

Item No.	Description	Unit	Unit Price US.\$.	Qty	Total Price US.\$.
PART 3	MECHANICAL ENGINEERING SERVICES				
1	General Technical Requirements The Contractor should revise the Mechanical drawings and make sure that they can be executed properly in the building. The Contractor should prepare completely shop drawings for all mechanical works and these shop drawings should be approved by the Engineer before executing. Contractor shall provide all necessary Mechanical works, maintenance, cleaning, relocation or removing, testing & commissioning for the existing mechanical system to ensure properly working system. The contractor shall inspect all the existing system and site condition prior to pricing. Cost of the above shall be included in the cost of items.				

Item No.	Description	Unit	Unit Price US.\$.	Qty	Total Price US.\$.
2	Fire Protection System				
2.1	FM-200				
2.1.1	High-Temperature Centrifugal Exhaust Fan Supply backward-curved / airfoil centrifugal fan, AMCA-certified for air and sound, rated 12,100 CFM ($\approx 20,560 \text{ m}^3/\text{h}$) at $\approx 350 \text{ Pa}$ external static pressure, suitable for continuous operation in air $\geq 60^\circ\text{C}$; galvanised / corrosion-resistant casing with inspection door and drain plug; fixed-speed (no VFD); motor $\approx 4 \text{ kW}$, 400 V / 3-phase / 50 Hz, IE3, IP55, Class F, S1 duty, with DOL / soft-starter and staggered-start provision; Fan width/depth should not exceed 800mm in order to transport the fan inside the building.	No.		3,600.0	0.00
2.1.2	Installation of Exhaust Fans deliver, install, connect, test, balance and commission the above mentioned exhaust fans, complete with flexible connector, anti-vibration mounts, matching flanges, mounting base/frame, local isolator and control wiring, supports and all accessories.	No.		1,000.0	0.00
2.1.3	Re-commissioning of Existing Fans Four of the existing axial fresh-air supply fans (8,000 CFM each) shall be retained, cleaned, relocated as per drawings and re-commissioned as powered make-up fresh air fans, 3 of them as duty and 1 as standby.	No.		500.0	0.00
2.2	Duct System				
2.2.1	Duct Work Supply, fabricate, deliver and install galvanized steel (hot-dip galvanized iron with zinc coating) sheet ductwork for heat extraction system, complete with all fittings, bends, elbows, tees, reducers, transitions, offsets, splitter vanes, access doors, turning vanes, flanged joints, sealant, gaskets, reinforcing angles and stiffeners, support channels, threaded rods, hangers, anchors, flexible connections to equipment, vibration isolators where required, fixing accessories, cutting, testing, balancing provisions and all incidentals necessary for a complete installation, in accordance with the project specifications, SMACNA HVAC Duct Construction Standards and approved shop drawings. The ductwork shall be manufactured from galvanized steel sheets of the specified thickness as per specifications section 2.4, complete with all reinforcements and supports suitable for the operating pressure, air velocity and service conditions. The item rate shall include all fabrication waste, transportation, lifting, installation and commissioning, complete in all respects.	m2		900.0	0.00
2.2.2	Plenum Box Supply, fabricate and install galvanized steel heat-extraction plenum box, fabricated from minimum 1.2 mm thick hot-dip galvanized steel, Z275 coating, complete with folded joints, reinforced corners, necessary internal stiffeners, 500 × 400 mm flanged branch connection, galvanized steel supports and brackets, sealant, gaskets, fasteners, anchorage, zinc-rich repair coating to damaged galvanized surfaces, transportation, lifting, installation, alignment, testing and all accessories necessary for a complete installation. The plenum box shall be suitable for continuous operation with exhaust-air temperatures up to 60°C and shall withstand the operating airflow and pressure without excessive vibration, deformation or noise. Wire-mesh panel, volume control damper and connecting ductwork shall be measured separately.	No.		225.0	0.00

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2.3	Wire Mesh Supply, fabricate and install removable galvanized welded wire mesh panel, size 1,500 × 1,200 mm (or as needed as per site condition), comprising 20 × 20 mm clear mesh opening with 2.0 mm diameter galvanized steel wire, complete with 25 × 25 × 2 mm galvanized steel angle perimeter frame, one central stiffener, galvanized or stainless-steel fixing bolts/screws with wide washers, high-temperature EPDM or silicone gasket rated not less than 100°C, cutting, welding, zinc-rich repair coating to all cut and welded surfaces, supports, accessories and installation to heat-extraction plenum box, suitable for approximately 2,600 CFM airflow and continuous air temperature up to 60°C, complete in all respects.	No.		120.0	0.00
2.4	Volume Control Damper (VCD) Supply, fabricate and install galvanized steel manual single-blade volume control damper, complete with galvanized steel frame and blade, galvanized shaft, bronze or nylon bearings, manual locking quadrant, operating handle, fixing accessories and all necessary hardware, suitable for exhaust air systems operating up to 80°C. Sizes as follows:				
2.4.1	300x600mm	No.		2.0	0.00
2.4.2	500x400mm	No.		19.0	0.00
2.4.3	500x500mm	No.		13.0	0.00
2.4.4	600x450mm	No.		16.0	0.00
2.4.5	600x600mm	No.		2.0	0.00
3	Testing, Adjusting, Balancing (TAB) and Commissioning Of the Complete Heat Extraction Ventilation System, including but not limited to inspection, functional testing, start-up, adjustment and balancing of all extraction fans, ductwork, plenum boxes, volume control dampers and associated accessories; measurement and recording of airflow, air velocity, static pressure, total pressure, fan rotational speed, motor voltage, current and power consumption; adjustment of manual volume control dampers to achieve the specified design airflow; verification of fan rotation, vibration levels, noise levels, duct leakage, and proper operation of all equipment; correction of deficiencies identified during testing; submission of complete TAB and commissioning reports, including calibrated instrument certificates; demonstration of satisfactory system operation to the Engineer; and all labour, equipment, instruments, temporary connections, consumables and accessories required to complete the works in accordance with the project specifications, SMACNA, AMCA and ASHRAE requirements.	Item		1.0	0.00
	MECHANICAL ENGINEERING SERVICES				0.00
	TOTAL CARRIED TO PRICE SUMMARY				0.00

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PART 4	ELECTRICAL ENGINEERING SERVICES				
1	General The Contractor should revise all the drawings and compare them with the site conditions and redo all the design works with the necessary calculations for all the electrical installations and works. Moreover, the Contractor should submit shop drawings and as-built drawings for the maintenance use in the future. The contractor should provide all the necessary maintenance works for all Electrical systems related to the building to ensure its proper works.				
2	LV Wires and Cables				
2.1	Low Voltage Distribution Cables (Cu/PVC/PVC, CU/XLPE/PVC or CU/XLPE/LSZH) Supply, install, test and commission low-voltage power cables from the respective feeder panel to the exhaust fan isolating switch, complete with cable pulling, routing, supports, conduits/trays where required, glands, lugs, terminations, identification tags, fixing accessories, and all associated materials and works, complete in accordance with the drawings and specifications. (Cable sizes to be verified by the contractor based on voltage drop calculation. Lengths to be verified as per site condition)				
2.1.1	Main Feeder Cables (Cu/XLPE/PVC) For Exhaust Air Fans				
2.1.1.1	4 x 4 mm ² + E = 4 mm ² (Only additions)	Lm		200.0	0.00
3	Isolating switches and Control Box				
3.1	Isolating Switches Supply, install and connect the following disconnect switch complete including cabling/conduit works back to respective panelboards, with all related accessories as shown on drawings and as specified.				
3.1.1	Isolating switch rated 16A TPN IP 65, for Exhaust Air Fans (Cable not included)	No.		11.0	0.00
3.2	Control Box Supply, install, test and commission a local IP-rated control box for exhaust fan automatic temperature control, complete with AC-3 rated contactor, digital temperature controller, remote temperature sensor, internal control wiring, terminals, fuses/accessories, and all necessary interconnections between the temperature sensor, control box and existing fan isolating switch, including cable/conduit, glands, terminations, supports and all related accessories, complete as required for a fully operational system				
3.2.1	IP65 metal/polycarbonate control box	No.		11.0	0.00
3.2.2	AC-3 magnetic contactor (9–18 A)	No.		11.0	0.00
3.2.3	Digital temperature controller	No.		11.0	0.00
3.2.4	Temperature sensor (NTC/PT100/PT1000, depending on controller)	No.		11.0	0.00
3.2.5	Control terminals, DIN rail, fuse holder/MCB, glands, accessories	No.		11.0	0.00
3.2.6	Control cable and sensor cable	No.		11.0	0.00
3.2.7	Conduit/trunking and fittings	No.		11.0	0.00
3.2.8	Installation, wiring, testing & commissioning	No.		11.0	0.00
	ELECTRICAL ENGINEERING SERVICES				
	TOTAL CARRIED TO PRICE SUMMARY				0.00

Item No.	Description	Unit	Unit Price US.\$.	Qty	Total Price US.\$.
PART 4A	ELECTRICAL ENGINEERING SERVICES (Optional)				
5	Main Feeder Cables CU/XLPE/LSZH) For Fresh Air Fans (Optional)				
5.1	4 x 4 mm ² + E =4 mm ² (New)	Lm		140.0	0.00
6	Cable tray (Optional) Supply, install the following cable tray, hot dip galvanized complete including the galvanized brackets for fixing the trays to the walls or ceilings, the galvanized bolts and the accessories for connection of different elements, the angle elements, the fixing rigidly to the walls and ceilings and all necessary connections and accessories. as shown on the drawings and as specification.				
6.1	Power Cable tray (300x50mm)	Lm		30.0	0.00
	ELECTRICAL ENGINEERING SERVICES (Optional)				
	TOTAL CARRIED TO PRICE SUMMARY				0.00