

1.0	Condensate Drainage					601.02																																																																																																											
	For all buildings, including existing buildings, at all points where condensate is produced by the operation of air conditioning equipment, there must be a means of collecting and disposing of the water. Condensate collection pans and drainage pipes must be installed to prevent standing water and to provide drainage. A minimum air break of twenty five (25) mm must be provided between the condensate piping and the wastewater pipe. If the condensate is not to be reused, it must be discharged to the wastewater system through a properly sized water trap.					Villas																																																																																																											
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3.0	Background <p>The high humidity in Dubai results in significant amounts of condensate being produced by air conditioning equipment. If this condensate is not collected and disposed of correctly there is potential for damage to the building and also health hazards as standing water can be a breeding place for mosquitoes or promote mould growth.</p> <p>The condensate can be pumped, collected and reused in irrigation or flushing of toilets, although there is no requirement for reuse under this regulation. Condensate reuse is addressed by Regulation 601.03 Condensate Recovery.</p>																																																																																																																
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## 5.0 Outcome / Benefit

With the hot and humid climate in Dubai, air conditioning is needed in most buildings. Correct disposal of condensate will contribute to the air conditioning systems' efficiency (and therefore aid in a reduced cooling load) and to reduced indoor air quality hazards. Poor condensate collection and disposal can result in significant and costly damage to buildings and to air conditioning systems. In addition, systems should perform at their most efficient levels to ensure economic efficiency, which is unlikely to occur if condensate drainage is not properly handled. Growth of mould and the associated health hazards can result from ineffective condensate drainage. Bacteria can contaminate indoor air, leading to an unhealthy environment for building occupants.

## 6.0 Guidance

### 6.1 General

Locations where condensate may occur in a building, such as air handling units and air conditioning systems, should be identified.

Adequate slopes must be incorporated in all condensate collection pans and pipes. There should be no dead ends or pipes which slope upwards.

Condensate drains should not be connected directly to a building wastewater system unless a standard water trap is fitted. A water trap comprises a permanent body of water which forms a barrier to air or fumes passing that point in either direction. This ensures that no bacteria can grow back up the condensate line to contaminate indoor air, and that sewer gases are not drawn up the drain and into the building.

The purpose of the air break requirement is to stop cross-contamination between the waste stream and the air conditioning equipment.

The use of plastic piping for condensate drainage may result in sagging between support fronts when subject to heat in Dubai's warm conditions. This may create zones where condensate may pool and stagnate. Care must be taken to ensure that adequate support is provided to eliminate this problem.

### 6.2 Technical Data and Specifications

No specific specification

## 7.0 Compliance

### 7.1 Responsibilities Matrix

	Consultant or Contractor	User / Operator	DM	DEWA	Other Government Department	3 <sup>rd</sup> party
Design/permit application	✓		✓			
Construction						
Commissioning/Completion	✓		✓			
Operation						
Refurbishment	✓		✓			
Demolition						

### 7.2 Consultant Document Requirements

Lifecycle Stage	Document Requirements
Design/permit application	Green Building Declaration Completed Self Assessment MEP drawings
Construction	n/a
Commissioning/Completion	Completed Green Building Site File
Operation	n/a
Refurbishment	Any works requiring a building permit from DM are required to comply with the Green Buildings Regulations for Dubai.
Demolition	n/a



**8.0****Common Practices/ Solutions**

It is common practice to collect and dispose of condensate to ensure that there is no damage or health concern resulting from the uncontrolled drainage of condensate.

**9.0****References.**

No references



1.0	Condensate Recovery	601.03																																																																																																											
	For all new buildings with a cooling load equal to or greater than three fifty (350) kilowatt (kW), condensate water from all air conditioning equipment units handling outside air, or a mixture of return air and outside air where the outside air is not preconditioned, must be recovered and used for irrigation, toilet flushing, or other onsite purpose.	Villas																																																																																																											
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3.0	Background <p>Regulation 601.02 requires the condensate from air conditioning equipment to be collected and drained to a suitable location. Rather than draining this water into the sewer system, condensate can be captured and used for irrigation and other various non-potable water applications on site. Condensate water is relatively free of minerals and other solids and therefore a good source of non-drinking water. Condensate should not be considered potable because it can contain dissolved contaminants and bacteria.</p>																																																																																																												
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**5.0 Outcome/ Benefit**

The recovery and use of condensate water will reduce water demand from other sources, e.g. potable or treated sewage effluent (TSE).

**6.0 Guidance****6.1 General**

The cooling load is calculated as part of the building permit application process. Buildings covered by this regulation will normally have one (or more) main air handling unit which conditions the outside fresh air and cools it to the required temperature for the building. The size of these units and the amount of condensation produced in cooling the air will result in the production of significant quantities of water. This water should not be discharged to waste but be reused for non-potable water applications. Condensate is of a higher quality than Treated Sewage Effluent (TSE) and does not require treatment before use. Condensate water is not suitable for drinking.

While the largest amount of condensate will be produced from the main air handlers in a building and others processing outside air, many other devices will also produce condensate. These devices should be considered as additional sources of condensate for capture and reuse.

Building Regulation 601.02 Condensate Drainage requires that all condensate be captured in a proper manner.

**6.2 Technical Data and Specifications**

The means of collecting and re-using condensate water will vary for each building. The requirements detailed in Regulation 603.01, when graywater is used in a building, must also be applied to condensate re-use.

**7.0 Compliance****7.1 Responsibilities Matrix**

	Consultant or Contractor	User / Operator	DM	DEWA	Other Government Department	3 <sup>rd</sup> party
Design/permit application	✓		✓			
Construction						
Commissioning/Completion	✓		✓			
Operation						
Refurbishment	✓		✓			
Demolition						

**7.2 Consultant Document Requirements**

Lifecycle Stage	Document Requirements
Design/permit application	Green Building Declaration Completed Self Assessment MEP drawings
Construction	n/a
Commissioning/Completion	Completed Green Building Site File
Operation	n/a
Refurbishment	Any works requiring a building permit from DM are required to comply with the Green Buildings Regulations for Dubai.
Demolition	n/a

**8.0 Common Practices/ Solutions**

Condensate from air conditioning systems is becoming recognised internationally as an alternative to potable water for many applications. One of the largest condensate recovery systems in the world has been incorporated into the design of the Burj Dubai.

**9.0 References.**

No references



1.0	Water Efficient Irrigation	601.04
	<p>For all new buildings, one hundred percent (100%) of the total exterior landscaping must be irrigated using non-potable water or drip or subsoil water delivery systems. The landscaping includes green roofs.</p> <p>All irrigation systems must incorporate, at any point that they connect to a portable water supply, backflow prevention devices which must be checked every twelve (12) months. Testing must be in line with the manufacturer’s recommended practice for field testing or any other testing regime approved by Dubai Municipality.</p>	Villas
		Residential/ Commercial
		Public Buildings
		Industrial

2.0	Intent/Goal
	<div><input type="checkbox"/> Ecology and Planning</div> <div><input type="checkbox"/> Building Vitality</div> <div><input type="checkbox"/> Resource Effectiveness: Energy</div> <div><input checked="" type="checkbox"/> Resource Effectiveness: Water – Conservation and Efficiency</div> <div><input type="checkbox"/> Resource Effectiveness: Materials and Waste</div>

3.0	Background
	<p>Dubai’s hot climate makes the responsible use of water resources a key element of sustainable development. Landscape irrigation accounts for a high percentage of the total water use in Dubai. Therefore, large potential savings in water use can be achieved by using efficient irrigation systems.</p> <p>Many irrigation systems deliver the required amount of water for specific plant types. Some of these systems are more efficient than others. As an example, drip and subsoil irrigation applies low pressure water slowly and evenly directly to the plant’s roots. Sprayed irrigation waters all areas and is more difficult to control, while using considerably more water than drip systems. It is important that the most water efficient means of irrigation be used in Dubai to conserve water.</p>

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## 5.0 Outcome/ Benefit

This regulation will reduce the use of potable water for landscape irrigation by requiring either the use of non-potable water or the use of efficient means of irrigation. A reduction in the amount of potable water for landscape irrigation will result in cost savings.

## 6.0 Guidance

### 6.1 General

The requirement that 100% of the outside landscaping area of a building site (including green roofs) be irrigated by drip or subsoil water delivery systems recognises that these type of irrigation systems are readily available, can be used for a variety of plants (including turf) and would contribute substantially to water savings in Dubai.

If other forms of irrigation are used, these must not use potable water.

The following are recommendations for irrigation planning:

- The use of recycled water for irrigation can contribute to reduce the use of potable water. The use of grey water for irrigation is addressed in regulation 603.01 Wastewater Reuse. The use of Treated Sewage Effluent (TSE) for irrigation from sources approved by Dubai Municipality should also be considered and implemented to the extent feasible.
- Plants should be located and grouped according to their water requirements. This allows for an irrigation schedule to apply the appropriate amount of water to each landscaped area. Trees, shrubs, groundcover, perennials, and annuals that naturally grow together and use about the same amount of water should be grouped together.
- Automatic irrigation systems' watering time and schedule should be adjusted throughout the year as the weather or the seasons change. In addition, routine maintenance of the irrigation system contributes to keep the system running efficiently.
- Night time irrigation is more efficient since evaporation is much lower and wind usually decreases at night.
- Drip irrigation systems should be implemented to dispense water for optimal plant health.
- Buried irrigation systems are very effective in delivering low levels of water to plant roots.

### 6.2 Technical Data and Specifications

There is a possibility that under certain conditions backflow from the irrigated ground could be drawn back into the potable water system. Precautions must be taken to ensure that there is no possibility of cross contamination between the irrigation system and the potable water supply.

Backflow preventers should be special devices designed for this purpose or, at the least, comprise two non-return valves with appropriate fittings so that any backflow can be detected. The systems must be checked and maintained as detailed in the regulation.

Backflow prevention device manufacturers will provide recommended maintenance and testing requirements. The devices are checked to ensure that they operate correctly and do not allow any back flow when the supply water pressure is reduced. Testing must be carried out at least once every 12 months.



Double and single backflow prevention devices

## 7.0 Compliance

### 7.1 Responsibilities Matrix

	Consultant or Contractor	User / Operator	DM	DEWA	Other Government Department	3 <sup>rd</sup> party
Design/permit application	✓		✓			
Construction						
Commissioning/Completion	✓		✓			
Operation		✓	✓			
Refurbishment	✓		✓			
Demolition						

### 7.2 Consultant Document Requirements

Lifecycle Stage	Document Requirements
Design/permit application	Green Building Declaration Completed Self Assessment Irrigation and drainage plans
Construction	n/a
Commissioning/Completion	Completed Green Building Site File
Operation	Water consumption log
Refurbishment	Any works requiring a building permit from DM are required to comply with the Green Buildings Regulations for Dubai.
Demolition	n/a

## 8.0 Common Practices / Solutions

Some countries, including parts of Australia ban the use of potable water for irrigation. The use of backflow prevention devices is common in most countries where ever there is a possibility of cross contamination of potable water supplies.

## 9.0 References.

The American Backflow Prevention Association (ABPA) is dedicated to backflow education and technical assistance. which is available from their website <http://abpa.org/>

Additional information and links are available at <http://www.nobackflow.com/backflow.htm>



1.0	Water Metering	602.01
	<p>For all new buildings, meters must be fitted to measure and record water demand and consumption of the facility as a whole and to provide accurate records of consumption (tariff class meters):</p> <p>A. For all buildings with a cooling load of at least 1 megawatt (MW) or gross floor area of 5,000 sqM 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.</p> <p>B. The building operator shall be responsible for recording water consumption for each individual meter. Records must be kept for five (5) years.</p> <p>C. Each individual tenancy in the building must have a sub-meter installed when a building tariff meter is not present.</p> <p>D. 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</p> <p>E. All meters must be capable of remote data access and must have data logging capability and complying with DEWA specifications. All meters should be approved by DEWA.</p> <p>F. Virtual meters using run-hours are not acceptable as sub-meters.</p> <p>G. The sub-meters should be used for demand management and cost allocation purposes.</p>	Villas
		Residential/ Commercial
		Public Buildings
		Industrial
2.0	Intent/Goal	<div><div><input type="checkbox"/> Ecology and Planning</div><div><input type="checkbox"/> Building Vitality</div><div><input type="checkbox"/> Resource Effectiveness: Energy</div><div><input checked="" type="checkbox"/> Resource Effectiveness: Water – Commissioning &amp; Management</div><div><input type="checkbox"/> Resource Effectiveness: Materials and Waste</div></div>
3.0	Background	<p>Many buildings in Dubai have more than one tenant and it is sometimes difficult to monitor the water consumption of a building as a Whole. If this data is available it can be used as an aid in determining a building’s water performance. This regulation will result in the metering infrastructure being in place to allow this data to be obtained.</p> <p>The regular recording of the water consumption of the building as a whole and of the individual tenants would make it possible to identify any poorly performing areas and take steps to identify and remedy any issues arising. Any significant leakage could also be identified by comparing usage records.</p>



## 4.0 Applicability

Main Typology Criteria	Typology Subdivisions	New	Existing	Typology Subdivisions	New	Existing
Villa		✓				
Residential/Commercial	Residential			Commercial		
	Apartment	✓		Hotels	✓	
	Offices	✓		Resorts	✓	
	Labour Accommodation	✓		Restaurants/Food Outlets	✓	
	Student Accommodation	✓		Laboratories	✓	
Public Buildings	Healthcare Facilities	✓		Retail Outlets	✓	
	Educational Facilities	✓		Post Offices	✓	
	Government Buildings	✓		Banks	✓	
	Worship Houses	✓		Museums	✓	
	Petrol Stations	✓		Cinema/theatres	✓	
	Shopping Mall	✓		Historical/heritage Buildings	✓	
Industrial	Workshops	✓				
	Factories	✓				
	Warehouses	✓				

## 5.0 Outcome / Benefit

Metering helps building occupiers to understand where all the water is being used, and enables them to identify and monitor patterns of water use and to implement actions to reduce water use

## 6.0 Guidance

### 6.1 General

Metering strategies should be considered at the design stage to ensure that the requirements of this regulation are met.

Sub-meters must be used to measure the water consumed by individual large consumers. A reasonable provision is for 90% of the estimated annual water consumption to be metered.

If a DEWA tariff meter is to be installed for the complete building, an addition meter is not required.

Areas of major water use of the building and major water uses in and around the building include Irrigation and Cooling Towers systems. Where a building uses non-potable water, such as Treated Sewage Effluent (TSE) or seawater, the consumption should also be metered.

The meters should be read on a monthly basis and the readings recorded in a building log book to compile the annual usage data.

The log book must be available for inspection and the building owner may be required to provide this to DEWA or its representatives.

The information obtained can be exported to a suitable spreadsheet or data management system for analysis and report generation, or may be read manually, and the data recorded in a suitable log book.

A computerized spreadsheet system is acceptable but regular backup copies of the data should be kept. The.



Reporting template to be used must clearly show the meter reference number, location, and the monthly meter readings and consumption. This is to ensure that there is no confusion over the readings from any specific meter. These meters will not be used as DEWA tariff meters and must be read by the building owner's representative.

Selected water meters must be suitable for the pipe size where they are fitted and not result in a large water pressure drop or in inaccurate readings.

## 6.2 Technical Data and Specifications

Meter suppliers will be able to provide full technical and installation details.

## 7.0 Compliance

### 7.1 Responsibilities Matrix

	Consultant or Contractor	User / Operator	DM	DEWA	Other Government Department	3 <sup>rd</sup> party
Design/permit application	✓		✓			
Construction						
Commissioning/Completion	✓		✓			
Operation		✓	✓			
Refurbishment	✓		✓			
Demolition						

### 7.2 Consultant Document Requirements

Lifecycle Stage	Document Requirements
Design/permit application	Green Building Declaration Completed Self Assessment MEP drawings
Construction	
Commissioning/Completion	Completed Green Building Site File
Operation	Water consumption log
Refurbishment	Any works requiring a building permit from DM are required to comply with the Green Buildings Regulations for Dubai.
Demolition	n/a

## 8.0 Common Practices / Solutions

BREEAM requires a meter with pulsed outlet on all buildings and each retail unit. Swimming pools should have their own meter.

## 9.0 References

There are no referred documents for this regulation.





1.0	Wastewater Reuse	603.01
	<p><b>For all buildings, if a system is installed for the collection and reuse of greywater produced within the building or for the use of Treated Sewage Effluent (TSE) from an external source, the following is required:</b></p> <ul style="list-style-type: none"> <li><b>A. The building must be dual-plumbed for the collection and recycled use of drainage water (greywater). Any pipes which transport greywater must be colour-coded differently from pipes that are used for potable (drinking standard) water and be labelled 'Not Suitable for Drinking.'</b></li> <li><b>B. There must be a minimum air break of twenty five (25) mm between any potable water sources and greywater collection systems.</b></li> <li><b>C. Greywater must not be used for purposes where it will come into contact with the human body. It must be treated to the standard required by Dubai Municipality.</b></li> </ul> <p><b>For all new commercial car washing facilities, they must recover and reuse at least fifty percent (50%) of their wastewater.</b></p>	<div>Villas</div> <div>Residential/ Commercial</div> <div>Public Buildings</div> <div>Industrial</div>
2.0	<b>Intent/Goal</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Ecology and Planning</li> <li><input type="checkbox"/> Building Vitality</li> <li><input type="checkbox"/> Resource Effectiveness: Energy</li> <li><input checked="" type="checkbox"/> <b>Resource Effectiveness: Water – On-Site Systems: Recovery &amp; Treatment</b></li> <li><input type="checkbox"/> Resource Effectiveness: Materials and Waste</li> </ul>	
3.0	<b>Background</b> <p>Greywater is waste water that has not come into contact with toilet or food waste. Greywater includes water from showers, wash basins, laundry sinks, and clothes washers.</p> <p>Currently, greywater collection systems are not a common part of the building infrastructure in Dubai. Most greywater is collected and treated as sewage. Greywater comprises 50-80% of residential wastewater and can be collected separately and be used for flushing of toilets or for irrigation of landscaping, but will require special measures to be undertaken. This regulation outlines these measures..</p> <p>As awareness of the need to conserve potable water in Dubai increases, there is rising interest in collecting and re-using some of the wastewater streams from buildings. This regulation is introduced to ensure that, when such a system is installed, measures are taken to protect the building users from possible cross contamination between the drinking water and wastewater systems. This will be achieved by ensuring that there are no direct connections between pipes carrying potable water and those conveying greywater. The greywater pipes must be easily distinguished from those carrying potable water. This regulation also includes a requirement to treat greywater to a minimum standard (specified in Dubai Municipality Technical Guideline 62) to ensure that the reused greywater does not become a health hazard.</p> <p>Due to the existence of an established circulation infrastructure for treated sewage effluent (TSE) in Dubai, building developers and owners may have the option to use TSE or to collect and reuse greywater.</p> <div data-bbox="1014 1661 1516 1999" data-label="Image"> </div> <p style="text-align: right;">Car washing facilities must recycle at least 50% of water</p> <p>Commercial car washing facilities consume large amounts of water, a portion of which can be captured and reused. Therefore, this regulation aims to increase the reuse of wastewater from these facilities.</p>	





## 4.0 Applicability

Main Typology Criteria	Typology Subdivisions	New	Existing	Typology Subdivisions	New	Existing
Villa		✓				
Residential/ Commercial	Residential			Commercial		
	Apartment	✓		Hotels	✓	
	Offices	✓		Resorts	✓	
	Labour Accommodation	✓		Restaurants/Food Outlets	✓	
	Student Accommodation	✓		Laboratories	✓	
Public Buildings	Healthcare Facilities	✓		Retail Outlets	✓	
	Educational Facilities	✓		Post Offices	✓	
	Government Buildings	✓		Banks	✓	
	Worship Houses	✓		Museums	✓	
	Petrol Stations	✓		Cinema/theatres	✓	
	Shopping Mall	✓		Historical/heritage Buildings	✓	
Industrial	Workshops	✓				
	Factories	✓				
	Warehouses	✓				

## 5.0 Outcome / Benefit

The implementation of a greywater system, as well as recovering and reusing wastewater of commercial car washes, will contribute to water resources conservation.

## 6.0 Guidance

### 6.1 General

Greywater collection and reuse systems should be particularly considered for (but not limited to): public buildings (such as government buildings), shopping malls, hotels and mosques.

The piping collection system for greywater can be connected to shower drains, bathtub drains, bathroom wash basin drains and laundry water drains. It must not be connected to toilets, kitchen sinks or dish-washing machines. Piping must be colour-coded (painted or coloured pipes) and different from that used for piping potable water. Greywater piping must also be clearly labelled 'Not Suitable for Drinking'.

Faucets and showerheads are not normally in contact with wastewater and natural air breaks occur at these points.

A collection tank for greywater must be provided in each building and the greywater must be filtered before entering the collection tank. This regulation applies to building-specific greywater systems; therefore greywater must be treated locally before reuse within the building or at the building site. Minimum greywater treatment and testing standards are specified in Dubai Municipality Technical Guideline 62 to ensure that the reused water does not become a health hazard. These treatment standards must be used for all greywater before reuse. Greywater should not be stored longer than 48 hours in order to prevent build-up of contaminants.

If the unused greywater has to be drained into the regular sewage system, it should be conveyed through a connecting valve system fitted with a backflow preventer, which will stop any sewage water from entering the greywater system. Any overflow from the storage tank must also be connected to the sewage system.

Commercial car washing facilities must recover and reuse a minimum of 50% of their wastewater. Recycled



water can be used to lather cars while they move through the automated wash. The requirement of reusing 50% of the water is based on car washing practices and studies carried out internationally (such as the study of Carwash Water Reclamation in Kuwait, This study found that 75% of the water can be recycled and reused for further local usages such as performing new carwashes. An average consumption of about 25% of freshwater is needed as feed to perform final rinses and make-ups. Therefore, the implementation of a 50% wastewater recycling is considered an adequate threshold.

It is also recommended that pool filters' back wash water be captured and recycled where feasible.

## 6.2 Technical Data and Specifications

There are numerous web sites which provide background and technical details for using greywater. These include:

<http://www.graywater.net/>  
<http://www.greywater.com/>  
<http://www.recycledwater.com.au>

## 7.0 Compliance

### 7.1 Responsibilities Matrix

	Consultant or Contractor	User / Operator	DM	DEWA	Other Government Department	3 <sup>rd</sup> party
Design/permit application	✓		✓			
Construction	✓		✓			
Commissioning/Completion	✓		✓			
Operation						
Refurbishment	✓		✓			
Demolition						

### 7.2 Consultant Document Requirements

Lifecycle Stage	Document Requirements
Design/permit application	Green Building Declaration Completed Self Assessment MEP drawings and specifications
Construction	Green Building Site File with orders and delivery notes for the correctly specified materials
Commissioning/Completion	Completed Green Building Site File
Operation	n/a
Refurbishment	Any works requiring a building permit from DM are required to comply with the Green Buildings Regulations for Dubai.
Demolition	n/a

## 8.0 Common Practices / Solutions

There is increased interest in the collection and reuse of grey water and some countries or local authorities require that it be undertaken in certain areas.

It is encouraged in various building rating schemes. BREEAM credits recovery of water from 80% of wash hand basins and showers and vehicle washing facilities with water reclaim system. LEED credits reducing potable water use by recovering and using greywater.

## 9.0 References.

Dubai Municipality Technical Guideline 62, The Reuse and Irrigation of Wastewater and Sludge.

Kuwait Institute for Scientific Research, Water Technologies Department. Carwash Water Reclamation in Kuwait, 2006. Presented at EuroMed 2006 conference on Desalination Strategies in South Mediterranean Countries: Cooperation between Mediterranean Countries of Europe and the Southern Rim of the Mediterranean. Sponsored by the European Desalination Society and the University of Montpellier II, Montpellier, France, 21–25 May 2006.



1.0	Water Consumption for Heat Rejection including Cooling Towers	603.02																																																																																																											
	For all new buildings:																																																																																																												
	Potable water supplied by Dubai Electricity and Water Authority (DEWA) must not be used for heat rejection purposes.	Residential/ Commercial																																																																																																											
	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.	Public Buildings																																																																																																											
	A separate totalizing meter must be fitted on the water supply to individual cooling towers and a daily log of water use must be kept	Industrial																																																																																																											
2.0	Intent/Goal <ul style="list-style-type: none"><li><input type="checkbox"/> Ecology and Planning</li><li><input type="checkbox"/> Building Vitality</li><li><input type="checkbox"/> Resource Effectiveness: Energy</li><li><input checked="" type="checkbox"/> Resource Effectiveness: Water – On-Site Systems: Recovery &amp; Treatment</li><li><input type="checkbox"/> Resource Effectiveness: Materials and Waste</li></ul>																																																																																																												
3.0	Background <p>Heat rejection from water cooled air conditioning systems, particularly cooling towers use large amounts of water due to the losses from evaporation and the need to flush out the buildup of dissolved minerals in the water. One method to reduce the need for potable water in cooling towers is to use other sources of water for that purpose, such as Treated Sewage Effluent (TSE), seawater or other forms of recycled water. Dubai Municipality is able to supply TSE to many sites in Dubai. The use of TSE for district cooling plants will both reduce the use of potable water in Dubai and reduce costs for the system operator</p>																																																																																																												
4.0	Applicability <table><tr><th>Main Typology Criteria</th><th>Typology Subdivisions</th><th>New</th><th>Existing</th><th>Typology Subdivisions</th><th>New</th><th>Existing</th></tr><tr><td>Villa</td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td rowspan="6">Residential/Comm ercial</td><td>Residential</td><td></td><td></td><td>Commercial</td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>Apartments</td><td>✓</td><td></td><td>Hotels</td><td>✓</td><td></td></tr><tr><td>Offices</td><td>✓</td><td></td><td>Resorts</td><td>✓</td><td></td></tr><tr><td>Labour Accommodation</td><td>✓</td><td></td><td>Restaurants/Food Outlets</td><td>✓</td><td></td></tr><tr><td>Student Accommodation</td><td>✓</td><td></td><td>Laboratories</td><td>✓</td><td></td></tr><tr><td rowspan="6">Public Buildings</td><td>Healthcare Facilities</td><td>✓</td><td></td><td>Retail Outlets</td><td>✓</td><td></td></tr><tr><td>Educational Facilities</td><td>✓</td><td></td><td>Post Offices</td><td>✓</td><td></td></tr><tr><td>Government Buildings</td><td>✓</td><td></td><td>Banks</td><td>✓</td><td></td></tr><tr><td>Worship Houses</td><td>✓</td><td></td><td>Museums</td><td>✓</td><td></td></tr><tr><td>Petrol Stations</td><td>✓</td><td></td><td>Cinema/theatres</td><td>✓</td><td></td></tr><tr><td>Shopping Mall</td><td>✓</td><td></td><td>Historical/heritage Buildings</td><td>✓</td><td></td></tr><tr><td rowspan="3">Industrial</td><td>Workshops</td><td>✓</td><td></td><td></td><td></td><td></td></tr><tr><td>Factories</td><td>✓</td><td></td><td></td><td></td><td></td></tr><tr><td>Warehouses</td><td>✓</td><td></td><td></td><td></td><td></td></tr></table>		Main Typology Criteria	Typology Subdivisions	New	Existing	Typology Subdivisions	New	Existing	Villa							Residential/Comm ercial	Residential			Commercial									Apartments	✓		Hotels	✓		Offices	✓		Resorts	✓		Labour Accommodation	✓		Restaurants/Food Outlets	✓		Student Accommodation	✓		Laboratories	✓		Public Buildings	Healthcare Facilities	✓		Retail Outlets	✓		Educational Facilities	✓		Post Offices	✓		Government Buildings	✓		Banks	✓		Worship Houses	✓		Museums	✓		Petrol Stations	✓		Cinema/theatres	✓		Shopping Mall	✓		Historical/heritage Buildings	✓		Industrial	Workshops	✓					Factories	✓					Warehouses	✓				
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5.0 Outcome/ Benefit

The implementation of this regulation will help restrict demand on DEWA potable water supplies.

6.0 Guidance

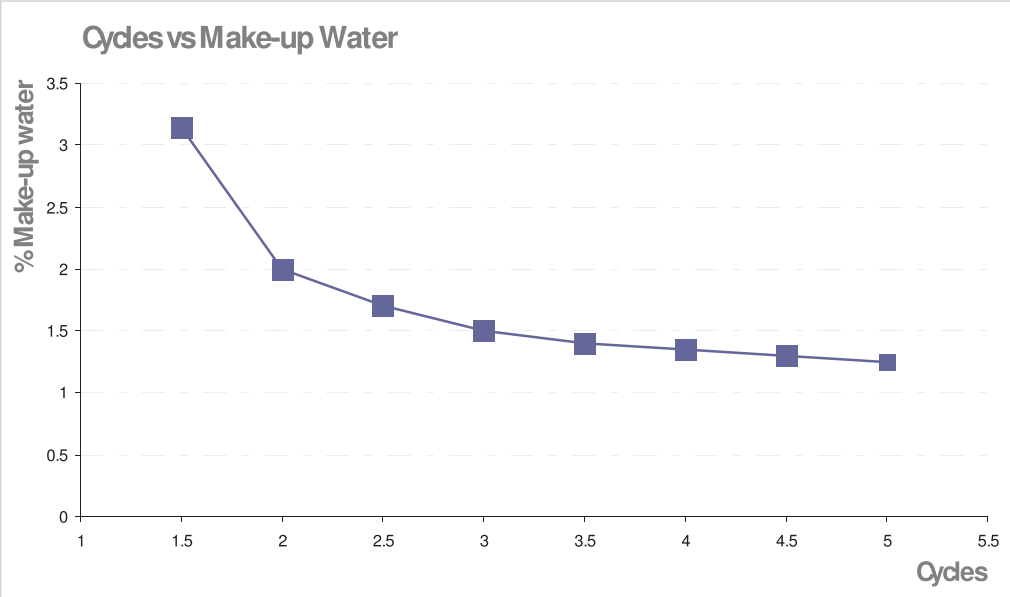
6.1 General

All cooling tower water must be treated and regularly tested according with Regulation (406.01: Legionella Bacteria and Building Water Systems), to prevent the growth of legionella bacteria.

Dubai Municipality has an established network to distribute TSE and has undertaken, in conjunction with DEWA, to provide TSE to any new district cooling plants if required.

Any TSE used for cooling towers will require a level of secondary treatment, however the reduced cost of purchasing TSE (when compared to potable water) will more than compensate for treatment costs.

A means of reducing the amount of water used by a cooling tower is by controlling the number of cycles of concentration. Cycles of concentration is defined as the number of times the dissolved minerals in the system cooling water are concentrated versus the level in the raw make-up water. The higher the cycles, the less makeup water and blow down are required.



Daily monitoring of the amount of make-up water to a cooling tower will quickly identify any malfunction which results in excessive water use. It is often difficult to visually check the amount of water being discharged by a system, so the meter readings will provide the required information to indicate any water consumption problems. Having a separate meter for the supply to each cooling tower will indicate the location of any problem

Daily monitoring of the amount of make-up water to a cooling tower will quickly identify any malfunction which results in excessive water use. It is often difficult to visually check the amount of water being discharged by a system, so the meter readings will provide the required information to indicate any water consumption problems.

Having a separate meter for the supply to each cooling tower will indicate the location of any problem.

6.2 Technical Data and Specifications

The water treatment required for cooling towers and the equipment needed to control the number of cycles of concentration are specialized items of equipment. Specifications for these equipments will be provided by the designers of the systems



## 7.0 Compliance

### 7.1 Responsibilities Matrix

	Consultant or Contractor	User / Operator	DM	DEWA	Other Government Department	3 <sup>rd</sup> party
Design/permit application	✓		✓			
Construction						
Commissioning/Completion	✓		✓			
Operation						
Refurbishment	✓		✓			
Demolition						

### 7.2 Consultant Document Requirements

Lifecycle Stage	Document Requirements
Design/permit application	Green Building Declaration Completed Self Assessment MEP drawings and specifications
Construction	n/a
Commissioning/Completion	Completed Green Building Site File
Operation	n/a
Refurbishment	Any works requiring a building permit from DM are required to comply with the Green Buildings Regulations for Dubai.
Demolition	n/a

## 8.0 Common Practices / Solutions

There is increasing interest in the use of non-potable water in cooling towers and Dubai is among the world leaders by regulating that potable water cannot be used for this purpose.

## 9.0 References

No references





# 700

## **Resource Effectiveness: Materials and Waste**

- Materials and Resources
- Waste Management



1.0	Thermal and Acoustical Insulation Materials	701.01
	<p><b>For all new buildings, insulation materials to be incorporated into the building must:</b></p> <ol style="list-style-type: none"> <li>1. Be manufactured without the use of Chlorofluorocarbons (CFC's);</li> <li>2. Be non-toxic and not release toxic fumes during combustion;</li> <li>3. Have 0.05 parts per million (ppm) or less of added formaldehyde</li> <li>4. Have a Threshold Limit Value (TLV) of 0.1 or less of Individual Volatile Organic Compounds</li> <li>5. Be fire resistant in accordance with the requirements of Dubai Civil Defence</li> <li>6. Be accredited / certified from Dubai Central Lab</li> <li>7. Achieve all the requirements of the approved specifications by Dubai Municipality</li> </ol> <p><b>All thermal and acoustical insulation must be installed as per the manufacturer's instructions after approval from Dubai Municipality</b></p>	<p>Villas</p> <p>Residential/ Commercial</p> <p>Public Buildings</p> <p>Industrial</p>
2.0	<p><b>Intent/Goal</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Ecology and Planning</li> <li><input type="checkbox"/> Building Vitality</li> <li><input type="checkbox"/> Resource Effectiveness: Energy</li> <li><input type="checkbox"/> Resource Effectiveness: Water</li> <li><input checked="" type="checkbox"/> <b>Resource Effectiveness: Materials and Waste – Materials and Resources</b></li> </ul>	
3.0	<p><b>Background</b></p> <p>The correct selection and installation of thermal and acoustical insulation materials is essential for their performance in reducing thermal and sound transfer. Many insulation materials can be easily damaged and must be protected before, during and after installation. In Dubai's humid climate insulation plays an important part in reducing the formation of condensation. Poor installation can result in water damage to other building elements.</p> <p>Large quantities of thermal and acoustical insulation materials are used in the construction of buildings and therefore it is important to minimise their environmental impact throughout their life cycle.</p>	





## 4.0 Applicability

Main Typology Criteria	Typology Subdivisions	New	Existing	Typology Subdivisions	New	Existing
Villa		✓				
Residential/ Commercial	Residential			Commercial		
	Apartment	✓		Hotels	✓	
	Offices	✓		Resorts	✓	
	Labour Accommodation	✓		Restaurants/Food Outlets	✓	
	Student Accommodation	✓		Laboratories	✓	
Public Buildings	Healthcare Facilities	✓		Retail Outlets	✓	
	Educational Facilities	✓		Post Offices	✓	
	Government Buildings	✓		Banks	✓	
	Worship Houses	✓		Museums	✓	
	Petrol Stations	✓		Cinema/theatres	✓	
	Shopping Mall	✓		Historical/heritage Buildings	✓	
Industrial	Workshops	✓				
	Factories	✓				
	Warehouses	✓				

## 5.0 Outcome/ Benefit

The proper specification, protection and installation of insulation materials ensure that the materials perform in an efficient manner, reducing heat and sound transfer and contributing to energy conservation. This regulation also aims to restrict the use of chemicals that can have significant human health or environmental impacts, in the manufacture of these materials.

## 6.0 Guidance

### 6.1 General

All insulation materials must be certified by DM .  
Conformity certificates must be renewed by DCL yearly. Materials certified by DCL are published on the Dubai Municipality website/portal.

The Montreal Protocol, to which UAE is a signatory, bans the use of CFC's and restricts the use of Hydrochlorofluorocarbons (HCFC's) in the future.

Formaldehyde and Volatile Organic Compounds have been identified as a major contributors to poor indoor air quality and 'sick buildings' and their use must be restricted.

TLVs are guidelines designed for use by industrial hygienists in making decisions regarding safe levels of exposure to various chemical substances and physical agents found in the workplace. In using these guidelines, industrial hygienists are cautioned that the TLVs are only one of multiple factors to be considered in evaluating specific workplace situations and conditions

Toxic materials may have acute effects (causing death or violent illness) or chronic effects (slowly causing irreparable harm) even in very small or trace amounts. Such materials must not be used. The release of toxic fumes during combustion must also be avoided wherever possible.



The Dubai Civil Defence Department (DCD) is responsible for setting the fire control requirements for materials used in buildings. The DCD recognises the Codes and Standards of the National Fire Protection Association (NFPA) as applicable for use in Dubai.

### Installation

Installation of insulation materials must be addressed at both the design and construction stages. Manufacturer's instructions and industry best practice must be followed during installation.

The following guidelines should be followed when constructing buildings in Dubai:

- Care during storage of insulation materials is important as many materials can be easily damaged or absorb moisture;
- Materials should be stored in dry, covered spaces away from general construction activity until installation. Particular care should be made to keep the materials dust free as much as practical;
- During installation of wall and roof insulation, roof insulation materials must have water proof vapour barriers on both sides. External wall insulation materials must have a water proof vapour barrier on at least one side. Any joints in the vapour barrier must be carefully sealed with tape where it meets other materials. The insulating material used may also form a vapour barrier.

When using insulation materials which may absorb moisture, ensure that:

- The bottom concrete layer is completely dry before applying the insulation material panels.
- When cavity walls incorporate insulation, they are sealed against air leakage;
- Any materials with evidence of mould, mildew, or moisture infiltration are removed and replaced;
- The original thickness of the thermal insulation material is maintained where possible. In cases where compression cannot be avoided, the final thickness after installation shall be sufficient to provide the amount of insulation required;
- All fixing fasteners for insulation materials are rust proof;
- When insulating above ceilings, the insulation weight does not alter the integrity of the ceiling structure; and
- Thermal bridging is avoided, especially with highly conductive metal framing systems.

Specifications must clearly address air tightness and subcontractors are responsible for carrying out the necessary sealing work. The building must be constructed so that there are no gaps in the insulation layers that could potentially compromise the integrity of the insulation system. Note that Regulation 501.05 requires the pressure testing of some buildings to ensure that the amount of air leakage is restricted

There are a variety of insulation materials available. Where possible insulation materials should be sought that are resistant to bacterial growth, as well as resistant to damage from pests or insects. Further, insulation materials should be used which are resistant to chemicals that might be used in the construction and maintenance of the building. Long term biodegradability should also be reviewed relative to deconstruction of building elements.

## 6.2 Technical Data and Specifications

Manufacturers routinely provide instructions and technical data on installation of thermal insulation. These instructions and technical data must be consulted.

Acoustical specialists are available in Dubai and may need to be consulted regarding the correct selection and application of acoustical insulation materials.

## 7.0

## Compliance

### 7.1 Responsibilities Matrix

	Consultant or Contractor	User / Operator	DM	DEWA	Other Government Department	3 <sup>rd</sup> party
Design/permit application	✓		✓			
Construction	✓		✓			
Commissioning/Completion	✓		✓			
Operation						
Refurbishment	✓		✓			
Demolition						



**7.2 Consultant Document Requirements**

Lifecycle Stage	Document Requirements
<b>Design/permit application</b>	<i>Green Building Declaration</i> <i>Completed Self Assessment</i> <i>Architectural specifications</i>
<b>Construction</b>	<i>Green Building Site File</i> with orders and delivery notes for the correctly specified materials
<b>Commissioning/Completion</b>	Completed <i>Green Building Site File</i>
<b>Operation</b>	n/a
<b>Refurbishment</b>	Any works requiring a building permit from DM are required to comply with the Green Buildings Regulations for Dubai.
<b>Demolition</b>	n/a

**8.0 Common Practices/ Solutions**


Specify maximum levels of volatile organic compounds and any other restricted components. Or require materials to meet internationally recognised certification requirements.

**9.0 References.**

The GREENGUARD Certification Program<sup>SM</sup> is an industry-independent, third-party testing program for low-emitting products and materials. Products certified by Green Guard are listed on the website <http://www.greenguard.org>

National Fire Protection Association (NFPA) Standards as applicable for use in Dubai.



1.0	Certified / Accredited Timber	701.02
	For all new buildings, at least twenty five percent (25%) by volume of the timber and timber-based products used during construction and permanently installed in the building must be from certified / accredited sources approved by Dubai Municipality	Villas
		Residential/ Commercial
		Public Buildings
		Industrial
2.0	<b>Intent/Goal</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Ecology and Planning</li> <li><input type="checkbox"/> Building Vitality</li> <li><input type="checkbox"/> Resource Effectiveness: Energy</li> <li><input type="checkbox"/> Resource Effectiveness: Water</li> <li><input checked="" type="checkbox"/> <b>Resource Effectiveness: Materials and Waste – Materials and Resources</b></li> </ul>	
3.0	<b>Background</b> <p>Historically, Dubai has imported timber and timber products. The amount of imported timber has increased substantially in recent years due to the rapid growth of the construction industry. Dubai imports timber from all over the world, including Africa, Asia, and the Americas.</p> <p>There are a number of schemes which have been developed to show that the source of timber is from environmentally responsible and sustainable forest management practices. Environmentally responsible forestry practices include preserving wildlife habitat, soil stability and water quality, sustainable timber harvesting, minimising the use of toxic chemicals and forest conservation.</p> 	



## 4.0 Applicability

Main Typology Criteria	Typology Subdivisions	New	Existing	Typology Subdivisions	New	Existing
Villa		✓				
Residential/ Commercial	Residential			Commercial		
	Apartment	✓		Hotels	✓	
	Offices	✓		Resorts	✓	
	Labour Accommodation	✓		Restaurants/Food Outlets	✓	
	Student Accommodation	✓		Laboratories	✓	
Public Buildings	Healthcare Facilities	✓		Retail Outlets	✓	
	Educational Facilities	✓		Post Offices	✓	
	Government Buildings	✓		Banks	✓	
	Worship Houses	✓		Museums	✓	
	Petrol Stations	✓		Cinema/theatres	✓	
	Shopping Mall	✓		Historical/heritage Buildings	✓	
Industrial	Workshops	✓				
	Factories	✓				
	Warehouses	✓				

## 5.0 Outcome / Benefit

This regulation promotes sustainable and environmentally responsible forest management practices. By using certified timber and timber products, projects in Dubai will encourage sustainable and environmentally responsible forestry practices in countries that export timber. Environmentally responsible forest management practices include approaches linked to the health and well being of the population near the forest, such as minimising the use of toxic chemicals and water quality considerations. They will also seek to minimise the environmental impact of logging operations including measures to protect local wildlife and biodiversity.






## 6.0 Guidance

### 6.1 General

While timber is not a major building material in Dubai the total amount of timber imported is still substantial. The requirement for the building to include at least 25% of its total amount of timber from certified sources has been established as a quantity which can be met from the present Dubai timber suppliers and higher percentages should be used when possible.



Certification schemes which are approved by Dubai Municipality include:

	<p><b>The Forest Stewardship Council (FSC)</b></p> <p>FSC is the most widely recognized timber certification organization. To date, some 41 million hectares of forest worldwide are managed to FSC's standards. FSC certification is well known to all major Dubai timber suppliers.</p>
	<p><b>Programme for Endorsement of Forest Certification (PEFC)</b></p> <p>PEFC is a network of independent national forest certification standards that effectively operates under a single brand. To date, 13 European countries have had their national forest certification systems endorsed by PEFC, amounting to a combined certified forest area of 51.6 million hectares.</p>
	<p><b>The Sustainable Forestry Initiative (SFI)</b></p> <p>The SFI program is a comprehensive system of principles, objectives and performance measures developed by professional foresters, conservationists and scientists, among others, that combines the perpetual growing and harvesting of trees with the long-term protection of wildlife, plants, soil and water quality. There are currently over 136 million acres of forestland in North America enrolled in the SFI program.</p>
	<p><b>The Canadian Standards Association (CSA)</b></p> <p>The CSA is a not-for-profit, independent standards writing organization. The CSA Sustainable Forest Management (SFM) Project was initiated in June 1994.</p>
	<p><b>Central Point of Expertise in Timber (CPET)</b></p> <p>CPET is a service developed by the UK Government, and is operated by ProForest, a company with wide experience in advising on responsible purchasing.</p>

The percentage of certified timber in the project must include materials permanently installed in the project, including (but not limited to) structural and general dimensional framing, flooring, sub-flooring, wood doors, and finishes. Any timber which is used during construction, such as boxing and formwork must also be included even if it does not form part of the completed building.

The percentage of certified timber used in the project can be obtained based on the total volume

In order to implement this regulation, it is recommended that the project team identify suppliers of certified timber products that can meet the project's needs early in the project development. Certified wood purchased and stored for use in the project construction must be stored in a suitable location that has ambient moisture levels similar to the levels of the final installation.

the following formula shall be used for the calculation of the percentage of certified timber.

$$\text{Certified Timber Percentage} = \frac{\text{Certified Timber Material Volume}}{\text{Total New Wood Material Volume}}$$

## 6.2 Technical Data and Specifications

Each certification scheme can provide details of their timber certification requirements.



## 7.0 Compliance

### 7.1 Responsibilities Matrix

	Consultant or Contractor	User / Operator	DM	DEWA	Other Government Department	3 <sup>rd</sup> party
Design/permit application	✓		✓			
Construction	✓		✓			
Commissioning/Completion	✓		✓			
Operation						
Refurbishment	✓		✓			
Demolition						

### 7.2 Consultant Document Requirements

Lifecycle Stage	Document Requirements
Design/permit application	Green Building Declaration Completed Self Assessment Architectural specifications
Construction	Green Building Site File with orders and delivery notes for the correctly specified materials
Commissioning/Completion	Completed Green Building Site File
Operation	n/a
Refurbishment	Any works requiring a building permit from DM are required to comply with the Green Buildings Regulations for Dubai.
Demolition	n/a

## 8.0 Common Practices / Solutions

As the adverse impact of uncontrolled logging on the World's environment is more fully understood public and industry pressure is demanding that only timber from sustainable sources should be used. Building rating schemes generally encourage the use of sustainable timber. For example, LEED credits the use of 50% of timber being certified in accordance with the Forest Stewardship Council (FSC).

## 9.0 References.

The following are the websites for the certification organizations referred to in this guideline:

The Forest Stewardship Council (FSC), <http://www.fscus.org>

Programme for Endorsement of Forest Certification (PEFC), <http://www.pefc.org/internet/html>

The Sustainable Forestry Initiative (SFI), <http://www.sfiprogram.org>

The Canadian Standards Association (CSA), <http://www.csa.ca/Default.asp?language=english>

Central Point of Expertise in Timber (CPET), <http://www.proforest.net/cpet>





1.0	<b>Asbestos Containing Materials</b>	701.03
	<b>For all new buildings and for the maintenance, addition or alteration of existing buildings, materials containing asbestos must not be used.</b>	Villas
		Residential/ Commercial
		Public Buildings
		Industrial
2.0	<b>Intent/Goal</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Ecology and Planning</li> <li><input type="checkbox"/> Building Vitality</li> <li><input type="checkbox"/> Resource Effectiveness: Energy</li> <li><input type="checkbox"/> Resource Effectiveness: Water</li> <li><input checked="" type="checkbox"/> <b>Resource Effectiveness: Materials and Waste – Materials and Resources</b></li> </ul>	
3.0	<b>Background</b> <p>Asbestos occurs as groups of impure magnesium silicate minerals in a fibrous form. Asbestos has been used in Dubai for a variety of building construction materials, both for insulation and as a fire-retardant. Exposure to asbestos can have severe health impacts, such as chest and abdominal cancers and lung diseases often leading to death. The use of asbestos products has been restricted or banned in several countries.</p> <div data-bbox="1105 985 1497 1370" data-label="Image"> </div> <p style="text-align: center;"><b>Magnified view of Asbestos fibres</b></p>	





## 4.0 Applicability

Main Typology Criteria	Typology Subdivisions	New	Existing	Typology Subdivisions	New	Existing
Villa		✓	✓			
Residential/Commercial	Residential			Commercial		
	Apartments	✓	✓	Hotels	✓	✓
	Offices	✓	✓	Resorts	✓	✓
	Labour Accommodation	✓	✓	Restaurants/Food Outlets	✓	✓
	Student Accommodation	✓	✓	Laboratories	✓	✓
Public Buildings	Healthcare Facilities	✓	✓	Retail Outlets	✓	✓
	Educational Facilities	✓	✓	Post Offices	✓	✓
	Government Buildings	✓	✓	Banks	✓	✓
	Worship Houses	✓	✓	Museums	✓	✓
	Petrol Stations	✓	✓	Cinema/theatres	✓	✓
	Shopping Mall	✓	✓	Historical/heritage Buildings	✓	✓
Industrial	Workshops	✓	✓			
	Factories	✓	✓			
	Warehouses	✓	✓			

Note: All new and existing buildings

## 5.0 Outcome/ Benefit

Exposure to asbestos can have severe health impacts. Inhalation of airborne asbestos fibres may result in asbestosis, lung cancer and other lung disorders which can be fatal. This regulation will reduce peoples' exposure to asbestos.

## 6.0 Guidance

### 6.1 General

Asbestos is commonly found in older buildings, in insulation materials for roofing, textured paints, coating materials, and resilient floor tiles, among other products. Improper attempts to disturb or remove these materials can release asbestos fibres into the air, increasing airborne asbestos levels and exposing building occupants to the inherent risks.

Materials containing asbestos must not be used in any new buildings or in the maintenance or alteration of existing buildings.

Dubai Municipality (DM) has requirements for the handling and disposal of asbestos waste (Dubai Municipality Technical Guideline 48). If a project involves demolition of an existing building or structure, the demolition contractor must also be aware of and abide by the requirements of Federal Ministerial Orders.

DM requires that, prior to any demolition, remodelling or maintenance of existing buildings; the presence or absence of asbestos materials should be determined by a qualified professional. If asbestos is present, removal

And /or repair should be done by people trained and qualified in handling asbestos.

The UAE Ministry of Environment and Water has issued Ministerial Order 42-2008 which addresses control procedures of asbestos pipe production and demolition and asbestos waste disposal procedures. These procedures must be strictly complied with.



## 6.2 Technical Data and Specifications

The major forms of asbestos used commercially were Chrysotile, Amosite and Crocidolite. Tremolite, Anthophyllite and Actinolite are of less commercial value. Asbestos containing materials (ACM) are mixtures of individual asbestos fibres and binding material.

- Chrysotile is the most common type of asbestos found in buildings. Also known as "white asbestos," Chrysotile makes up approximately 90%-95% of all asbestos contained in buildings.
- Amosite is the second most prevalent type of asbestos found in building materials. Amosite is also known as "brown asbestos."
- Crocidolite or "blue asbestos," is found in specialized high temperature applications.

Asbestos fibres cannot be seen without a special microscope. Analysis by an accredited testing laboratory is the only way to know for certain whether a material contains asbestos.

It is usual that the asbestos content of suspect materials is determined by analyzing samples with polarised light microscopy (PLM). PLM analysis results give the percent and type of asbestos in the sample.

## 7.0 Compliance

### 7.1 Responsibilities Matrix

	Consultant or Contractor	User / Operator	DM	DEWA	Other Government Department	3 <sup>rd</sup> party
Design/permit application	✓		✓			
Construction	✓		✓			
Commissioning/Completion	✓		✓			
Operation						
Refurbishment	✓		✓			
Demolition	✓		✓			

### 7.2 Consultant Document Requirements

Lifecycle Stage	Document Requirements
Design/permit application	Green Building Declaration Completed Self Assessment Architectural specifications
Construction	Green Building Site File with orders and delivery notes for the correctly specified materials
Commissioning/Completion	Completed Green Building Site File
Operation	n/a
Refurbishment	Any works requiring a building permit from DM are required to comply with the Green Buildings Regulations for Dubai.
Demolition	n/a

## 8.0 Common Practices/ Solutions


Most countries now ban the use of materials using asbestos.

## 9.0 References.

UAE Federal Ministerial Orders, Regarding Asbestos Production Control Procedures and Asbestos Waste by-products Control Procedures

Dubai Municipality Technical Guideline 48, Safety in Handling Asbestos



1.0	<b>Lead or Heavy Metals Containing Materials</b>	701.04
	<p>For all new buildings and for the maintenance, addition or alteration of existing buildings, paints, or other materials, containing lead or other heavy metals with percentage more than the approved specifications by Dubai Municipality must not be used unless the metal is encapsulated in a system such as a photovoltaic cell.</p> <p>All paints and materials containing lead or other heavy metals must be accredited / certified from Dubai Central Lab or any source approved by Dubai Municipality.</p>	Villas
		Residential/ Commercial
		Public Buildings
		Industrial
2.0	<b>Intent/Goal</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Ecology and Planning</li> <li><input type="checkbox"/> Building Vitality</li> <li><input type="checkbox"/> Resource Effectiveness: Energy</li> <li><input type="checkbox"/> Resource Effectiveness: Water</li> <li><input checked="" type="checkbox"/> <b>Resource Effectiveness: Materials and Waste – Materials and Resources</b></li> </ul>	
3.0	<b>Background</b> <p>Lead is a toxic metal that was used for many years in products found in and around buildings. Lead-based paint is a major source of lead poisoning for children and can also affect adults. In children, lead poisoning can cause irreversible brain damage and can severely impair mental and physical development. In adults, it can also have serious impacts, such as poor muscle coordination, nerve damage, reproduction problems, and increased blood pressure.</p>  <p style="text-align: center;">Lead-based paint peeling and creating a health hazard</p> <p>Many countries banned lead-based paints decades ago and, while they are no longer commonly used in Dubai, there is a need to eliminate their further use for health reasons. Lead-based paint may have been used in older buildings in Dubai and care must be taken when removing lead based paint to ensure that particles are not inhaled. This requirement is consistent with Dubai Municipality Standard DMS 20, Specification for Paints and Varnishes.</p> <p>Other heavy metals such as cadmium, chromium VI, mercury, and arsenic can also have severe health impacts. DMS 20 also prohibits the use of these heavy metals as an ingredient of paints and coatings, and this regulation is consistent with that requirement.</p>	

## 4.0 Applicability

Main Typology Criteria	Typology Subdivisions	New	Existing	Typology Subdivisions	New	Existing
Villa		✓	✓			
Residential/ Commercial	Residential			Commercial		
	Apartment	✓	✓	Hotels	✓	✓
	Offices	✓	✓	Resorts	✓	✓
	Labour Accommodation	✓	✓	Restaurants/Food Outlets	✓	✓
	Student Accommodation	✓	✓	Laboratories	✓	✓
Public Buildings	Healthcare Facilities	✓	✓	Retail Outlets	✓	✓
	Educational Facilities	✓	✓	Post Offices	✓	✓
	Government Buildings	✓	✓	Banks	✓	✓
	Worship Houses	✓	✓	Museums	✓	✓
	Petrol Stations	✓	✓	Cinema/theatres	✓	✓
	Shopping Mall	✓	✓	Historical/heritage Buildings	✓	✓
Industrial	Workshops	✓	✓			
	Factories	✓	✓			
	Warehouses	✓	✓			

Note: All new buildings and existing buildings

## 5.0 Outcome / Benefit

This regulation will reduce or eliminate the use of paints containing lead and other heavy metals, therefore preventing human exposure to these materials and their associated health impacts.

## 6.0 Guidance

### 6.1 General

Products containing heavy metals must not be used in new construction or renovations, and handling and disposal of materials containing these metals must be conducted by qualified personnel in a safe manner. Improper attempts to remove lead paint or other products containing lead can release lead dust, fumes, or chips, therefore exposing people to the above mentioned risks.

Consistent with DMS 20, the following heavy metals and their compounds must not be used as an ingredient of paints and varnishes: cadmium, lead, chromium VI, mercury, and arsenic. Traces of these metals may be included in the products due to impurities in the raw materials or to the manufacturing process. Therefore, for purpose of this regulation, the maximum detected levels of these materials that are allowed in any product are as follows:



Heavy Metal	Maximum Level Allowed
Lead	100mg/kg
Cadmium	500 mg/kg
Chromium VI	500 mg/kg
Mercury	100 mg/kg
Arsenic	100 mg/kg

Prior to renovating, refurbishing or demolishing an existing building, it is recommended that an inspection be carried out to determine the presence of lead based paint. If lead based paint is identified, safe work practices must be undertaken to avoid lead exposure to workers, occupants or any other people near the building.

One acceptable means of lead based paint handling and removal would be to follow the engineering and work practice controls included in Occupational Safety & Health Administration (OSHA)'s Technical Manual Section V, Chapter 3: Controlling Lead Exposures in the Construction Industry: Engineering and Work Practice Controls. The following are general guidelines that shall be followed by contractors removing lead-based paint. These guidelines are included as an example of best practice.

- Children and other occupants (especially infants, pregnant women, and adults with high blood pressure) shall be kept out of the work area until the job is completed;
- All food and eating utensils shall be removed from the work area;
- Contractors should remove all furniture, carpets, and drapes and seal the work area from the rest of the building prior to commencing the work. The contractor also should cover and seal the floor unless lead paint is to be removed from the floor;
- Contractors should assure that workers wear respirators designed to avoid inhaling lead;
- Contractors should not allow eating or drinking in the work area. Contractors should cover and seal all cabinets and food contact surfaces;
- Contractors should dispose of clothing worn in the room after working. Workers should not wear work clothing in other areas of the building. The contractor should launder work clothes separately; and
- Contractors should clean up debris using special vacuum cleaners with HEPA (high efficiency particulate air) filters and should use a wet mop after vacuuming.

## 6.2 Technical Data and Specifications

Some modern equipment and technologies may include small amounts of heavy metals. For example some photovoltaic cells contain cadmium and arsenic. Any threat of exposure to these materials will occur during manufacture and no public health or environmental issues from their use have been found. Use of heavy metals in such products will be allowed in Dubai



## 7.0 Compliance

### Responsibilities Matrix

	Consultant or Contractor	User / Operator	DM	DEWA	Other Government Department	3 <sup>rd</sup> party
Design/permit application	✓		✓			
Construction	✓		✓			
Commissioning/Completion	✓		✓			
Operation						
Refurbishment	✓		✓			
Demolition						

### 7.2 Consultant Document Requirements

Lifecycle Stage	Document Requirements
Design/permit application	Green Building Declaration Completed Self Assessment Architectural specifications
Construction	Green Building Site File with orders and delivery notes for the correctly specified materials
Commissioning/Completion	Completed Green Building Site File
Operation	n/a
Refurbishment	Any works requiring a building permit from DM are required to comply with the Green Buildings Regulations for Dubai.
Demolition	n/a

## 8.0 Common Practices/ Solutions

Most countries now ban the use of materials using lead.

## 9.0 References.

Dubai Municipality Standard DMS 20, Specification for Paints and Varnishes.

(OSHA)'s Technical Manual Section V



1.0	<b>Ozone Depletion Potential (ODP) Material Management</b>	701.05
	<p><b>For all new buildings:</b></p> <p>A. Installations of heating, ventilation, and air conditioning (HVAC) and refrigeration equipment must contain refrigerants with zero ozone depletion potential (ODP) or with global warming potential (GWP) less than 100, with the exception of equipment containing less than 0.23 kilograms (kg) of refrigerant;</p> <p>B. Fire suppression systems must not contain any ozone-depleting substances (Chlorofluorocarbons [CFCs], Hydro chlorofluorocarbons [HCFCs] or Halons.</p> <p><b>For existing equipment:</b></p> <p>A. CFC and halon-based materials are not to be used for any purposes;</p> <p>B. From 1 January 2030, HCFC based materials or any other material having any ODP are not to be used for any purposes;</p> <p>C. The venting or direct discharging of any refrigerants during equipment maintenance is strictly prohibited; and</p> <p>D. The recovery, reclamation, recycling and reuse of refrigerants must be practiced at all times.</p>	<p>Villas</p> <p>Residential/ Commercial</p> <p>Public Buildings</p> <p>Industrial</p>
2.0	<p><b>Intent/Goal</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Ecology and Planning</li> <li><input type="checkbox"/> Building Vitality</li> <li><input type="checkbox"/> Resource Effectiveness: Energy</li> <li><input type="checkbox"/> Resource Effectiveness: Water</li> <li><input checked="" type="checkbox"/> <b>Resource Effectiveness: Materials and Waste – Materials and Resources</b></li> </ul>	
3.0	<p><b>Background</b></p> <p>The ozone layer in the stratosphere between 10 kilometres (km) and 50 km above the earth protects us from the harmful effects of ultra-violet (UV) radiation from the sun. The thinning of the ozone layer increases the amount of UV reaching the earth, which can cause numerous health problems such as suppressing the human body's immune system, increasing skin cancers, and causing eye disorders such as cataracts. In addition, the thinning of the ozone layer results in negative impacts to marine life and agricultural crop yields.</p> <p>The UAE is a signatory of the Montreal Protocol which sets out a timetable the phase out of substances know to deplete the ozone layer.</p> <p>It is also recognized that some of the substances covered by the Montreal Protocol also have a significant Global Warming Potential (GWP) and will there contribute to climate change.</p>	





## 4.0

## Applicability

Main Typology Criteria	Typology Subdivisions	New	Existing	Typology Subdivisions	New	Existing
Villa		✓	✓			
Residential/Commercial	Residential			Commercial		
	Apartments	✓	✓	Hotels	✓	✓
	Offices	✓	✓	Resorts	✓	✓
	Labour Accommodation	✓	✓	Restaurants/Food Outlets	✓	✓
	Student Accommodation	✓	✓	Laboratories	✓	✓
Public Buildings	Healthcare Facilities	✓	✓	Retail Outlets	✓	✓
	Educational Facilities	✓	✓	Post Offices	✓	✓
	Government Buildings	✓	✓	Banks	✓	✓
	Worship Houses	✓	✓	Museums	✓	✓
	Petrol Stations	✓	✓	Cinema/theatres	✓	✓
	Shopping Mall	✓	✓	Historical/heritage Buildings	✓	✓
Industrial	Workshops	✓	✓			
	Factories	✓	✓			
	Warehouses	✓	✓			

Note: Applies to equipment in new and existing buildings

## 5.0

## Outcome/ Benefit

The intent is to reduce the use of materials which have a negative impact on ozone depletion and to meet the UAE obligations as a signatory to the Montreal Protocol. It is also recognised that some ozone depleting substances have a significant Global Warming Potential (GWP) and hence will contribute to climate change. This regulation also aims to reduce these global warming impacts.

## 6.0

## Guidance

## 6.1 General

Ozone Depletion Potential (ODP) is defined as the ratio of the amount of degradation to the ozone layer caused by a particular substance relative to the calculated depletion for the reference gas CFC 11 (ODP=1.0). Global Warming Potential (GWP) is the potential for global warming that a substance has relative to 1 unit of carbon dioxide, the primary greenhouse gas. In determining the GWP, the Intergovernmental Panel on Climate Change (IPCC) methodology using a 100-year Integrated Time Horizon should be applied.





Table 701.05 (1) ODP and GWP Indices for Commonly Used Refrigerant Gases (100-year Potential)

Refrigerant	ODP	GWP	Common Building Applications
<b>Chlorofluorocarbons (CFCs)</b>			
CFC-11	1.0	4,680	Centrifugal chillers
CFC-12	1.0	10,720	Refrigerators, chillers
CFC-114	0.94	9,800	Centrifugal chillers
CFC-500	0.605	7,900	Centrifugal chillers, humidifiers
CFC-502	0.221	4,600	Low-temperature refrigeration
<b>Hydrochlorofluorocarbons (HCFCs)</b>			
HCFC-22	0.04	1,780	Air conditioning, chillers
HCFC-123	0.02	76	CFC-11 replacement
<b>Hydrofluorocarbons (HFCs)</b>			
HFC-23	~0	12,240	Ultra-low-temperature refrigeration
HFC-134a	~0	1,320	CFC-12 or HCFC-22 replacement
HFC-245fa	~0	1,020	Insulation agent, centrifugal chillers
HFC-404A	~0	3,900	Low-temperature refrigeration
HFC-407C	~0	1,700	HCFC-22 replacement
HFC-410A	~0	1,890	Air conditioning
HFC-507A	~0	3,900	Low-temperature refrigeration
<b>Natural Refrigerants</b>			
Carbon Dioxide (CO <sub>2</sub> )	0	1.0	
Ammonia (NH <sub>3</sub> )	0	0	
Propane	0	3	

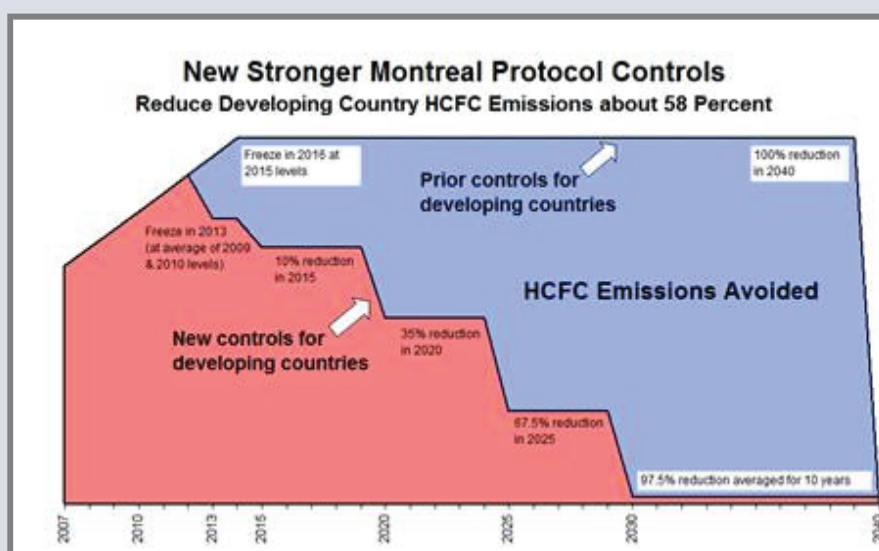
The Montreal Protocol, of which the UAE is signatory, established measures to control the use of ozone depleting substances. The use of substances which deplete the ozone layer is to be phased out. The timescale for countries to phase out the use of these substances has recently been shortened. This regulation details the reduced use of ozone depleting substances which is required to meet UAE's obligations as signatory of the Montreal Protocol.



Table 701.05 (2) Ozone Depleting Substances' Scheduled Phase Out

Ozone Depleting Substances	Scheduled Phase Out
CFCs	Total phase out by 2010
Halons	Total phase out by 2010
Carbon tetrachloride	Total phase out by 2010
Methyl choloform	Total phase out by 2015
HCFCs	Freeze in 2013 at a base level calculated as the average of 2009 and 2010 consumption levels; 10% reduction by 2015; 35% reduction by 2020; 67.5% reduction by 2025; total phase out by 2030
Hydrobromofluorocarbons (HBFCs)	Phased out at the end of 1995
Methyl bromide (horticultural uses)	Freeze in 2002 at average 1995-1998 base level; 20% reduction by 2005; total phase out by 2015
Bromochloromethane (BCM)	Phase out by 2002.

The time scale for the phase-out for HCFCs for developing countries is illustrated in the figure below. The HCFC reduction represented in the graph is the difference between the original phase-out schedule (where production level was frozen at 2015 levels until 2040) and the five new step-wise reductions between 2013 and 2040.



All existing equipment or appliances for domestic and commercial refrigeration or air conditioning should be maintained leak free at all times.

Additional details on the Dubai Municipality's policy on the control of ozone depleting substances are published within Technical Guideline Number 58, Policy on the Control of Ozone Depleting Substances, and Circular 108, Procedures for controlling the use of ozone depleting material (CFC), both of which are available on the Dubai Municipality website. It must be noted that some of the dates in these publications do not reflect UAE's present commitments.

This regulation requires the elimination of the use of CFC-based refrigerants and phase out of the use of HCFC-based products. The implementation programmes for the adoption of the Montreal Protocol by developing countries such as the UAE is presently being reviewed again and new obligations under the Protocol may impose more stringent controls than this regulation.



## 6.2 Technical Data and Specifications

The ODP and GWP figures for their products are available from manufacturers and may be required for inspection by Dubai Municipality.

## 7.0 Compliance

### 7.1 Responsibilities Matrix

	Consultant or Contractor	User / Operator	DM	DEWA	Other Government Department	3 <sup>rd</sup> party
Design/permit application	✓		✓			
Construction	✓		✓			
Commissioning/Completion	✓		✓			
Operation		✓	✓			
Refurbishment	✓		✓			
Demolition	✓		✓			

### 7.2 Consultant Document Requirements

Lifecycle Stage	Document Requirements
Design/permit application	Green Building Declaration Completed Self Assessment MEP Specifications
Construction	Green Building Site File with orders and delivery notes for the correctly specified materials
Commissioning/Completion	Completed Green Building Site File
Operation	n/a
Refurbishment	Any works requiring a building permit from DM are required to comply with the Green Buildings Regulations for Dubai.
Demolition	n/a

## 8.0 Common Practices / Solutions

To meet the requirements of the Montreal Protocol Ban the use of ozone depleting refrigerants in new equipment and progressively ban their use over time is required in most countries.

## 9.0 References.

Dubai Municipality Technical Guideline Number 58—Policy for the Control of Ozone Depleting Substances.

Dubai Municipality Circular 108 - Procedures for controlling the use of ozone depleting material (CFC)



1.0	Recycled Content	701.06																																																																																																											
	For all new buildings, recycled content must account for at least five percent (5%) of the total volume of materials used in the construction of the building.	Villas																																																																																																											
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3.0	Background <p>The extraction, manufacture, transport, use and disposal of new building materials have environmental effects that range from air and water pollution, natural resources depletion, and natural habitat damage to land use impacts. Recycling or reusing materials for the construction of new buildings can result in reduced construction waste disposed to landfill, reduced energy and water use, reduced pollution, and reduced greenhouse gas emissions.</p>																																																																																																												
4.0	Applicability <table><tr><th>Main Typology Criteria</th><th>Typology Subdivisions</th><th>New</th><th>Existing</th><th>Typology Subdivisions</th><th>New</th><th>Existing</th></tr><tr><td>Villa</td><td></td><td>✓</td><td></td><td></td><td></td><td></td></tr><tr><td rowspan="6">Residential/Commercial</td><td>Residential</td><td></td><td></td><td>Commercial</td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>Apartments</td><td>✓</td><td></td><td>Hotels</td><td>✓</td><td></td></tr><tr><td>Offices</td><td>✓</td><td></td><td>Resorts</td><td>✓</td><td></td></tr><tr><td>Labour Accommodation</td><td>✓</td><td></td><td>Restaurants/Food Outlets</td><td>✓</td><td></td></tr><tr><td>Student Accommodation</td><td>✓</td><td></td><td>Laboratories</td><td>✓</td><td></td></tr><tr><td rowspan="6">Public Buildings</td><td>Healthcare Facilities</td><td>✓</td><td></td><td>Retail Outlets</td><td>✓</td><td></td></tr><tr><td>Educational Facilities</td><td>✓</td><td></td><td>Post Offices</td><td>✓</td><td></td></tr><tr><td>Government Buildings</td><td>✓</td><td></td><td>Banks</td><td>✓</td><td></td></tr><tr><td>Worship Houses</td><td>✓</td><td></td><td>Museums</td><td>✓</td><td></td></tr><tr><td>Petrol Stations</td><td>✓</td><td></td><td>Cinema/theatres</td><td>✓</td><td></td></tr><tr><td>Shopping Mall</td><td>✓</td><td></td><td>Historical/heritage Buildings</td><td>✓</td><td></td></tr><tr><td rowspan="3">Industrial</td><td>Workshops</td><td>✓</td><td></td><td></td><td></td><td></td></tr><tr><td>Factories</td><td>✓</td><td></td><td></td><td></td><td></td></tr><tr><td>Warehouses</td><td>✓</td><td></td><td></td><td></td><td></td></tr></table>		Main Typology Criteria	Typology Subdivisions	New	Existing	Typology Subdivisions	New	Existing	Villa		✓					Residential/Commercial	Residential			Commercial									Apartments	✓		Hotels	✓		Offices	✓		Resorts	✓		Labour Accommodation	✓		Restaurants/Food Outlets	✓		Student Accommodation	✓		Laboratories	✓		Public Buildings	Healthcare Facilities	✓		Retail Outlets	✓		Educational Facilities	✓		Post Offices	✓		Government Buildings	✓		Banks	✓		Worship Houses	✓		Museums	✓		Petrol Stations	✓		Cinema/theatres	✓		Shopping Mall	✓		Historical/heritage Buildings	✓		Industrial	Workshops	✓					Factories	✓					Warehouses	✓				
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## 5.0 Outcome / Benefit

The use of materials with recycled content will help conserve existing resources, reduce waste and help generate the creation of new industries in Dubai.

## 6.0 Guidance

### 6.1 General

The availability of materials with recycled content in Dubai is increasing rapidly but there may presently be difficulty in all new buildings having a 5% recycled content. In order to ensure that there are materials available which will allow all building to comply with the 5% requirement. All new buildings should strive to include as much recycled content as possible immediately.

The percentage of recycled content must include materials that are permanently installed in the building. This percentage must be based on the estimated cost of materials on the project.

When a component of the material is recycled, the recycled content shall be determined by its contribution to the weight of the product. The fractional value of the weight is then multiplied by the total estimated cost of the material assembly to determine the Recycled Content Value (RCV). The suppliers or manufacturers of these products must provide a declaration as to the recycled content of their products.

Mechanical, electrical, and plumbing plant and components should not be included in the recycled material calculation for this regulation.

Project teams shall prepare a preliminary calculation during the design phase in order to set appropriate recycled content targets for construction materials. The project team shall be responsible for identifying products with recycled content, pursuing documentation from suppliers that confirms the recycled content of each product, and keeping the records of documentation suitable for submission to Dubai Municipality.

The majority of reinforcing steel contains very high percentages of recycled content. Because most new buildings in Dubai contain large quantities of reinforcing steel, the required percentage of recycled material may be met by this material alone.

The calculation of recycled content value (RCV) is as follows:

Recycled Content Value = Percentage of Recycled Content x Material Cost

Total materials cost for the project may be determined as either:

- Total actual cost of all materials for use in the project; or
- 45% of the total construction cost of the project.

The following is the equation that must be used to calculate the overall percent of recycled content for the project:

$$\text{Percent Recycled Content} = \frac{\text{Total RCV} \times 100}{\text{Total Materials Cost}} \%$$

Materials which may contain a proportion of recycled content include:

- |                             |                           |
|-----------------------------|---------------------------|
| ▪ Reinforcing steel;        | ▪ Fly ash cement;         |
| ▪ Acoustical ceiling tiles; | ▪ Insulation materials;   |
| ▪ Aggregate;                | ▪ Metal doors and frames; |
| ▪ Carpeting;                | ▪ Some roofing materials; |
| ▪ Ceramic tiles;            | ▪ Structural steel;       |
| ▪ Composite wood products;  | ▪ Some toilet partitions. |

### 6.2 Technical Data and Specifications

Suppliers will be required to provide documentation confirming the recycled content of their products.

