.03 Charging Equipment for Electrical Vehicles

For Golden and Platinum Sa'fa and for all new buildings other than villas, where preferred parking spaces were provided according to item 301.02, necessary charging equipment for electrical vehicles must be provided for 30% of the total preferred parking spaces.

301.04 Bicycle Storage

For Golden and Platinum Sa'fa and for all new buildings, other than villas, secured and covered racks or storage areas for bicycles must be provided within the building or within a shaded area located on the ground floor and no more than 30m 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 10% of the number of car parking spaces required for the building, as defined in the Dubai Municipality (DM) Building Regulations.

For Student accommodation and Labor accommodation, secure racks or storage areas must be provided for bicycles, for at least 10% 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 25% of the total planted area within the building plot, including green roofs, must utilise plant and tree species indigenous or adapted to Dubai's climate and region. In addition to above, 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 requirements:

1. All exterior light fixtures on the building site, other than architectural accent lighting and Civil Aviation safety lighting, must be shielded, so that the full light emitted by the fixture, either directly or indirectly by reflection or by 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.
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, all opaque external roofing surfaces must comply with a minimum Solar Reflectance Index (SRI) value according to Table 304.01 (1), for a minimum of 75% of the roof area:

Table (1) 304.01 - Roof SRI Requirements

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

304.02 Heat Rejection Equipment Installation

For all new buildings, individual heat rejection equipment having a power rating greater than 4.0 kW and which exhausts externally, must be installed not less than 3m above the ground level of the building.

304.03 Green Roofs

For Platinum Sa'fa and for all new buildings, the roof of the building should be provided with vegetated roof (green roof) for at least 30% of the total roof area, or for the remaining area after complying the following conditions:

- The services should be grouped and distributed on each surface so that the space is optimized.
- At least 150 m^2 of roof area is available on any roof surface.

304.04 Colours on the Outside of Buildings

For all new buildings, at least 75% of the area for external walls must have a minimum Light Reflectance Value (LRV) of 45%.

304.05 Orientation of Glazed Façades

For all new buildings, one of the following must be achieved for Silver Sa'fa, whereas for Golden and Platinum Sa'fa both the requirements must be achieved:

1. At least 50% of the total glazed surface area of the building, (excluding glazed areas with back insulated panels), must be facing the angle located between the east and the north-west which equals to 135° starting from the east.
2. South and west glazed areas, excluding glazed areas with back-insulated panels, must be treated environmentally.

304.06 Hardscape

For all new buildings, 50% of the hardscape of the development must achieve at least one of the following:

1. Demonstrate a Solar Reflectance Index (SRI) of at least 29
2. Use an open grid pavement system
3. Be shaded by vegetation
4. Be shaded by materials with an SRI equal to or greater than those specified in Table 304.01 (1)

304.07 Shading of Public Access Areas

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

305 Chapter 5

Environmental Impact Assessment

305.01 Environmental Impact Assessment

For all new buildings, if any of the following criteria is applicable, then an Environmental Impact Assessment (EIA) and/or a Construction Environmental Management Plan (CEMP) would be required and must be submitted and approved by Environment Department of Dubai Municipality:

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.

Building Vitality

400

Section Four

401: Chapter One: Ventilation & Air Quality

402: Chapter Two: Thermal Comfort

403: Chapter Three: Acoustic Comfort

404: Chapter Four: Hazardous Materials

405: Chapter Five: Day lighting & Visual Comfort

406: Chapter Six: Water Quality

407: Chapter Seven: Responsible Construction

401 Chapter 1

Ventilation and Air Quality

401.01 Minimum Ventilation Requirements for Adequate Indoor Air Quality

All new and existing buildings which are air-conditioned must be mechanically or mixed mode ventilated and also must comply with the minimum requirements of latest edition of ASHRAE Standards 62.1, 62.2 and 170.

Occupancy density for each space shall be determined based on its activity and shall be in accordance with Dubai Municipality's requirements. If the occupancy density values are not mentioned then, default occupancy density values stated in the latest edition of ASHRAE Standards 62.1, 62.2 and 170 shall be considered.

401.02 Indoor Air Quality during Construction, Renovation or Decoration

For all the buildings under construction or renovation, building occupants and systems must be protected from airborne contaminants that are generated or spread during construction or renovation works, carried out inside the buildings. These contaminants include toxic substances or substances that are harmful to the human body, such as asbestos, lead, pesticides, heavy metals, mold, dust, fumes, paints, 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 related air distribution component openings, must be covered with tape, plastic, sheet metal or other suitable 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 at least a Minimum Efficiency Reporting Value of 8 (MERV 8).

Prior to occupancy, all temporary return air filters must be removed and replaced with permanent filters having at least Minimum Efficiency Reporting Value of 8 (MERV 8).

401.03 Air Inlets and Exhausts

For all new and existing buildings, outdoor air intakes for all ventilation systems, including doors and operable windows, that are part of mixed mode ventilation system, must be located at a suitable distance from potential sources of contamination. This is to reduce the possibility of odor, smoke or other air contaminants entering the ventilation system. This must also be in compliance with Dubai Municipality's requirements or with the latest edition of ASHRAE Standards 62.1 and 62.2.

Exhaust air must be discharged in a way that it does not get drawn back into the building or the building ventilation system. It also must not become a nuisance to the building occupants or occupants for nearby buildings or to pedestrians.

401.04 Isolation of Pollutant Sources

All new and existing buildings having spaces that has activities producing hazardous fumes or chemicals, must provide dedicated air extraction systems for those spaces. The system must create negative pressure and exhaust the fumes or chemicals, to ensure it does not enter adjacent rooms.

Dangerous goods must be stored in accordance with Dubai Municipality's requirements.

401.05 Openable Windows

For all new buildings, openable windows must be provided in accordance with Dubai Municipality Building Regulations unless there is safety requirements restricting opening of these windows. These windows may be used in special cases like when use of air-conditioning or ventilation system is not required or during automatic switch off or during system break-down.

401.06 Indoor Air Quality Compliance - New Buildings

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

The buildings must apply the following procedures:

A. Indoor air quality testing must be carried out prior to occupancy. The maximum limit for the indoor air contaminants stated in Table 401.06 (1), must not be exceeded. Report showing compliance with these requirements, must be submitted to Dubai Municipality.

Table (1) 401.06 - Schedule, Duration of Sampling and Maximum Limit for Contaminants

Sampling Schedule	Type of Samples	Maximum Acceptable	Sampling Duration
Pre-Occupancy	Formaldehyde	< 0.08 (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 specialized companies or laboratories.

C. Air quality testing equipment must have initial and periodical calibration certificate. Calibration certification frequency shall either be annually or as per manufacturer specification and shall be from an external calibration facility, accredited by DM. The initial and periodical calibration certificates must be saved in a special register. The calibration certificate would be checked by DM to validate the accuracy of the readings. This also is a requirement for renewing the indoor air quality certificate of the building.

401.07 Indoor Air Quality Compliance - Existing Buildings

For all existing hotels, shopping malls, educational facilities, government buildings, healthcare facilities, mosques and worship buildings, theatres, cinemas or any other existing buildings as determined by DM in future, suitable ventilation system must to be provided for the building occupants. The provided system must ensure, the air quality provided is in accordance with the technical guidelines issued by Dubai Municipality.

The buildings must apply the following procedures:

A. Indoor air testing for the contaminants listed in Table 401.07 (1) must be carried out, to ensure the air quality in the building, is suitable for occupancy. The maximum limit for the indoor air contaminants provided in Table 401.07 (1), must not be exceeded.

Table (1) 401.07 - Schedule, Duration of Sampling and Maximum Limit for Contaminants

Sampling Schedule	Type of Samples	Maximum Acceptable	Sampling Duration
Testing should be 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 (Agar plate)	
	Fungi	< 500 CFU / m^3 (Agar plate)	

B. Air quality testing must be carried out by specialized companies or laboratories.

C. Air quality testing equipment must have initial and periodical calibration certificate. Calibration certification frequency shall either be annual or as per manufacturer specification and shall be from an external calibration facility, accredited by DM. The initial and periodical calibration certificates must be saved in a special register. The calibration certificate would be checked by DM to validate the accuracy of the readings. This also is a requirement for renewing the indoor air quality certificate of the building.

401.08 Sealing Doors and Window Frames

For all new buildings, doors and window frames on the building exteriors must be sealed from any openings. This must be with a nonflammable materials and with materials that prevent the transmission of air and sound that may occur as a result of difference in pressure across the exterior of the building. Insulation materials selected must be approved by the Dubai Municipality.

401.09 Inspection and Cleaning of HVAC Equipment

For all new and existing buildings, the cleanliness of HVAC equipment and systems must be maintained. 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. Specialized maintenance companies,

approved by Dubai Municipality must carry out this inspection and cleaning. This can also be carried out by the building operator, if sufficient evidence can be provided on their qualification for carrying out these tasks.

401.10 Parking Ventilation

For all buildings having enclosed parking:

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

- Providing a minimum of 6 outside air changes per hour, or
- Installing a variable volume ventilation system that is controlled by a input response from a minimum of one CO sensor per 400 m^2 floor area of parking.

B. Outdoor air must be provided for each parking level.

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

D. Ventilation systems must be capable of providing 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 400 m^2 floor area of parking. Sound alarm should be triggered, when the CO concentration reaches or exceeds 75 ppm, in at least 5% of the monitored locations.

F. Where a Building Management System (BMS) or Central Control and Monitoring System (CCMS) is installed, 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 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.

401.11 Environmental Tobacco Smoke

A. Smoking is strictly prohibited in all public areas 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 where smoking is permitted are determined in accordance with the conditions listed in the Manual of Regulating Smoking in Public Places issued by Dubai Municipality. It defines the public places where smoking is strictly prohibited and places where smoking is permitted under specific conditions.

C. Designated smoking areas must be at least 7.5m away from the entrances of the building, doors and operable windows and outdoor air intakes of ventilation systems.

D. An annual permit is issued from the competent department of Dubai Municipality for all places where smoking is permitted, upon submission of all required documents and drawings mentioned in the guideline.

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 95% of the year:

Table (1) 402.01 - Thermal comfort requirements

	Type of Samples	Maximum Acceptable
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, must meet the control requirements set out in Table 403.01 (1).

Table (1) 403.01 - Acoustical Control requirements

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

403.02 Silencers

For all new buildings, the mechanical systems must be designed, equipped and selected with noise control materials, to reduce the transmission of sound and noise through these systems.

Systems include HVAC, air ducts, water pipes and its suspension and installation requirements.

403.03 Expansion joints and vibration prevention

For all new buildings:

1. An automatic air vent shall be installed on each vertical water supply riser, addressed with an isolate valve. A drain valve shall be used at the bottom of the risers.
2. The water network pipes shall be installed with sufficient supports and connectors, to prevent any sound and vibration, while allowing thermal expansion of the pipes through the expansion joints.

404 Chapter 4

Hazardous Materials

404.01 Low Emitting Materials: Paints and Coatings

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

404.02 Low Emitting Materials: 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 the allowed limits for Volatile Organic Compound (VOC) specified by Dubai Municipality. This must be accredited / certified from Dubai Central Laboratory or any other laboratory, approved by Dubai Municipality.

404.03 Carpet Systems

For all new and existing public and commercial buildings, each new carpet system (Carpets or new permanently installed carpet padding) must be certified / accredited from Dubai Central Laboratory or any other laboratory, approved by Dubai Municipality (DM).

Carpets are not allowed to be used in labor accommodation, educational facilities or any other places as 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 the reliance on electrical lighting and to improve conditions for the building occupants. The provided lighting openings must be in accordance with Dubai Municipality's building regulations and specification.

405.02 Views

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

406 Chapter 6

Water Quality

406.01 Legionella Bacteria and Building Water Systems

All new and existing buildings must comply with 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 to minimize the risk of legionella bacteria or germs contamination. This must be in accordance with the technical guidelines issued by Dubai Municipality, regarding the control of legionella bacteria in water systems.

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

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

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

Specialized laboratories approved by Dubai Municipality shall carry out the water tests and sampling. All test results must be recorded and kept along with the records for maintenance and remedial works, at site. This would be checked by Dubai Municipality.

406.02 Water Quality of Water Features

For all new and existing buildings, all water features having a water storage volume of over 1,000 l 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. It must also not exceed the maximum limits, outlined in the technical guidelines issued by Dubai Municipality.

407 Chapter 7

Responsible Construction

407.01 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. The following is also 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 Local Order (61) issued in 1991.
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 hazardous material.
5. For the disposal of hazardous waste, permit must be prepared and obtained from Dubai Municipality's Waste Management Department. The hazardous waste must be transported in accordance with the requirements of DM Technical Guidelines and DM Code of Construction Safety Practice.
6. Excluding the usage for drinking, toilet activities and concrete works, potable water cannot be used for construction activities on 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.

407.02 Ensuring Quality and Safety for Construction Activities

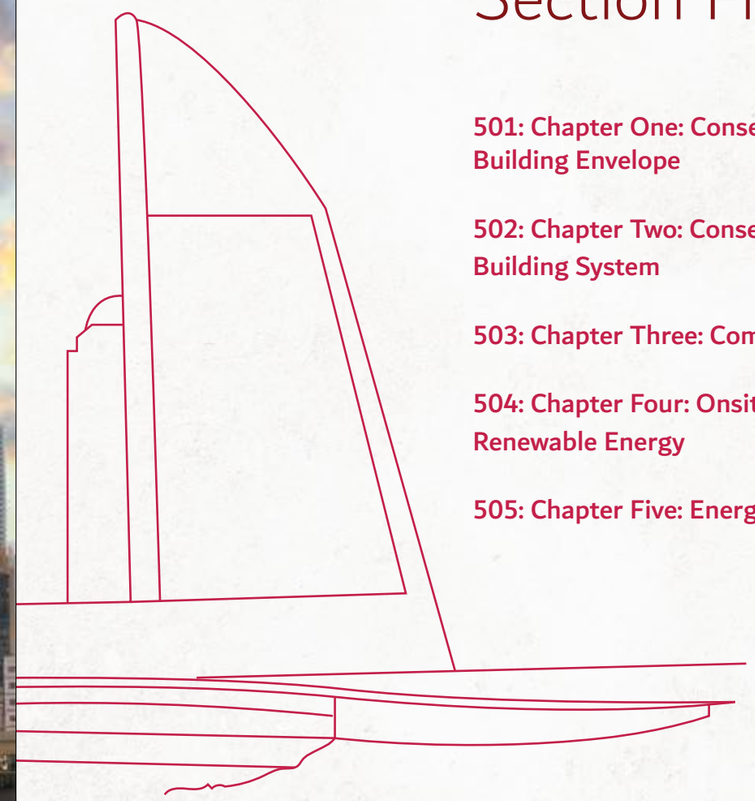
For Golden and Platinum Sa'fa and for all new buildings other than villas, the main consultant and contractor should be certified by approved utilities from Dubai Municipality. To ensure the quality and safety practices of construction activities, they must also be certified for ISO 14004 or OSHA or any equivalent as per the approval of authorized department.

407.03 Sustainable Concrete

For Golden and Platinum Sa'fa and for all new buildings, concrete mixes shall have an environmental impact less than that specified in Dubai Sustainable Concrete Baseline.

The environmental impact for all mixes used in the project shall be less than the baseline by 7% for Golden Sa'fa and 15% for Platinum Sa'fa.

Energy Efficiency



500
Section Five

501: Chapter One: Conservation & Efficiency: Building Envelope

502: Chapter Two: Conservation & Efficiency: Building System

503: Chapter Three: Commissioning & Management

504: Chapter Four: Onsite Systems: Generation & Renewable Energy

505: Chapter Five: Energy Demand

501

Chapter 1

Conservation and Efficiency: Building Envelope

501.01 Minimum Building Envelope Performance Requirements

For all new air-conditioned buildings, the average thermal transmittance (also referred as u-value) and shading co-efficient (SC) values for the exterior building elements, must not exceed the values indicated in the below tables. The light transmittance values for the glazed elements should be greater than or equal to the values indicated in the below tables.

A. External Walls, Roofs, and Floors:

The average thermal transmittance (U-value) for building elements that includes the external walls, roofs, and floors (where one side of the floor is exposed to ambient conditions) must not exceed the following values:

Table (1) 501.01 - Heat Transfer co-efficient for Roof, External Wall and Exposed Floor

	For Silver Sa'fa (W/m^2K)	For Golden and Platinum Sa'fa (W/m^2K)
Roof	0.3	0.3
External Wall and Exposed Floor	0.57	0.42

For the floor area that is in contact with the ground, the insulation should only be applied for 1m, from the perimeter of the building.

Glazed elements having back-insulated panels must be treated as walls and must meet the performance requirement for walls.

B. Glazed Elements - Fenestration:

1. If window to external wall ratio is less than 40%, then the glazing elements must meet the following performance criteria:

Table (2) 501.01 - Glazing performance criteria for window to external wall ratio less than 40%

	For Silver Sa'fa	For Golden and Platinum Sa'fa
Thermal Transmittance (Summer U-value) in W/m^2K	2.1 (max)	1.9 (max)
Shading Coefficient (SC)	0.4 (max)	0.32 (max)
Light Transmittance	0.25 (min)	0.25 (min)

2. If window to external wall ratio is between 40% and 60%, then the glazing elements must meet the following performance criteria:

Table (3) 501.01 - Glazing performance criteria for window to external wall ratio between 40% and 60%

	For Silver Sa'fa	For Golden and Platinum Sa'fa
Thermal Transmittance (Summer U-value) in W/m^2K	1.9 (max)	1.9 (max)
Shading Coefficient (SC)	0.32 (max)	0.25 (max)
Light Transmittance	0.1 (min)	0.1 (min)

3. If window to external wall ratio is greater than 60%, then the glazing elements must meet the following performance criteria:

Table (4) 501.01 - Glazing performance criteria for window to external wall ratio greater than 60%

	For Silver Sa'fa	For Golden and Platinum Sa'fa
Thermal Transmittance (Summer U-value) in W/m^2K	1.9 (max)	1.7 (max)
Shading Coefficient (SC)	0.25 (max)	0.25 (max)
Light Transmittance	0.1 (min)	0.1 (min)

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

Table (5) 501.01 - Glazing performance criteria for shopfronts and showrooms, except ground floor

Thermal Transmittance (Summer U-value) in W/m^2K	1.9 (max)
Shading Coefficient (SC)	0.76 (max)

5. For glazing elements, if the glazing area on the roof is 10% or lower than the total roof area, the following performance criteria must be met:

Table (6) 501.01 - Glazing performance criteria for roof glazing area less than 10% of total roof area

Thermal Transmittance (Summer U-value) in W/m^2K	1.9 (max)
Shading Coefficient (SC)	0.32 (max)
Light Transmittance	0.4 (min)

6. For glazing elements, if the glazing area on the roof is greater than 10% than the total roof area, the following performance criteria must be met:

Table (7) 501.01 - Glazing performance criteria for roof glazing area greater than 10% of total roof are

Thermal Transmittance (Summer U-value) in W/m^2K	1.9 (max)
Shading Coefficient (SC)	0.25 (max)
Light Transmittance	0.3 (min)

501.02 Thermal Bridges

1. For all new air-conditioned buildings, thermal bridges must either be eliminated or efficiently insulated to reduce the amount of heat transfer. Thermal bridging may occur at connection points between concrete or steel beams, external walls and columns and around doors and windows.
2. For all villas, thermal bridges can be avoided by increasing the efficiency of building envelope. The average thermal transmittance (U-value) for the building envelope must not exceed 0.40 W/m^2K.

501.03 Air Conditioning Design Parameters

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

A. Outdoor Condition of the Building

Table (1) 501.03 - Air-conditioning Design Parameters (Outdoor Condition)

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)	13.8° C (25° F)

B. Indoor Condition of the Building

Table (1) 501.03 (1) - Air-conditioning Design Parameters (Indoor Condition)

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

The heat transfer coefficients 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 heat load calculations are not known, the coefficients indicated in the latest edition of ASHRAE Fundamentals guide can be used.

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

Table (1) 501.03 - Air-conditioning Design Parameters (Safety Factor)

Sensible Heat	10%
Latent Heat	5%

Heat load calculations must be carried out for each air-conditioned space, considering peak load incidence in that space. The calculations must be carried out using software registered with Dubai Municipality.

(2) All new air-conditioned buildings shall be provided with a fresh air system. The system must ensure that the building is provided with treated fresh air for at least 95% of the year. The design temperatures that needs to be considered, are as follows:

1. Dry bulb temperature of 34° C (93° F) 2. Wet bulb temperature of 32° C (89° F)

501.04 Air Loss from Entrance and Exits

For all new air-conditioned buildings, loss of conditioned air in regularly used air-conditioned entrance lobbies, must be mitigated by use of efficient barrier system.

501.05 Air Leakage

All new air conditioned buildings with a cooling load of 1 MW or greater must be tested to demonstrate that air leakage does not exceed 10 $m^3/hr/m^2$ into or out of the building, at an applied pressure difference of 50 Pa.

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

For golden and platinum Sa'fa, whatever the required cooling load, air leakage test shall be conducted by following the previously specified values.

501.06 Shade Effect Calculations

For all new buildings other than villas, the impact of external shade factors on the building's thermal load must be calculated.

502 Chapter 2

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 approved by Emirates Authority for Standardization & Metrology (ESMA), as indicated:

1. Latest edition of UAE.S 5010 -1: Labelling - Energy efficiency label for electrical appliances, Part 1: household air conditioner.

For Golden Sa'fa: Minimum star rating of 4 For Platinum Sa'fa: Minimum star rating of 5

2. Latest edition of UAE.S 5010 -5: Labelling - Energy efficiency label for electrical appliances, Part 5: Commercial and central air-conditioners:
   - **Table 1:** Split and packaged unit including cassette type unit
   - **Table 4:** Multiple split unit.

For Golden and Platinum Sa'fa: Minimum efficiency shall be at least 10% higher than the efficiencies specified in the tables or the units must be of variable flow type.

3. Latest edition of UAE.S 5010 -5: Labelling - Energy efficiency label for electrical appliances, Part 5: Commercial and central air-conditioners:
   - **Table 2:** Water source heat pumps

4. For Chillers - Minimum efficiency requirements and test procedures as listed in table 502.01 (1):

Table (1) 502.01 - Minimum Efficiency Requirements for Chillers

Chillers 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 550/590 T3-ISO 5151
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	
Water cooled, electrically operated, centrifugal	<150 tons	6.0 COP		T1-ARI 550/590
	>=150 tons and <300 tons	6.5 COP 7.1 IPLV		
	>=300 tons	6.5COP 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 buildings where alteration, changes, modification, expansion or restoration are carried out, Demand Controlled Ventilation (DCV) using Carbon Dioxide (CO2) sensing or by other means to measure occupancy, must be used in spaces larger than 100 m^2 and having a maximum design occupancy density greater than or equal to 25 people per 100 m^2. Default occupancy density values from the latest edition of ASHRAE Standard 62.1 and 62.2., can be used when the actual occupancy is not known.

CO2 concentration set-point should be kept below 800 ppm.

An alarm must be triggered if CO2 concentration rises above 1000 ppm. This alarm can either be automatically monitored by a central control system, if available, or give a local audible or visual indication, when activated.

For all new and existing buildings with DCV, the CO2 sensors and systems must be checked and recalibrated as per manufacturer recommendations. Recalibration frequency must not exceed 12 months and must be carried out by specialized companies.

502.03 Elevators and Escalators

1. Escalators:

For all new buildings, escalators must be fitted with controls to reduce speed or to stop when no traffic is detected. Escalators shall be designed with energy saving features as described below:

a. Reduced speed control: The escalator shall reduce to a slower speed when no activity has been detected for a maximum period of 3 minutes. Detection shall be by photocell activation, placed at the top and bottom landing areas.

b. Use on demand: The escalator shall shut down when no activity has been detected for a maximum period of 15 minutes. Use of on-demand escalators must be designed with energy efficient soft start technology. The escalator shall start automatically when required. Detection shall be by photocell activation, placed at the top and bottom landing areas.

2. Elevators (lifts):

For all new buildings, elevators (lifts) must be provided with controls to reduce the energy demand. The following features must be incorporated in traction drive elevators:

a. Use of AC Variable-Voltage and Variable-Frequency (VVVF) drives on non-hydraulic elevators.

b. Energy efficient lighting inside the elevator, including controls to turn lights off when the elevator has been inactive for a maximum period of 5 minutes.

502.04 Lighting Power Density - Interior

Table (1) 502.04 - Interior Lighting Power Density

Building Type	Maximum average Watts per square metre (W/m²) across total building area
Commercial/Public: Offices, Hotels, Resorts, Restaurants	10
Educational Facilities	12
Manufacturing Facilities	13
Retail Outlets, Shopping Malls, Workshops	14
Warehouses	8

For new buildings, the average Lighting Power Density for the interior connected lighting load must not exceed the values given in Table 502.04 (1).

Lighting Power Density values for the building types not listed in Table 502.04 (1), shall not exceed the values indicated in the latest edition of ASHRAE Standards 90.1 and 90.2 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 for specific building types must not exceed the values given in Table 502.05 (1).

Table (1) 502.05 - Building Exterior Lighting Power Density

Building Area	Maximum Watts per square metre (W/m²) or linear metre
Uncovered parking lots and drives	1.6 W/m²
Walkways less than 3 m wide	3.3 W/linear metre
Walkways 3 m wide or greater	2.2 W/m²
Outdoor Stairways	10.8 W/m²
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/m²
Building Facades	2.2 W/m² 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/m²
Drive-up windows at fast food restaurants	400 W / drive-through

Lighting Power Density values for exterior areas for building types not listed in Table 502.05 (1), shall not exceed the values indicated in the latest edition of ASHRAE standard 90.1 or equivalent as approved by DEWA.

If the light power density values for external lighting exceeds the values specified in Table 502.05 (1), the additional lighting load must be powered entirely, through renewable energy sources such as photovoltaic systems or similar.

502.06 Lighting Controls

For all new buildings:

A. Occupant lighting controls must be provided so that it allows the lighting to be switched off when daylight levels are adequate or when spaces are unoccupied. It also allows the occupant to control the lighting levels.

B. Common areas such as corridors and lobbies which are not regularly occupied, the lighting levels should be reduced to a maximum level of 25% of normal condition, 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 based on occupancy level. Lighting required for safety purposes is excluded.

D. In offices, if the average design lighting power density value is less than 6 W/m² of gross floor area (GFA), then the control requirements of part C of this regulation need not apply.

E. It is recommended (optional) that in offices, the artificial lighting in spaces within 6m in depth from the exterior windows must be fitted with lighting controls. The lighting controls to incorporate photocell sensors capable of adjusting electric lighting levels and shall supplement the natural daylight, when required. The use of both artificial light and daylight must provide an illumination level at the working plane between 400 and 500 lux. When 100% of daylight is available, the lux levels may exceed 500 lux.

502.07 Electronic Ballasts

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

High frequency electronic ballasts must be labelled and must be compliant with international standards as approved by the DEWA and Dubai Municipality.

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

For all new buildings other than villas, HVAC systems shall be equipped with efficient controls to reduce energy consumption. This shall be in accordance with latest edition of ASHRAE standard 90.1 or equivalent.

The following control specification must be included within the HVAC systems:

1. Divide control systems into sub-zones with independent controls for each area of the building zones. Controls for each zone can vary based on the zone's exposure to sun or cooling load levels or by nature of usage.
2. All independent control areas shall be able to:
   - Independently control temperature.
   - Turn off the system when the building or the controlled part of the building is not occupied.
3. Central systems shall operate only when required by zonal control systems.

502.09 Control Systems for Hotel Rooms

For all new hotels, each guest room must incorporate control systems that can turn off the lighting, air conditioning and power, when the room is not occupied.

In addition, it is also recommended (optional) that each guest room incorporates control system that can turn off the air-conditioning when the balcony door / window is kept open.

502.10 Exhaust Air Energy Recovery Systems and Condensation of water

For Silver Sa'fa and for all new buildings that require treated outdoor air of over 1,000 l/s, energy recovery systems must be provided for at least 50% of the total exhaust air. The energy recovery systems must have at least 70% sensible load recovery efficiency.

For Golden Sa'fa and for all new buildings that require treated outdoor air of over 1,000 l/s, energy recovery systems must be provided for at least 60% of the total exhaust air. The energy recovery systems must have at least 75% sensible load recovery efficiency.

For Platinum Sa'fa and for all new buildings that require treated outdoor air of over 1,000 l/s, energy recovery systems must be provided for at least 70% of the total exhaust air. The energy recovery systems must have at least 80% sensible load recovery efficiency.

For Golden and Platinum Sa'fa and for all new buildings with a cooling load of 1 MW or greater, condensate water must be recollected and used as described in regulation no. 601.03. The thermal energy from the retrieved condensate water can be restored and can be re-used either in cooling the walking lanes in parking spaces or for public places within plot building limits or for cooling of potable water.

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 to prevent condensation.

1. Pipes and ducts passing through conditioned spaces must be insulated in accordance with British Standard BS 5422 or other insulation standards as 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 (1) 502.11 Minimum insulation thickness for pipes passing through unconditioned spaces

Steel pipe nominal pipe size (mm)	Temperature of contents (°C)					
	10°C		5°C		0°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	30	45	30	45	30	50
20	30	45	30	55	30	60
25	30	55	35	55	40	60
32	30	55	35	55	40	65
40	30	55	35	60	40	65
50	30	60	40	60	45	70

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

Steel pipe nominal pipe size (mm)	Temperature of contents (°C)					
	10°C		5°C		0°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
65	40	60	40	60	45	70
80	40	60	40	65	45	75
100	40	70	40	65	45	75
150	40	75	45	80	50	90
200	45	75	45	80	55	90
250	45	75	55	80	55	100
300+	70	80	75	100	80	100

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).

Minimum air temperature inside duct (°C)							
15		10		5		0	
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 must meet the requirements of regulation 701.01, Thermal and Acoustical Insulation Materials or BS 5422:2009, whichever is more stringent.

Installation for all insulations must have 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. TES shall be designed with a capacity of at least 20% of the designed plant capacity.

502.13 Ductwork Air Leakage

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

Ductworks attached to an equipment and having an external static pressure of more than 250 Pa and ductworks that are exposed to external ambient conditions or within unconditioned spaces, must be pressure tested prior to occupancy. This must be carried out as per Dubai Municipality's approved methodology and must ensure the compliant amount of air leakage is achieved.

Ductwork leakage testing must be carried out by a company that is specialised in commissioning of buildings and is DM approved.

502.14 Maintenance of Mechanical Systems

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

1. Mechanical systems must be installed in a way such that adequate access is available. This would allow for regular inspection, maintenance and cleaning of the equipment, without the need to remove or dismantle any building components.
2. The building operator must ensure that a proper maintenance manual and schedule is developed for the building. This shall be based on the instructions for preventative maintenance or recommendation from equipment manufacturer or supplier or according to the latest edition of ASHRAE Standard 180 or equivalent as approved by DM.
3. The building operator must either have a service contract with a DM approved maintenance company or provide sufficient evidences that the equipment shall 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 staff.

502.15 Control of Air Flow

For Golden and Platinum Sa'fa and for all new buildings, the fresh air supply to the building shall be controlled to prevent damage due to moisture. This is to ensure that occupant comfort, safety and health conditions are effectively maintained. This shall be achieved with appropriate and adequate use of temperature, humidity and DDC devices as part of a central building management system.

502.16 Control of Chilled Water

For Golden and Platinum Sa'fa and for all new buildings, the HVAC equipment and chilled water control shall be equipped with the hydronic balancing valves including pressure independent control valves for optimum energy usage and occupant comfort. The chilled water control shall be achieved with appropriate use of temperature, humidity and pressure monitoring devices as part of a central building management system.

502.17 Control of Air Conditioning Zones

For Platinum Sa'fa and for all new buildings, mechanical ventilation and temperature control system shall be designed such that it allows the occupants to control the air temperature and air speed in each thermal zone. In addition to achieving this requirement, there shall also be control of HVAC system in thermal zones using occupancy sensors that automatically modulate temperature and air flow-rate, based on occupancy. The system shall prevent in-efficient use of air-conditioning system, by use of interlocks in window / door / energy saving input contacts to the control devices. This shall be integrated with central building management system which can generate alarms, in case of deficient use.

502.18 Cooling of Corridors and Public Areas

For Platinum Sa'fa and for all new buildings other than villas, all open corridors and open public areas shall be cooled by use of renewable energy systems.

502.19 Air Conditioning of Parking Areas

For Golden and Platinum Sa'fa and for all new buildings other than villas, if air conditioning system is installed for cooling of parking area and in case of shortage in condensation water collected for such purpose, an indirect evaporative cooling system must be used, provided that the design comfort temperature is no less than 28° C.

502.20 Air Conditioning of Industrial Buildings

For all industrial buildings, where air-conditioning is required for areas other than areas where special systems are used for manufacturing process, air-conditioning shall be achieved by using indirect evaporative cooling system. This system shall be used, provided the design comfort temperature is no less than 28° C.

502.21 Cooling Water Purification to Enhance Cooling Efficiency

For all new buildings other than villas, chilled water system shall include water purification unit to prevent any calcification in the system. This shall also enhance the heat exchanger performance.

502.22 Heat Exchangers

For Golden and Platinum Sa'fa and for all new buildings other than villas:

1. Heat exchangers shall be designed and certified in accordance with the following:

- AHRI Liquid to Liquid heat exchanger certification program.
- The tolerances shall be as per ANSI / AHRI 400.

2. Selection shall consider thermal block load, pressure drop, thermal performance, temperature and provision for future additional loads.

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Chapter 3

Commissioning and Management

503.01 Commissioning of Building Services - New Buildings

For all new air-conditioned buildings having a cooling load of 1 MW or greater, commissioning of air distribution systems, water distribution systems, lighting, central control and building management systems, refrigeration systems and boilers must be carried out.

1. Commissioning must be carried out in accordance with the CIBSE Codes listed below or 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-2010'
   1.3. 'CIBSE Commissioning Code, Lighting, Code L-2018'
   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. Commissioning results must be recorded and available for inspection by DM.
3. 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 operator, upon completion of commissioning works.

503.02 Re-Commissioning of Building Services - Existing Buildings

For all existing buildings having a cooling load of 2 MW or greater, re-commissioning of ventilation, water systems central plant, lighting and control systems must be carried out, at least once in every 5 years. Where possible, the re-commissioning works should be carried out in accordance with the requirements of Regulation 503.01. At a minimum, systems that required to be re-commissioned should ensure that:

1. The amount of fresh air supplied from each ventilation outlet is within ± 5% of the design volume.
2. The volume of the chilled water supplied to any cooling coil is within ± 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 achieved.
8. Controls are checked and re-calibrated for operation, as designed. And to also ensure that any remote devices respond as required.
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.

Where original design requirements are not available, the contractor is to certify that after re-commissioning, the installed systems are operating correctly.

503.03 Electricity Metering

For all new buildings, meters must be installed to measure and record electricity demand and consumption of the facility as a whole. It must also provide accurate records of consumption and must be complying with DEWA specifications. All meters should be approved by DEWA.

1. For all buildings having a cooling load of at least 1 MW or gross floor area of 5,000 m^2 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 100 kW or greater must be sub-metered.
2. The building operator shall be responsible for recording the details of the energy consumption for the building and for ensuring that major electricity uses are sub-metered. Records must be kept for 5 years.
3. 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.
4. 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.
5. Virtual meters using run-hours are not acceptable as sub-meters.

503.04 Air Conditioning Metering

For all new buildings 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 installed to measure and record chilled water supply to air conditioning units. It must also 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 for calculating 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 and not 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 (CCMS)

For all new buildings having a cooling load of 1 MW or gross floor area of 5,000 m^2 or greater, must have a central control and monitoring system capable of ensuring that the building's systems operate as designed and as required during all operating conditions. The system shall provide full control and monitoring of system operations, apart from diagnostic reporting.

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

503.06 Cost of the Expected Performance Assessment

For Golden and Platinum Sa'fa and for all new buildings other than villas, the consultant must provide a detailed study on the effect of the additional requirements to meet the Sa'fa regulations. The study shall compare the cost of construction and operation of the building for the additional requirements when compared to a building without these additional requirements.

503.07 Performance and Commissioning Reports

For Golden and Platinum Sa'fa and for all new buildings other than villas, a detailed report on the performance of the building based on the design considerations must be submitted. This should include the actual performance reports for a minimum period of 6 months, of which three months shall be thermal peak months.

503.08 Sustainable Awareness

For Golden and Platinum Sa'fa and for all new buildings other than villas, the building operator must develop and provide a clear mechanism for sustainable awareness for the users of the building. This must include information on the consumption of energy and water in the building.

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 a solar photovoltaic system, it can be a solar grid connected system or a solar off-grid system.

A. The grid connected solar generator shall be connected to Dubai Electricity and Water Authority (DEWA) network, operated and maintained according to DEWA regulations.

B. For off-grid solar system, the backup off-grid load is to be indicated in the Total Connected load (TCL) along with the grid based battery charger load, if applicable.

504.02 On-Site Renewable Energy - Sustainable Water Heating System

For all new villas, labour accommodations, hotels, mosques, and educational facilities, sustainable water heaters must be used to provide the total demand of hot water for the building. In case of using solar water heaters specifically, the system must be designed to provide the building with 75% of the total demand on hot water. The tanks and pipes must be insulated.

For Golden and Platinum Sa'fa, this regulation is applied for all building typologies.

504.03 On-site Renewable Energy - Electrical Power Generation

For Golden and Platinum Sa'fa and for all new buildings, the electrical power shall be generated on-site using solar panels. The power generation shall be 10% of the electrical load of the building (excluding electrical loads for fire extinguishing system, air conditioning units and air conditioning system pumps).

If sufficient space is not available to achieve the above percentages, then the electrical power shall be generated to cover 30% of the lighting load of the common areas, provided that the capacity of the solar panels shall not be less than 20 kWp.

505 Chapter 5

Energy Demand

505.01 Reduction of Energy Demand

For Golden and Platinum Sa'fa and for all new buildings, innovative ideas and new mechanisms shall be provided that would contribute for at least 5% reduction in energy demand. These ideas or new mechanisms shall not be from the requirements listed in the regulations.

505.02 Smart Building

For Platinum Sa'fa and for all new buildings, various building equipment and systems shall be provided with intelligent techniques to control and reduce the energy and water consumption of the building. The intelligent techniques shall also ensure the safety and comfort of the building occupants.

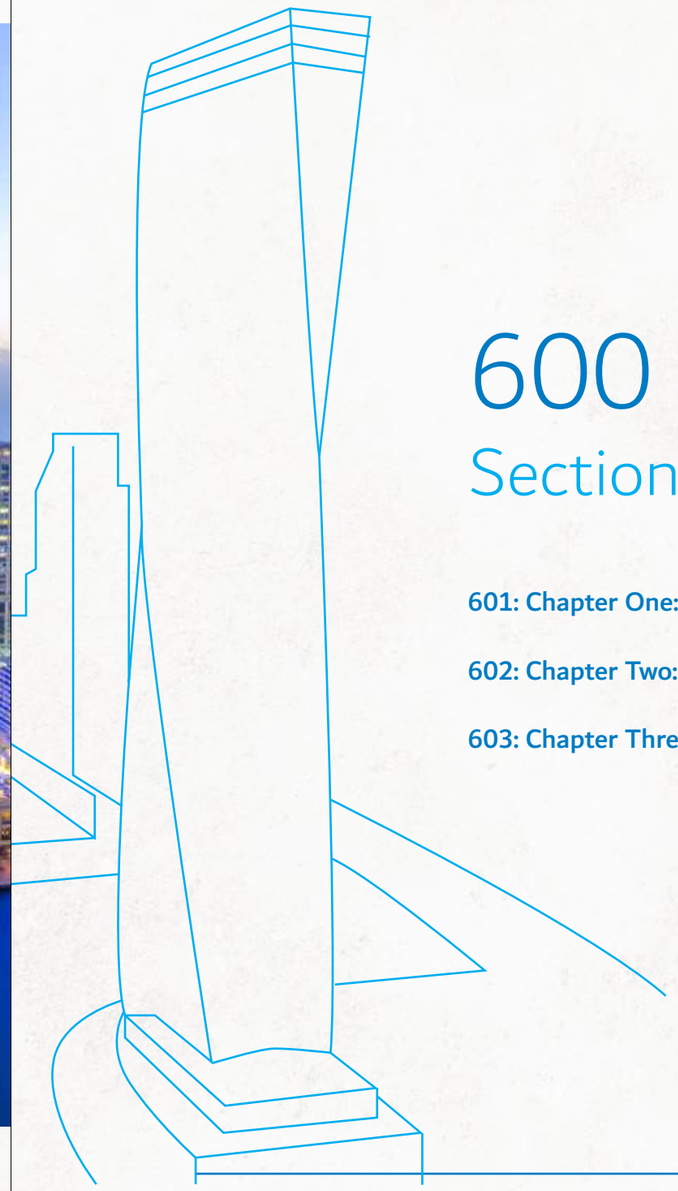
505.03 Efficiency of Building Performance

For Golden and Platinum Sa'fa and for all new buildings, the following requirements can be replaced by using techniques that enhances the building performance.

501.01	Minimum Envelope Performance Requirements	502.18	Cooling of Corridors and Public Areas
501.02	Thermal Bridges	502.22	Heat Exchangers
502.04	Lighting Power Density - Interior	503.06	Cost of the Expected Performance Assessment
502.05	Lighting Power Density - Exterior	503.07	Performance and Commissioning Reports
502.10	Exhaust Air Energy Recovery Systems and Condensate water	504.03	On-Site Renewable Energy - Electrical Power Generation
502.16	Control of Chilled Water	505.01	Reduction of Energy Demand

The techniques used should increase the energy savings of the building. The energy savings percentage of the building when compared to a building designed with Silver Sa'fa regulations shall be at least 15% for Golden Sa'fa and 20% for Platinum Sa'fa.

Water



600
Section Six

601: Chapter One: Conservation & Efficiency

602: Chapter Two: Commissioning & Water Management

603: Chapter Three: Onsite Systems: Recovery & Treatment

601

Chapter 1

Conservation and Efficiency

601.01 Water Efficient Fittings

For all new buildings, following must be used:

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

Table (1) 601.01 Maximum Flow Rate

Fixture Type	Maximum Flow Rate
Showerheads	8 l/min
Hand wash basins	6 l/min
Kitchen sinks	7 l/min
Dual Flush Toilets	6 l Full flush
Urinal	3 l Part flush
External Wall and Exposed Floor	1l per flush or waterless

B. Dual Flush toilets.

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

D. Cisterns serving single or multiple urinals in public, commercial and industrial buildings with manual or automatic flush controls that operate based on usage patterns. Only sanitary flushing is acceptable in the event of building closure or shutdown (including overnight).

Faucets installed for specialized application may be exempt from meeting the flow rates, subject to Dubai Municipality's approval.

601.02 Condensate Drainage

For all buildings including existing buildings, where condensate water is produced by air-conditioning equipment, the condensate water must be collected and disposed appropriately. Condensate collection pans and drainage pipes must be installed to provide proper drainage and to prevent any stagnant water. A minimum air break of 25 mm must be provided between the condensate piping and the wastewater pipe. If the condensate water is not reused, it must be discharged into the wastewater system through a properly sized water trap.

601.03 Condensate Reuse

For all new buildings with a cooling load not less than 350 kW, condensate water from all air-conditioning equipment, air handling units or equipment handling a mixture of return air and outside air, where the outside air is not preconditioned, must be recovered and reused. The condensate water can be re-used for irrigation, toilet flushing, or other onsite purposes wherein it will not come into direct contact with the human body. The condensate water can also be re-used for heat recovery as per the requirements set in regulation 502.10.

601.04 Water Efficient Irrigation

For all new buildings, 100% water requirement for the total exterior landscaping must be irrigated using non-potable water or by use of drip or subsoil water delivery systems. The landscaping shall also include the area for green roofs.

All irrigation systems must incorporate backflow prevention devices, if at any point they get connected to a potable water supply. The backflow prevention devices must be checked in line with the manufacturer's recommended practice.

602 Chapter 2

Commissioning and Water Management

602.01 Water Metering

For all new buildings, meters must be installed to measure and record water demand and consumption of the facility as a whole. It must also provide accurate records of consumption (tariff class meters). All meters should be approved by DEWA and comply with DEWA specifications.

A. For all buildings having a cooling load of at least 1 MW or gross floor area of 5,000 m^2 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 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. Virtual meters using run-hours are not acceptable as sub-meters.

F. 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 Golden and Platinum Sa'fa and for all new buildings, the building must be provided with a system for the collection and reuse of greywater (15% for Gold, 30% for Platinum).

For all cases and Sa'fa levels, if a system is installed for the collection and reuse of greywater produced within the building or uses Treated Sewage Effluent (TSE) from an external source, the following must be complied:

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

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

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

For all new commercial car washing facilities, at least 50% of the wastewater generated must be recovered and re-used.

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 line to the individual cooling towers. A daily log of water use must also be kept.

700
Section Seven

701: Chapter One: Materials and Resources

702: Chapter Two: Waste Management

701 Chapter 1

Materials and Resources

701.01 Thermal and Acoustical Insulation Materials

For all new buildings, insulation materials that are installed in the building must:

1. Be manufactured without the use of Chlorofluorocarbons (CFCs).
2. Be non-toxic and does not release toxic fumes during combustion.
3. Have 0.05 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 as per the requirements set forth by Dubai Civil Defence.
6. Thermal Insulation Materials should be certified by Dubai Central Laboratory.
7. Achieve all the requirements set forth by Dubai Municipality.

All thermal and acoustical insulation must be installed as per the manufacturer's instructions and must be approved by Dubai Municipality.

701.02 Certified / Accredited Timber

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

701.03 Asbestos Containing Materials

For all new buildings and for the maintenance, addition or alteration of existing buildings, asbestos containing materials 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 that may contain percentage of lead or other heavy metals that is more than the prescribed limits set by Dubai Municipality, must not be used, unless the metal is encapsulated in systems such as a photovoltaic cell.

All paints and materials containing lead or other heavy metals must be accredited / certified from Dubai Central Laboratory 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, unless the equipment contains less than 0.23 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.

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

701.06 Recycled Content

For all new buildings, of the total materials used in the construction of the building, the following percentage of recycled content must be met:

- 5% for Silver Sa'fa
- 10% for Golden Sa'fa
- 15% for Platinum Sa'fa

701.07 Regional Materials

For all new buildings, of the total materials used in the construction of the building, the following percentage of materials must be procured regionally:

- 5% for Silver Sa'fa
- 10% for Golden Sa'fa
- 15% for Platinum Sa'fa

701.08 Composite Wood Products

For all new buildings, the composite wood products that are used in the interior of the building, the added urea-formaldehyde resins must be within the accepted percentage as prescribed by Dubai Municipality.

702 Chapter 2

Waste Management

702.01 Construction and Demolition Waste

For all new buildings except buildings in CBD area, at least 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 shall be implemented as follows:

1. Concrete waste must be diverted to Construction Waste Treatment Plant.
2. Other recyclable materials such as woods, plastics and metals can be re-used at site.
3. Excavated soil, land-clearing debris and hazardous waste must be diverted to places designated by the concerned departments of Dubai Municipality (these materials are exempt while calculating the percentages for recycling or reuse).

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 10 m^2. The area does not need to be designated, solely for the purpose of bulky waste collection (e.g. An area can be set aside in the car park area).

The bulky waste storage area must be reachable and must not restrict access to the building. It must also comply with all fire and safety requirements.

702.03 Waste Storage

For all new villas and apartments, domestic kitchens must be provided with a minimum 2 storage facilities of 10 l waste receptacles. This shall be clearly labeled as 'recyclable' and 'non-recyclable'. The storage facility should be in a proper place within the kitchen.

702.04 Waste Collection

For all new buildings which require chute for general waste as per Dubai Municipality Building Regulations, one of the following must be provided:

1. A second chute must be provided to handle recyclable material and should discharge it into a separate receptacle within the waste management area; or

2. The garbage room on each floor must have a minimum floor area of 2 m^2, where recyclable waste can be stored, until collected by the building operator on a daily basis. Waste must be transported in a service lift and must be discharged into a designated receptacle within the waste management area.

All new buildings which does not require chute for general waste, in accordance with Dubai Municipality Building Regulations, the garbage room on each floor must have a minimum floor area of 3 $m^{2,}$ where non-recyclable and recyclable waste can be stored, until collected by the building operator on a daily basis. Waste must be transported in a service lift and must be discharged into a designated receptacle within the waste management area.

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 must comply with the requirements for the location, access and specifications of general waste areas set in 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 provided in the general waste collection:

The size of the room must be increased by 10% but not less than 5 m^2, which would allow additional manoeuvrability 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, as indicated in Table 702.05 (1).

Where the Total Built Up Area (BUA) of the building falls between the figures outlined in the below table, linear interpolation must be used to determine an appropriate percentage area for the recyclable storage space.

Table (1) 702.05 - Sizing Requirements

Built Up Area (BUA)	Minimum Space for Storage of Recyclables
Less than 500 m^2	7.5 m^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