

BILL OF QUANTITIES
ESIGN SUPPLY AND INSTALLATION OF AIR CONDITION SYSTEM AT ROSHANEE BUILDING 8TH FLOOR

Item	Description	Unit	Quantity	Rate/ Unit	Rate/ Unit
				Material	Labour

Item	Description	Unit	Quantity	Rate/ Unit	Rate/ Unit
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1.1	<p style="text-align: center;"><u>BILL No: 1</u> <u>AIR-CONDITIONING SYSTEM</u></p> <p><u>General</u></p> <p>(a) Rates shall include for supplying and complete installation of air-conditioning systems; including all pipework, electrical wiring, insulation, stands for outdoor units etc.</p> <p>(b) All AC Equipments must be VRV/VRF or Central systems which have the capacity to control & operate multiple indoor units</p> <p>(c) The brand of AC Equipment specified or to be proposed should have similar two Projects completed and delivered over the past 5 years in Maldives with proven records of successful Hospital Grade Projects</p> <p>(d) Contractor shall provide Shop Drawings for Consultants' Approval for all electrical units including lighting, power, ACMV systems.</p> <p>(e) The Brand of AC Equipment specified or to be proposed should demonstrate that it is adequate to cater for highly corrosive environment of Maldives and should have 5 years of past projects completed</p> <p>(f) The brand or AC Equipment specified should demonstrate all specs below from manufacturers original catalogue</p> <p><u>Outdoor Specs</u></p> <p>(a) The Outdoor Unit Shall be Factory assembled with Weather Proof casing, constructed from Heavy Gauge Mild Steel Panels and coated with Anti Corrosive Epoxy resin finish. The unit should be completely factory wired and tested and shall be fitted with all necessary controls and switch gear.</p> <p>(b) All outdoor units need to be VRV or Central systems which have the capacity to control & operate multiple indoor units</p> <p>(c) The Condensor Coil of the Outdoor must be a black fin Condensor with anti corrosion</p> <p>(d) The brand of AC Equipment proposed should have an outdoor or outdoor sets with a maximum Energy Efficiency Ratio of (EER) or COP kw/kw 4.09</p> <p>(e) The brand of AC Equipment proposed should have Outdoor Environment sensor for Compressor Control and adjustment</p> <p>(f) The Brand of AC Equipment proposed should have an outdoor or outdoor sets of Sound Pressure Level dB (A) below 57</p> <p>(g) All Outdoor units shall be with inverter compressors and be able to operate even in the event of failure of one compressor</p> <p>(H) All outdoor units shall be equipped with high efficiency optimized heat exchangers with variable heat exchanger circuits</p> <p>(i) The outdoor units shall be provided with its own microprocessor control panels</p> <p>(j) The manufacturer & contractor needs to provide a warranty of 12 to 18 months replacement for the outdoor units</p> <p>(k) The Outdoot should have a high external static pressure upto 78.4 PA</p>				

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	<p>(l) The Scroll Compressor should have Back Pressure control mechanism to minimize refrigerant load and operational loss</p> <p><u>Indoor Specs</u></p> <p>(a) The address of the indoor unit shall be set automatically in case of individual and group control</p> <p>(b) In case of centralized control, it shall be set by liquid crystal remote controller</p> <p>(c) The fan shall be a dual suction, aerodynamically designed turbo, multi blade centrifugal type fan which shall be statically & dynamically balanced to ensure low noise and vibration free operation. The fan shall be direct driven, mounted directly on motor shaft having support from the unit housing.</p> <p>(d) The cooling coil shall be made out of seamless copper tubes and have continuous aluminum fins. The tubes shall be staggered in the direction of airflow and shall be hydraulically/ mechanically expanded to bond to the fins. Each coil shall be factory tested at 21kg/sqm air pressure under water.</p> <p>(e) Each unit shall have a cleanable type filter fixed to an integrally moulded plastic frame. The filter shall be a slide out type and shall be neatly inserted.</p> <p>(f) Automatic Sensors to control airflow and direction of the airflow by detecting human presence</p> <p>(i) Each unit shall be provided with a hand held multi-function remote controller. The controller shall be able to change fan speed and angle of swing, temperature and mode.</p> <p>(J) Each Unit shall have service Ball valves for After sale service and future Isolation of FCU</p> <p><u>Refrigerant Piping</u></p> <p>(a) All refrigerant piping for the air conditioning system shall be constructed from Hard seamless copper up to outer diameter of 41.3 mm and hard drawn copper above outer diameter of 41.3 mm. Fittings shall have silver-soldered joints and connections to equipment shall use compression fittings.</p> <p>(b) All joints in copper piping shall be swag joints using low temperature brazing and or silver solder. Before joining any copper pipe or fittings, its interiors shall be thoroughly cleaned by passing a clean cloth via wire or cable through its entire length. The piping shall be continuously kept clean of dirt etc. while constructing the joints. Subsequently, it shall be thoroughly blown out using nitrogen.</p> <p>(c) After the refrigerant piping installation has been completed, the refrigerant piping system shall be pressure tested using nitrogen at pressure of 580 PSIG. Pressure shall be maintained in the system for 24 hours. The system shall then be evacuated to minimum vacuum of 700mm hg and held for 24 hours.</p> <p>(d) The thickness of copper piping shall as per Standard ASTM B280-03</p> <p><u>Refrigerant Pipe Insulation</u></p>				

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	<p>(a) The whole of the liquid and suction refrigerant lines including all fittings, valves etc. shall be insulated with 25mm thick insulation for all copper sizes. Insulation shall be closed cell elastomeric nitrile rubber.</p> <p>(b) To protect nitrile rubber of exposed piping from degrading due ultra violet rays & atmospheric conditons, it shall be covered polyshield coating with at least two coats of resin and hardener (Make-Polybond /Paramount Polytrear). Fiberglass tape shall be helically wound & painted with two coats of resin with hardener to give smooth & plain finish.</p> <p>(c) All insulation has to be wrapped in Aluminium Fiber Foil Tape or sheet</p>				
1.2	<u>08th floor AC system</u>				
1.2.1	<u>Design supply and complete installation and commissioning of VRV/VRF System. Rates must include removing existing AC unit as well as ceiling works if required to install new AC. finishing of ceiling is same as it is.</u>				
(1)	18000BTU 4 Way Ceilling Casette AC Indoor unit for Conference room	Item	2.00		
(2)	12000BTU 4 Way Ceilling Casette AC Indoor Unit for Room 1-4	Item	4.00		
(3)	240000BTU 4 Way Ceilling Casette AC Indoor Unit for Room 5	Item	1.00		
(4)	24000BTU 4 Way Ceilling casette AC Indoor Unit for Room 6	Item	2.00		
(5)	24000BTU 4 Way Ceilling casette AC Indoor Unit for waiting area.	Item	2.00		
(6)	12000BTU 4 Way Ceilling casette AC Indoor Unit for 7	Item	1.00		
(7)	15000BTU 4 Way Ceilling casette AC Indoor Unit for 8	Item	1.00		
(8)	9000BTU 4 Way Ceilling casette AC Indoor Unit for 9	Item	1.00		
(9)	260,000 BTU VRV/VRF Central Outdoor Top Throw	Item	1.00		
BILL No:2 - AIR-CONDITIONING SYSTEM					
TOTAL OF BILL No:2 - Carried over to summary					