



NAYA RAIPUR DEVELOPMENT AUTHORITY

**Tender Document for Supply, Installation, Testing ,
Commissioning & Three year's Comprehensive
maintenance of HVAC system and other allied accessories
for Retail Complex building at sector-21 of of Naya Raipur**

(Following Three-Envelope Tender Procedure)

**Schedule – A
Price Tender
To be submitted in ENVELOPE-3**

NIT No. 105 /HVAC/RB/ELECT/CE(E)/NRDA/2016-17, Naya Raipur

Dated: 21.09.2016

Issued by: Chief Executive Officer,
Naya Raipur Development Authority (NRDA)
4th Floor, Paryavas bhawan, North block, Sector- 19,
Naya Raipur- 492 002, Chhattisgarh
Tel No: + 91 771 2512500; Fax No.: +91 771 2512400.
Website: www.nayaraipur.gov.in

Tender Document Contains

- (a) Only schedule "A" and Section-I of schedule "D" are to be filled & signed by the tenderer
- (b) All the certificates as per pre qualification criteria shall be appended with relevant forms of schedule "D"

1. PART ONE (NRDA F-1)-(Attached herewith, to be submit along the tender)

Part (A)

- a) Press Notice
- b) Detailed NIT

Part (B)

a) Schedule-A

- (i) Cost Abstract
- (ii) Bill of Quantities

- b) Schedule-B –NIL
- c) Schedule-C –NIL
- d) Schedule-D

Section-I..... Technical tender forms

- (i) Letter of Technical Tender
- (ii) Tenderer's Information Sheet
- (iii) Annual Turnover
- (iv) Specific Construction Experience
- (v) Declaration
- (vi) Check list for Technical tender evaluation

Section –IIScope of work

Section –III..... Technical specifications of work

Section –IV..... Special Conditions of Contract

Section –V..... List of approved makes

Section –VI..... Drawings

- e) Schedule-E
- f) Schedule-F

2. PART TWO (NRDA F-2/3)-Standard form (Not Attached herewith, and not to be submitted along the tender) Important note: - Link site <http://nayaraipur.com/documents/gcc.pdf>

1. General Guidelines
2. Tender
3. General rules and directions
4. Conditions of contract
5. Clauses of contract
6. Model rules relating to labour, water supply and sanitation in labour camps safety code
7. Contract forms
 - (a) Draft Format for Performance Security
 - (b) Earnest Money Deposit Form (Bank Guarantee)
 - (c) Format of Contract Agreement
 - (d) Draft Format for Performance Guarantee for Water Proofing and Anti-termite Works
 - (e) Indemnity Bond
 - (f) Indenture Bond
 - (g) Notice for Appointment of Arbitrator

8. Proforma of schedules (Schedule 'A' to Schedule 'F')

**Naya Raipur Development Authority (NRDA)
Raipur, Chhattisgarh**

Document details

Name of work : “Supply, Installation, Testing , Commissioning & Three year’s Comprehensive maintenance of HVAC system and other allied accessories for Retail Complex building at sector-21 of of Naya Raipur”.

Name of Tenderer:

Details

- a) Cost of Tender Document : Rs
- b) EMD : Rs

Signature of Tenderer

Date:_____

Signature of Contractor.....

Signature of NRDA.....

BILL OF QUANTITY
Supply, Installation, Testing , Commissioning & Three year's Comprehensive maintenance of HVAC system and other allied accessories for Retail Complex building at sector-21 of Naya Raipur

Sr. No.	Description	Total Amount Rs. (In Figure)	Total Amount Rs. (In words)
1	REFRIGERATION MACHINES	-	
2	PUMPS	-	
3	VIBRATION ISOLATORS	-	
4	AIR HANDLING UNITS	-	
5	VENTILATION & EXHAUST FANS	-	
6	DRAIN PIPING	-	
7	CHILLED WATER PIPING WITH ALUMINUM CLADDING	-	
8	SHEET METAL DUCTING	-	
9	ALUMINUM GRILLES / DIFFUSERS	-	
10	ELECTRICAL PANELS	-	
11	SPLIT Air conditioners	-	
	Total amount In INR	-	
<small>Note :- Order Equipment and Materials only after approval of shop Drawing.</small>			

BILL OF QUANTITY

Supply, Installation, Testing , Commissioning & Three year's Comprehensive maintenance of HVAC system and other allied accessories for Retail Complex building at sector-21 of Naya Raipur

Sr. No.	Description of Items	Unit	Total Quantity	Rate in INR(In Figure)	Rate in words (in INR)	Amount in INR
1	Supply, Fabrication, Installation, Testing, Balancing and Commissioning of the following equipment and materials in accordance with Specifications and Tender Drawings and inclusive of all taxes, duties, transportation, scaffolding, insurance upto installation, commissioning, handing over & additional 3 months.					
1.1	REFRIGERATION MACHINES					
1.1.1	Supply, Fabrication, Installation, Testing, Balancing and Commissioning AIR COOLED SCREW CHILLERS complete with multiple hermetic / semi-hermetic compressors/ circuits, air cooled condensers with protective blygold / thermo guard coat from OEM on condenser coil/fins & copper pipes, refrigerant - 134a, oil, flow switches, micro-processor panel, electrical panel with open protocol master panel for hook-up with BMS, in-built weather proof elec.panels, isolators, all elec.to be IP 55, transformer for control circuit, service modem connectivity, protective guards for condenser & compressors from OEM Air entering cond. - 42 Deg.C Ch.Water In/Out - 7 / 12 Deg. C Fouling Factor - 0.0005 (British) Refrigerant - 134a Chiller cost include with Temperature Gauge, Pressure Gauge, Strainers, etc. on supply and return line (excludes sensors & control system).					
1.1.1.1	170TR (Actual At Raipur Weather Condition) (2W + 1N)	Nos	3			-
1.1.1.2	Common Items for item 1.1.1 .1					
A	BMS Compatibility to building IBMS system	Lot	1			-
B	Vibration Isolators for Seismic IV zone	Lot	1			-
C	Victaulic Couplings (Inlet / outlet)	Lot	1			-
D	Chiller System Manager	Lot	1			-
1.1.1.2	200TR (Actual At Raipur Weather Condition) (2W + 1N)	Nos	3			-
1.1.1.3	Common Items for item 1.1.1 .2					
A	BMS Compatibility to building IBMS system	Lot	1			-
B	Vibration Isolators for Seismic IV zone	Lot	1			-

BILL OF QUANTITY

Supply, Installation, Testing , Commissioning & Three year's Comprehensive maintenance of HVAC system and other allied accessories for Retail Complex building at sector-21 of Naya Raipur

Sr. No.	Description of Items	Unit	Total Quantity	Rate in INR(In Figure)	Rate in words (in INR)	Amount in INR
C	Victaulic Couplings (Inlet / outlet)	Lot	1			-
D	Chiller System Manager	Lot	1			-
1.1.1.4	INSTALLATION, TESTING & COMMISSIONING of 170 TR Air-cooled Screw Chillers.	Lot	1			-
1.1.1.5	INSTALLATION, TESTING & COMMISSIONING of 200 TR Air-cooled Screw Chillers.	lot	1			-
	1. SUB TOTAL OF REFRIGERATION MACHINES					-
2	Supply, Fabrication, Installation, Testing, Balancing and Commissioning of the following equipment and materials in accordance with Specifications and Tender Drawings and inclusive of all taxes, duties, transportation, scaffolding, insurance upto installation, commissioning, handing over & additional 3 months.					
2.1	<u>PUMPS</u>					
2.1.1	Centrifugal pumps (insulated), factory mounted on a common base with electric motor, for recirculation of water for the central airconditioning system. The pumps motor shall be suitable for 415 +/- 10% volts, 50 cycles, 3 phase AC power supply. [Contractor to select pumps head, motor to suit Screw chiller - '3 Nos x '170TR system pumping head] Pump cost include with Temperature Gauge, Pressure Gauge, Strainers, etc. on supply and return line (excludes sensors & control system).	Nos.	3			-
2.1.1.1	<u>Primary Chilled Water Pumps</u> <u>(Constant Flow) - end suction type</u>					
2.1.1.1.1	Water - 454 usgpm Head - '15Mtr.WC Max.Motor Rating - '7.5 KW Speed - '1450 rpm					
2.1.2	Centrifugal pumps (insulated), factory mounted on a common base with electric motor, for recirculation of water for the central airconditioning system. The pumps motor shall be suitable for 415 +/- 10% volts, 50 cycles, 3 phase AC power supply. [Contractor to select pumps head, motor to suit Screw chiller - 3 Nos x 200Tr system pumping head] Pump cost include with Temperature Gauge, Pressure Gauge, Strainers, etc. on supply and return line (excludes sensors & control system).	Nos.	3.00			-

BILL OF QUANTITY

Supply, Installation, Testing , Commissioning & Three year's Comprehensive maintenance of HVAC system and other allied accessories for Retail Complex building at sector-21 of Naya Raipur

Sr. No.	Description of Items	Unit	Total Quantity	Rate in INR(In Figure)	Rate in words (in INR)	Amount in INR
2.1.2.1	Water - 534 usgpm Head - '15Mtr.WC Max.Motor Rating - '7.5 KW Speed - '1450 rpm					
2.1.3	Secondary Chilled Water Variable Speed Pumping System Supply, installation, testing, balancing and commissioning of Secondary Variable Speed Pumping system , 3 Nos. Dedicated microprocessor based pump controller with parallel pumping software duly downloaded, 3 Nos. variable frequency drives and multiple differential pressure sensor / transmitters as necessary and as described in the specifications. Pumps shall be end suction vertical split casing pump have bronze impeller, mechanical seal,motor,baseplates,couplings ,coupling guards & electrical isolators (lockable ON / OFF push buttons). All electricals & motors to be IP 55. (Contractor to confirm head for system of 170 Tr chiller) Pump cost include with Temperature Gauge, Pressure Gauge, Strainers, etc. on supply and return line (excludes sensors & control system).					
2.1.3.1	Water - 454 usgpm Head - 30 Mtr.WC Max.Motor Rating - 15 KW Speed - 1450 rpm	Nos.	3			0
2.1.3.2	Pump logic controller capable of controlling 3 pumps in parallel specially designed for VSPS pumps in parallel & expandable to control upto 6 pumps in parallel, UL & Canadian underwriter lab listed capable of accepting 16 analog inputs from zone sensor / transmitters can accept inputs from flow meter, KS sensor meter, capable of communicating with BAS by both hard wired & serial communications and capable of communicating with Honeywell, Johnsons Controls, Siemens, Sauter, Modicon's Modbus, BACNet Class II, Allen Bradley, Profibus & Trane Tracer. Panel to be suitable for outdoor installation (IP 55) & duly ventilated with fans. Complete panel by OEM.	Nos	1			0
2.1.3.3	Parallel Pumping Software for two chilled water system duly downloaded & single / multiple differential pressure sensors / transmitters by OEM.	lot	1			
2.1.3.4	DP sensor / transmitter shall be	Nos	7			
2.1.3.5	Interfacing amongst all components & compatibility of I/O signals	Lot	1			

BILL OF QUANTITY

Supply, Installation, Testing , Commissioning & Three year's Comprehensive maintenance of HVAC system and other allied accessories for Retail Complex building at sector-21 of Naya Raipur

Sr. No.	Description of Items	Unit	Total Quantity	Rate in INR(In Figure)	Rate in words (in INR)	Amount in INR
2.1.4	<p>Secondary Chilled Water Variable Speed Pumping System Supply, installation, testing, balancing and commissioning of Secondary Variable Speed Pumping system , 3 Nos. Dedicated microprocessor based pump controller with parallel pumping software duly downloaded, 3 Nos. variable frequency drives and multiple differential pressure sensor / transmitters as necessary and as described in the specifications. Pumps shall be end suction vertical split casing pump have bronze impeller, mechanical seal, motor, baseplates, couplings, coupling guards & electrical isolators (lockable ON / OFF push buttons). All electricals & motors to be IP 55. (Contractor to confirm head for system of 200 Tr chiller)</p> <p>Pump cost include with Temperature Gauge, Pressure Gauge, Strainers, etc. on supply and return line (excludes sensors & control system).</p>					
2.1.4.1	Water - 534 usgpm Head - 30 Mtr.WC Max.Motor Rating - 15 KW Speed - 1450 rpm	Nos.	3			-
2.1.4.2	Pump logic controller capable of controlling 3 pumps in parallel specially designed for VSPS pumps in parallel & expandable to control upto 6 pumps in parallel, UL & Canadian underwriter lab listed capable of accepting 16 analog inputs from zone sensor / transmitters can accept inputs from flow meter, KS sensor meter, capable of communicating with BAS by both hard wired & serial communications and capable of communicating with Honeywell, Johnsons Controls, Siemens, Sauter, Modicon's Modbus, BACNet Class II, Allen Bradley, Profibus & Trane Tracer. Panel to be suitable for outdoor installation (IP 55) & duly ventilated with fans. Complete panel by OEM. Pump cost include with Temperature Gauge, Pressure Gauge, Strainers, etc. on supply and return line (excludes sensors & control system).	Nos	1			
2.1.4.3	Parallel Pumping Software for two chilled water system duly downloaded & single / multiple differential pressure sensors / transmitters by OEM.	lot	1			
2.1.4.4	DP sensor / transmitter	Nos	7			
2.1.4.5	Interfacing amongst all components & compatibility of I/O signals	Lot	1			
2. SUB TOTAL OF PUMPS						
3.0	Supply, Fabrication, Installation, Testing, Balancing and Commissioning of the following equipment and materials in accordance with Specifications and Tender Drawings and inclusive of all taxes, duties, transportation, scaffolding, insurance upto installation, commissioning, handing over & additional 3 months.					
3.1	<u>VIBRATION ISOLATORS</u>					

BILL OF QUANTITY

Supply, Installation, Testing , Commissioning & Three year's Comprehensive maintenance of HVAC system and other allied accessories for Retail Complex building at sector-21 of Naya Raipur

Sr. No.	Description of Items	Unit	Total Quantity	Rate in INR(In Figure)	Rate in words (in INR)	Amount in INR
3.1.1	Vibration Isolators complete with frame / flanges, rust resistant springs, rust resistant bolts / nuts etc. to prevent transmission of vibration and sound etc.					
3.1.1.1	<u>For Pumps</u> Rectangular structural beam or channel concrete form for floating foundations, concrete reinforcement bars, rust resistance spring isolators on 1/4" neoprene acoustical pads etc.	Nos	6			-
3.2	Double sphere flexible connector with G I flanges, bolts etc.					
3.2.1	On Chillers					
3.2.1.1	250 mm dia	Nos	6			-
3.2.1.2	200 mm dia	Nos	6			-
3.2.2	On Pumps					
3.2.2.1	250 mm dia	Nos	12			-
3.2.2.2	200 mm dia	Nos	12			-
	3. SUB TOTAL OF VIBRATION ISOLATORS					-
4	Supply, Fabrication, Installation, Testing, Balancing and Commissioning of the following equipment and materials in accordance with Specifications and Tender Drawings and inclusive of all taxes, duties, transportation, scaffolding, insurance upto installation, commissioning, handing over & additional 3 months.					
4.1	<u>AIR HANDLING UNITS</u>					

BILL OF QUANTITY

Supply, Installation, Testing , Commissioning & Three year's Comprehensive maintenance of HVAC system and other allied accessories for Retail Complex building at sector-21 of Naya Raipur

Sr. No.	Description of Items	Unit	Total Quantity	Rate in INR(In Figure)	Rate in words (in INR)	Amount in INR
4.1.1	Double skin cabinet type AHU with backward curved centrifugal direct driven plug type fan, insulated sandwich type SS drain tray, coil section with coil, door limit switch, filter section with non-flammable prefilters & MERV 13 filters, vibration isolators, gear type outlet dampers (OEM), non - flammable flexible duct connectors test port, all accessories etc., insulated drain pipe, Electrical Panel with necessary control, MCCB single Phase preventor, phase indicating lights, ON/OFF status, non polarised NO-NC contacts for tripping on signal from Fire Dampers / Fire Alarm Panel, cu power & control cabling within the AHU room upto the thermostat / sensor etc. motors to be EFF1 complete with VFD drive with harmonic filters and bypass starter Coil shall be selected for a face velocity of 500 ft / min. VFD with harmonic filters copper cabling for AHU motors to be part of Electrical panel. Chilled Water in/out - 7 °C / 12 °C AHU cost include with Complete chilled water piping station in AHU Room to include pipes , Main Butterfly valve.Pressure Independent Dynamic balancing cum 2 way motorised actuator temperature control valves, Bypass valves / Isolator valves, Temperature Gauge, Pressure Gauge, Strainers, etc.(excludes sensors & control system).including Thermostat to control temperature. Chilled water & drain pipes to be insulated with 25 mm (19 + 6 mm) Armaflex class 'O' nitrile rubber & finished with glass cloth, FOSTER 30-36 coat & final finished with 24G Al. cladding within AHU Room.					
4.1.1.1	Horizontal Floor / Loft Mounted suitable for 75 mm static pressure.					
4.1.1.1.1.1	5000 cfm	Nos.	1			-
4.1.1.1.1.2	7300 cfm	Nos.	1			-
4.1.1.1.1.3	8200 cfm	Nos.	1			-
4.1.1.1.1.4	9100 cfm	Nos.	2			-
4.1.1.1.1.5	9400 cfm	Nos.	2			-
4.1.1.1.1.6	11200 cfm	Nos.	4			-
4.1.1.1.1.7	11600 cfm	Nos.	1			-
4.1.1.3	Ceiling Suspended					
	Additional insulated drip tray to extended 150 mm beyond AHU & valve station					
4.1.1.3.1	6 Rows Coil					
4.1.1.3.1.1	5100 cfm	Nos.	1			-
4.1.1.3.1.2	6900 cfm	Nos.	1			-
4.3	Additional piping station to install BTU meter, complete with all insulation and installation of thermowells. Cost to include installation of BTU meter, supply & installation of piping (BTU meter and thermowell supply by BMS contractor/Client)					
	PIPE Size					
4.3.1	1" - 2" dia	SET	245			-

BILL OF QUANTITY

Supply, Installation, Testing , Commissioning & Three year's Comprehensive maintenance of HVAC system and other allied accessories for Retail Complex building at sector-21 of Naya Raipur

Sr. No.	Description of Items	Unit	Total Quantity	Rate in INR(In Figure)	Rate in words (in INR)	Amount in INR
4.3.2	2 1/2" - 3" dia	SET	22			-
4.3.2	4" - 5" dia	SET	3			-
4.3.3	18" dia	SET	1			-
	4.SUB TOTAL OF AIR HANDLING UNITS					-
5	VENTILATION & EXHAUST FANS					
5.1	Basement Car Park Ventilation					
5.1.1	<p>Supply, Installation, Testing and commissioning of approved makes direct driven Smokespill Axial fans. Fan shall be balanced to vibration grade of G2.5 as per AMCA 204. Fan shall be complete with GSS casing (220 GSM), Aluminium impeller, Imported make Motor Class H, special rated motor certified for 250 Deg C for 2 Hrs - 415/3P/50Hz. Complete Fan & motor assembly shall be Tested & certified for 250 Deg C for 2 Hrs. fire rating as per BS 7346 Part 2: 1990 Class B or EN 12101-3 by Third party Lab.</p> <p>Quoted price shall be including of fire redidant canvas connection, Mounting arrangement, Vibration isolater, Motorised damper, Starter panel, Suitable size of Armoured FRLS copper cabling with end termination with double compression gland and copper luges, Copper earthing, Suitable size of Shielded armoured FRLS Copper control cable up to PLC Panel with end termination with double compression gland and copper luges, suitable to interface with BMS & Fire Alarm System / PLC Panel, etc. complete as directed by the engineer-in-charge.</p> <p>The Starter Panel shall be proided with incomer MCCB, Bus Bar, Starters, control wiring,In bult Logic suitable to interface with BMS & Fire Alarm System / PLC Panel System as required for functioning of Smokespill Fan.</p> <p>The Panels shall be fabricated from 14 SWG MS sheet complete with required MS angle supports,tinned electrolytic copper bus bar chamber with required rating ,control switchgear and meter fixing plate, compartments for switch gear, meters and cables as per approved general arrangement plan , including 7 tank processes , approved shade powder coating, neoprene rubber gasket ,internal wiring required foundation , earthing terminal, detachable gland plate, required size. complete as directed by the engineer-in-charge.</p> <p>All electricals panel to be IP 54 protection and cables laid on G.I perforated trays. Complete installation to be Epoxy coated.</p>					
5.1.1.1	60835 cubic Feet per minute, 20 mmwg External Static Pressure, 950 rpm	No.	24			0

BILL OF QUANTITY

Supply, Installation, Testing , Commissioning & Three year's Comprehensive maintenance of HVAC system and other allied accessories for Retail Complex building at sector-21 of Naya Raipur

Sr. No.	Description of Items	Unit	Total Quantity	Rate in INR(In Figure)	Rate in words (in INR)	Amount in INR
5.1.2	<p>Supply, Installation, Testing and commissioning of approved makes Induced Air Centrifugal Jet fans Fan shall be AMCA certified for Air & Sound performance, balanced to vibration grade of G2.5 as per AMCA 204. Fan shall be complete with GSS casing (220 GSM), MS impeller, Imported make Dual speed smoke venting Class H, special rated motor certified for 250 Deg C for 2 Hrs - 415/3P/50Hz. Complete Fan & motor assembly shall be Tested & certified for 250 Deg C for 2 Hrs. fire rating as per BS 7346 Part 2: 1990 Class B or EN 12101-3 by Third party Lab.</p> <p>Quoted price shall be including of Mounting arrangement, Suitable size of Armoured FRLS copper cabling with end termination with double compression gland and copper luges up to PLC / starter Panel, Copper earthing, Copper earthing, suitable to interface with BMS & Fire Alarm System, etc. complete as directed by the engineer-in-charge.</p> <p>All electricals panel to be IP 54 protection and cables laid on G.I perforated trays. Complete installation to be Epoxy coated.</p> <p>The Locationing of the jet fans has to be done in such a way that the Air velocity at any point on the plane of 1m from the ground level should not be less than 0.25m/s during the normal mode. The CFD Analysis should be done for jet fan positioning by Original Equipment manufacturer.</p>					
5.1.2.1	<p>Centrifugal Type Jet fan (11100/5550 CMH, 97/24 Thrust force) Note : Qty. are indicative only. Actual Qty. are base on CFD analysis.</p>	No.	22			0
5.1.3	<p>The development and validation of longitudinal ventilation system proposed in basement using jet fans through a computational fluid dynamics (CFD) model. The CFD model of the basement's should include, indicate and share results (as applicable) of component models for turbulence, fire, radiation, smoke, and location of the jet fan.</p>	No.	6			0
5.1.4	<p>Supply, installing, testing and commissioning of approved makes CO Sensor.</p> <p>Quoted price shall be including of Suitable size of Shielded armoured FRLS Copper control cable up to PLC Panel with end termination with double compression gland and copper luges, etc. complete as directed by the engineer-in-charge.</p> <p>All electricals panel to be IP 54 protection and cables laid on G.I perforated trays. Complete installation to be Epoxy coated.</p>	No.	30			0

BILL OF QUANTITY

Supply, Installation, Testing , Commissioning & Three year's Comprehensive maintenance of HVAC system and other allied accessories for Retail Complex building at sector-21 of Naya Raipur

Sr. No.	Description of Items	Unit	Total Quantity	Rate in INR(In Figure)	Rate in words (in INR)	Amount in INR
5.1.5	<p>Supplying, fabricating, installation, testing and commissioning free standing/Wall mounted type MS powder coated cubicle three phase, 415 V Electrical cum PLC panel.</p> <p>The Panel shall be provided with PLC Controller , incomer MCCB, Bus Bar, Starters, control wiring,In built Logic suitable to interface with BMS & Fire Alarm System as required for functioning of jet fans /Main Exhaust Fan.</p> <p>The Panels shall be fabricated from 14 SWG MS sheet complete with required MS angle supports,tinned electrolytic copper bus bar chamber with required rating ,control switchgear and meter fixing plate, compartments for switch gear, meters and cables as per approved general arrangement plan , including 7 tank processes , approved shade powder coating, neoprene rubber gasket ,internal wiring required foundation , earthing terminal, detachable gland plate, required size. complete as directed by the engineer-in-charge.</p> <p>All electricals panel to be IP 54 protection and cables laid on G.I perforated trays. Complete installation to be Epoxy coated.</p> <p>Note : Co-relation of panel qty. to Qty. of Jet / Main Exh. & CO sensores shall be as per zoning and computational fluid dynamics (CFD) model . In case of Signal came from fire alarm System to PLC Panel to activate the fans in fire mode.</p>	No.	6			0
5.2	Pump Room Ventilation					
5.2.1	<p>Supply, Installation, Testing and commissioning of approved makes direct driven Vane Axial fan with Attenuator at one side.Fan shall be AMCA certified for Air performance, Fan shall be balanced to vibration grade of G2.5 as per AMCA 204. Fan shall be complete with Heavy guage Casing, Aluminium impeller, Class F Motor. Motor RPM should not exceeds 1000rpm</p> <p>Quoted price shall be including of fire redidant canvas connection, Mounting arrangement, Starter panel, Suitable size of Armoured FRLS copper cabling with end termination with double compression gland and copper luges, Copper earthing, suitable to interface with BMS & Fire Alarm System, etc. complete as directed by the engineer-in-charge.</p> <p>The Starter Panel shall be provided with incomer MCCB, Bus Bar, Starters, control wiring,In built Logic suitable to interface with BMS & Fire Alarm System / PLC Panel System as required for functioning of Vane Axile Fan.</p> <p>The Panels shall be fabricated from 14 SWG MS sheet complete with required MS angle supports,tinned electrolytic copper bus bar chamber with required rating ,control switchgear and meter fixing plate, compartments for switch gear, meters and cables as per approved general arrangement plan , including 7 tank processes , approved shade powder coating, neoprene rubber gasket ,internal wiring required foundation , earthing terminal, detachable gland plate, required size. complete as directed by the engineer-in-charge.</p> <p>All electricals panel to be IP 54 protection and cables laid on G.I perforated trays. Complete installation to be Epoxy coated.</p> <p>All equipment/accessories from OEM (Original Equipment manufacturer)</p>					
5.2.1.1	7525 cubic Feet per minute, 15 mmwg External Static Pressure,	No.	6			0
5.3	Electrical Panel room & Meter room Ventilation					

BILL OF QUANTITY

Supply, Installation, Testing , Commissioning & Three year's Comprehensive maintenance of HVAC system and other allied accessories for Retail Complex building at sector-21 of Naya Raipur

Sr. No.	Description of Items	Unit	Total Quantity	Rate in INR(In Figure)	Rate in words (in INR)	Amount in INR
5.3.1	Supply, Installation, Testing and commissioning of approved makes of direct driven Propeller fan. Fan shall be AMCA certified for Air performance. . Fan shall be balanced to vibration grade of G2.5 as per AMCA 204. Fan shall be complete with Heavy guage Wall Plate , Sickle shape impeller, Sinlge Phase Class F Motor. Motor RPM should not exceeds 1500rpm. Quoted price shall be including of Mounting arrangement, Starter panel, Electrical copper cabling, Copper earthing, Birdscreen, Safety guards etc. complete as directed by the engineer-in-charge. All electricals panel to be IP 54 protection and cables laid on G.I perforated trays. Complete installation to be Epoxy coated.					
5.3.1.1	1350 cubic Feet per minute, free flow (Electrical Room)	No.	12			0
5.3.1.2	1485 cubic Feet per minute, free flow (Electrical Room)	No.	6			0
5.4	Ventilation					
5.4.1	Cabinet type Double Skin GI construction fan section with backward curve, motor, filter, electrical panel cabling starter, isolator cabling, dampers mounting arrangements. Spring isolators etc. All electricals to be IP 55. The Panels shall be fabricated from 14 SWG MS sheet complete with required MS angle supports,tinned electrolytic copper bus bar chamber with required rating ,control switchgear and meter fixing plate, compartments for switch gear, meters and cables as per approved general arrangement plan , including 7 tank processes , approved shade powder coating, neoprene rubber gasket ,internal wiring required foundation , earthing terminal, detachable gland plate, required size All electricals panel to be IP 54 protection and cables laid on G.I perforated trays. Complete installation to be Epoxy coated.					
5.4.1.1	Ventilation Fans with filters					
5.4.1.1.1	500 cubic Feet per minute with 30 mmwg External Static Pressure	Nos.	1			0
5.4.1.1.2	1300 cubic Feet per minute with 30 mmwg External Static Pressure	Nos.	1			0
5.4.1.1.3	1400 cubic Feet per minute with 30 mmwg External Static Pressure	Nos.	1			0
5.4.1.1.4	1600 cubic Feet per minute with 30 mmwg External Static Pressure	Nos.	1			0
5.4.1.1.5	1700 cubic Feet per minute with 30 mmwg External Static Pressure	Nos.	2			0
5.4.1.1.6	1900 cubic Feet per minute with 30 mmwg External Static Pressure	Nos.	1			0
5.4.1.1.7	2100 cubic Feet per minute with 30 mmwg External Static Pressure	Nos.	4			0
5.4.1.1.8	2200 cubic Feet per minute with 30 mmwg External Static Pressure	Nos.	2			0
5.4.1.1.9	2400 cubic Feet per minute with 30 mmwg External Static Pressure	Nos.	1			0

BILL OF QUANTITY

Supply, Installation, Testing , Commissioning & Three year's Comprehensive maintenance of HVAC system and other allied accessories for Retail Complex building at sector-21 of Naya Raipur

Sr. No.	Description of Items	Unit	Total Quantity	Rate in INR(In Figure)	Rate in words (in INR)	Amount in INR
5.4.2	Supply, Installation, Testing and commissioning of approved makes of direct driven Cabinet Type Inline fans. Fan shall be AMCA certified for Air performance, Fan shall be balanced to vibration grade of G2.5 as per AMCA 204. Fan shall be complete with Rectangular Cabinet, Forward curve Impeller & Single Phase Class F Motor. Motor RPM should not exceeds 1500rpm. Quoted price shall be including of Mounting arrangement, Vibration Isolator, Starter panel, Electrical copper cabling, Copper earthing, Birdscreen etc. complete as directed by the engineer-in-charge. All electricals panel to be IP 54 protection and cables laid on G.I perforated trays. Complete installation to be Epoxy coated.					
5.4.2.1	Exhaust Fans without filters					
5.4.2.1.1	1000 cubic Feet per minute with 20mmwg External Static Pressure	No.	6			0
5.4.2.1.2	1500 cubic Feet per minute with 20mmwg External Static Pressure	No.	4			0
5.5	Lift well Pressurization Fans					
5.5.1	Supply, Installation, Testing and commissioning of approved makes of direct driven Tube Axial Pressurization fan .Fan shall be AMCA certified for Air performance, Fan shall be balanced to vibration grade of G2.5 as per AMCA 204. Fan shall be complete with Heavy guage Casing, Aluminium impeller, Class F Motor. Motor RPM should not exceeds 1500rpm. Fan should be capable to handling 1.5 inch External Static Pressure. Quoted price shall be including of fire redidant canvas connection, Mounting arrangement, Motorised damper, birdsceen, Starter panel, Suitable size of Armoured FRLS copper cabling with end termination with double compression gland and copper luges, Copper earthing, vibration isolators, 2 Nos. Sensor to maintain 0.5 inch static pressure and suitable to interface with BMS & Fire Alarm System, etc. complete as directed by the engineer-in-charge. The Starter Panel shall be proided with incomer MCCB, Bus Bar, Starters, VFDs,control wiring,In bult Logic suitable to interface with BMS & Fire Alarm System as required for functioning of Tube Axial Pressurization Fan. The Panels shall be fabricated from 14 SWG MS sheet complete with required MS angle supports,tinned electrolytic copper bus bar chamber with required rating ,control switchgear and meter fixing plate, compartments for switch gear, VFDs, meters and cables as per approved general arrangement plan , including 7 tank processes . approved shade powder coating, neoprene rubber gasket ,internal wiring required foundation , earthing terminal, detachable gland plate, required size. complete as directed by the engineer-in-charge. All electricals panel to be IP 55 protection and cables laid on G.I perforated trays. Complete installation to be Epoxy coated.					
5.5.1.1	2000 cubic Feet per minute	No.	4			0
5.5.1.2	3500 cubic Feet per minute	No.	4			0
	5. SUB TOTAL OF VENTILATION & EXHAUST FANS					-
6	DRAIN PIPING					

BILL OF QUANTITY

Supply, Installation, Testing , Commissioning & Three year's Comprehensive maintenance of HVAC system and other allied accessories for Retail Complex building at sector-21 of Naya Raipur

Sr. No.	Description of Items	Unit	Total Quantity	Rate in INR(In Figure)	Rate in words (in INR)	Amount in INR
6.1	Providing and fixing in position uPVC pipes conforming to IS 4985 Class 6, 1.25 Mpa pressure rating, of approved makes of following diameters for drain pipe with required fittings such as elbows, Tees, unions, reducers, clean out etc with 13mm thick approved makes class 'O' microcelluler Closed cell Nitrile rubber tube insulation. Conforming to IS 7834 and jointing material and labor etc. complete, as per directions of engineer-in-charge.					
6.1.1	32 MM Nominal Bore	RMT	800			-
6.1.2	40 MM Nominal Bore	RMT	89			-
6.1.3	50 MM Nominal Bore	RMT	517			-
6.1.4	65 MM Nominal Bore	RMT	179			-
6.1.5	80 MM Nominal Bore	RMT	227			-
6.1.6	100 MM Nominal Bore	RMT	92			-
	6. SUB TOTAL OF DRAIN PIPING					-
7	Supply, Fabrication, Installation, Testing, Balancing and Commissioning of the following equipment and materials in accordance with Specifications and Tender Drawings and inclusive of all taxes, duties, transportation, scaffolding, insurance upto installation, commissioning, handing over & additional 3 months.					
7.1	<u>CHILLED WATER PIPING WITH ALUMINUM CLADDING</u>					
7.1.1	Insulated chilled water piping, MS heavy duty 'C' Class (as per IS 1239 - Part I 2004) complete with bends, elbows, tees, vibration isolators, hangers, full round PU / rubber supports insulated with 50 mm thick pre-formed sections of TF thermocole finished with glass cloth, FOSTER 30-36 coat & final finished with 24G Al. cladding etc. Pipe thickness: 6.3 mm thick for 200 - 250 dia pipes 8 mm thick for 300 - 350 dia pipes 10 mm thick for 400 - 600 dia pipes 12 mm thick for 650 - 1000 dia pipes Insulation thickness exposed to sun - 75 mm remaining - 50 mm					
	<u>Pipes</u>					
7.1.1.1	350 mm dia	RMT	260			-
7.1.1.2	300 mm dia	RMT	40			-
7.1.1.3	250 mm dia	RMT	45			-

BILL OF QUANTITY

Supply, Installation, Testing , Commissioning & Three year's Comprehensive maintenance of HVAC system and other allied accessories for Retail Complex building at sector-21 of Naya Raipur

Sr. No.	Description of Items	Unit	Total Quantity	Rate in INR(In Figure)	Rate in words (in INR)	Amount in INR
7.1.1.4	200 mm dia	RMT	310			-
7.1.1.5	150 mm dia	RMT	250			-
7.1.1.6	125 mm dia	RMT	982			-
7.1.1.7	100 mm dia	RMT	75			-
7.1.1.8	80 mm dia	RMT	190			-
7.1.1.9	65 mm dia	RMT	227			-
7.1.1.10	50 mm dia	RMT	643			-
7.1.1.11	40 mm dia	RMT	530			-
7.1.1.12	32 mm dia	RMT	325			-
7.1.1.13	25 mm dia	RMT	1685			-
7.1.2	Insulated Butterfly Valves with flanges, gaskets, bolts etc.					
7.1.2.1	250 mm dia	Nos.	27			-
7.1.2.2	200 mm dia	Nos.	27			-
7.1.2.3	150 mm dia	Nos.	4			-
7.1.2.4	125 mm dia	Nos.	12			-
7.1.2.5	100 mm dia	Nos.	6			-
7.1.2.6	80 mm dia	Nos.	20			-
7.1.2.7	65 mm dia	Nos.	20			-
7.1.2.8	50 mm dia	Nos.	18			-
7.1.2.9	40 mm dia	Nos.	16			-
7.1.3	Control-cum-balancing valves complete with flanges, measuring ports, insulation etc.					
7.1.3.1	250 mm dia	Nos.	3			-
7.1.3.2	200 mm dia	Nos.	3			-
7.1.3.3	150 mm dia	Nos.	2			-

BILL OF QUANTITY

Supply, Installation, Testing , Commissioning & Three year's Comprehensive maintenance of HVAC system and other allied accessories for Retail Complex building at sector-21 of Naya Raipur

Sr. No.	Description of Items	Unit	Total Quantity	Rate in INR(In Figure)	Rate in words (in INR)	Amount in INR
7.1.3.4	125 mm dia	Nos.	6			-
7.1.4	Insulated Gate Valve with flanges.					
7.1.4.1	65 mm dia	Nos.	8			-
7.1.6	Insulated ball valves without strainers etc.					
7.1.6.1	32 mm dia	Nos.	28			-
7.1.6.2	25 mm dia	Nos.	436			-
7.1.7	Insulated check valves with flanges, nuts, bolts, gaskets etc.					
7.1.7.1	250 mm dia	Nos.	6			-
7.1.7.2	200 mm dia	Nos.	6			-
7.1.7	Insulated Pot / 'Y' strainers with flanges, nuts, bolts, gaskets etc.					
7.1.7.1	250 mm dia	Nos.	9			-
7.1.7.2	200 mm dia	Nos.	9			-
7.1.9	Motorised On / Off type Butterfly Valve with position feed back & connectivity to main BMS system					
7.1.9.1	250 mm dia	Nos.	3			-
7.1.9.2	200 mm dia	Nos.	3			-
7.2	To install BMS equipment given by BMS vendor including Valves, fitting, flanges , insulation etc.for 170 Tr Chiller System	Lot	1			-
7.3	To install BMS equipment given by BMS vendor including Valves, fitting, flanges , insulation etc.for 200 Tr Chiller System	Lot	1			-

BILL OF QUANTITY

Supply, Installation, Testing , Commissioning & Three year's Comprehensive maintenance of HVAC system and other allied accessories for Retail Complex building at sector-21 of Naya Raipur

Sr. No.	Description of Items	Unit	Total Quantity	Rate in INR(In Figure)	Rate in words (in INR)	Amount in INR
7.4	Precharged steel closed expansion tank with replaceable heavy duty butyl rubber bladder, mounting stand with all necessary system connection & charging valve connection to facilitate on site charging. Tank to meet ASME Boiler & pressure vessel code (suitable for 125 psi working pressure) all valve mounting etc. System to be complete with pressurisation unit and accessories like pressure reducing valve, auto air purge etc. All tanks shall be ON LINE & active. To be sized, in case of a tank failure, the other tank sustains the system. Capacity - to be confirmed by contractor	Nos.	4			-
7.5	Automatic Make-up water pump (1W + 1N) to suit the Expansion Tank and System pressure with pre adjustment, switches, necessary valves, piping, electrical etc.(Totally automatic)	Set	2			-
7.6	<u>MICROBUBBLE DEARETOR AND DIRT SEPERATOR</u>					
7.6.1	High flow type Microbubble dearetor cum dirt Seperator complete made of MS250 with brass drain valve at the bottom capable of removing fine dirt from the system online. All the free air in the system shall be vented out from the top vent made of brass in the form of microbubble. The connections should be flanged / Weld end The unit is to have a vertical mild steel housing, and to ensure Deaeration is achieved, it must be fitted with a non-clogging cluster of SPIROTUBE manufactured from steel tube and copper wire to create the optimum deaerating conditions. Size 200 Dia Contractor to check size etc. to suit system design.	Nos.	2			-
7.7	Chilled Water Dosing System for two chilled water system for 170 tr chiller system.					
7.7.1	Chemical feed system with Tank and Canopy and Test kit	Lot	1			-
7.7.2	Chemguard - 12000 - 3C	Lot	1			-
7.7.3	Chemguard - 2100 - 2C	Lot	1			-
7.7	Chilled Water Dosing System for two chilled water system for 200 tr chiller system					
7.7.1	Chemical feed system with Tank and Canopy and Test kit	Lot	1			-
7.7.2	Chemguard - 12000 - 3C	Lot	1			-
7.7.3	Chemguard - 2100 - 2C	Lot	1			-
	7.SUB TOTAL OF CHILLED WATER PIPING WITH ALUMINUM CLADDING					-

BILL OF QUANTITY

Supply, Installation, Testing , Commissioning & Three year's Comprehensive maintenance of HVAC system and other allied accessories for Retail Complex building at sector-21 of Naya Raipur

Sr. No.	Description of Items	Unit	Total Quantity	Rate in INR(In Figure)	Rate in words (in INR)	Amount in INR
8	Supply, Fabrication, Installation, Testing, Balancing and Commissioning of the following equipment and materials in accordance with Specifications and Tender Drawings and inclusive of all taxes, duties, transportation, scaffolding, insurance upto installation, commissioning, handing over & additional 3 months.					
8.1	SHEET METAL DUCTING SMACNA STANDARDS ROLASTAR Ducting System with ROLAMATE System Components					
8.1.1	GSS fire rated ducting complete with elbows, turning vanes, volume control duct dampers, fire rated gaskets, GI fully threaded rods, G.I. supports / hangers etc. (Car Park area & pressurization duct work)					
8.1.1.1	Duct Pressure Class - 1 inch W.G with intermediate bracing					
8.1.1.1.1	1 - 450 (upto 18") -- 26 G C&SS	Sq.m	1645			-
8.1.1.1.2	451 - 750 (19" - 30") -- 26 G TDF	Sq.m	640			-
8.1.1.1.3	751 - 1000 (41" - 60") -- 24 G	Sq.m	490			-
8.1.1.1.4	1001 - 1200 (61" - 72") -- 22 G	Sq.m	231			-
8.1.1.1.5	1201 - 2100 (73" - 84") -- 20 G	Sq.m	710			-
8.1.1.1.6	2101 - 2400 (85" - 96") -- 18 G	Sq.m	25			-
8.2	GSS Louvres with bird screen, adjustable damper for fresh air and without damper for exhaust air etc.					
8.2.1	For Fresh Air	Sq.m	4			-
8.2.2	For Exhaust Air	Sq.m	2			-
8.3	Underdeck insulation for exposed roof					
8.3.1	25 mm Armaflex Class 'O' with adhesives, etc	Sq.m	6000			-

BILL OF QUANTITY**Supply, Installation, Testing , Commissioning & Three year's Comprehensive maintenance of HVAC system and other allied accessories for Retail Complex building at sector-21 of Naya Raipur**

Sr. No.	Description of Items	Unit	Total Quantity	Rate in INR(In Figure)	Rate in words (in INR)	Amount in INR
8.4	ACOUSTICAL INSULATION Elastomeric Nitrile rubber foam ARMASOUND PLUS with fire retardant adhesives recommended by OEM. Self adhesive pins, washers, accessories, etc.					
8.4.1	Plant Room 15 mm thick Armasound with white RP tissue + 18G chickenwire mesh	Sq.m	760			-
8.4.2	Ducts 15 mm thick	Sq.m	395			-
8.5	THERMAL INSULATION					
8.5.1	19 mm thick	Sq.m	1380			-
8.5.2	9 mm thick	Sq.m	2275			-
8.6	Combined smoke and fire dampers with 90 minutes rating with extended wall sleeves & motorised actuators (Belimo) to operate with either signal from factory calibrated / electronic sensing device (70 oC), mounted in air-stream or signal from smoke detection system. Provide remote control panel to operate and test damper and all electricals etc.					
8.6.1	Smoke Fire Dampers with separate extended sleeves	Sq.m	25.5			-
8.6.2	Belimo/equivalent Actuator BF - 24 - T	Nos.	32			-
	8.SUB TOTAL OF SHEET METAL DUCTING					-
9	Supply, Fabrication, Installation, Testing, Balancing and Commissioning of the following equipment and materials in accordance with Specifications and Tender Drawings and inclusive of all taxes, duties, transportation, scaffolding, insurance upto installation, commissioning, handing over & additional 3 months.					

BILL OF QUANTITY

Supply, Installation, Testing , Commissioning & Three year's Comprehensive maintenance of HVAC system and other allied accessories for Retail Complex building at sector-21 of Naya Raipur

Sr. No.	Description of Items	Unit	Total Quantity	Rate in INR(In Figure)	Rate in words (in INR)	Amount in INR
9.1	<u>ALUMINUM GRILLES / DIFFUSERS</u>					
9.1.1	Square / Rect. with VCD (SAD) with insulated plenum box to connect with flexible duct to suit tile size - 4 way (Plenum box part of grille Manufacturers)					
9.1.1.1	600 x 600	Nos.	145.00			-
9.2	Square / Rect. without VCD (RAD) to suit tile size					
9.2.1	600 x 600	Nos.	155.00			-
9.3	Supply, installation, testing & commissioning of approved make Linear Grilles (EP-00, EP-15, EP-30, EP-45) - continous or with four side flange, including mitered corners etc. complete as directed by the engineer-in-charge.					
9.3.1	EP - 15 / 00					
9.3.1.1	300 mm Wide	RMT	140.00			-
9.3.1.2	650 X 650	Nos.	18.00			-
9.3.1.3	400 X 400	Nos.	12.00			-
9.3.1.4	350 X 350	Nos.	12.00			-
9.3.1.5	200 X 200	Nos.	40.00			-
9.3.2	Supply, installation, testing & commissioning of approved make Linear Grilles (EP-00, EP-15, EP-30, EP-45) - continous or with four side flange, including mitered corners etc. The Linear Grilles shall be with Aluminium opposed Blade Dampers. Nylon - geared with Aerofoil Blades Matt Black powder coated finishing. complete as directed by the engineer-in-charge.					
9.3.2.1	150 X 150	Nos.	245.00			-
9.4	Aluminium opposed Blade Dampers. Nylon - geared with Aerofoil Blades Matt Black powder coated finishing					
9.4.1	EP - 15	Sq.m	16.00			-
9.5	Aluminium adjustable louvres in matt black powder coated finishing					
9.5.1	EP - 15	Sq.m	16.00			-

BILL OF QUANTITY

Supply, Installation, Testing , Commissioning & Three year's Comprehensive maintenance of HVAC system and other allied accessories for Retail Complex building at sector-21 of Naya Raipur

Sr. No.	Description of Items	Unit	Total Quantity	Rate in INR(In Figure)	Rate in words (in INR)	Amount in INR
9.6	Supply, installation, testing & commissioning of approved make extruded Aluminum powder coated Louver with bird screen.The Blades are incline at 45 deg. On a 40 mm pitch to minimized water ingress. complete as directed by the engineer-in-charge.	Sq.m	228.00			-
9.7	Non-return dampers double nylon bushing frame 18g & flaps 20g on basement ventilation / exhaust fans	Sq.m	72.00			-
	9.SUB TOTAL OF ALUMINUM GRILLES / DIFFUSERS					-
10	ELECTRICAL PANEL Supply, Fabrication, Installation, Testing, Balancing and Commissioning of the following equipment and materials in accordance with Specifications and Tender Drawings and inclusive of all taxes, duties, transportation, scaffolding, insurance upto installation, commissioning, handing over & additional 3 months.					
10.1	Floor mounted (IP 54) cubicle type compartmentalised dust & vermin proof Electrical Main Airconditioning central pane for System 1 duly painted by 7 Tank painting process in 14/16G with draw-out type ACB and MCCB, required to cater to Chillers, Pumps, Fans, etc in the Plant Room with Electrolytic tinned copper busbars, incoming outgoing feeders, starters, soft starters for each primary pump, indicating lamps, selector switches, internal cu. power & control cabling, auto / manual seletcor switch for start / stop, volt free contacts to receive EMS start / stop signal, AMP meter, Volt meter, KW meter. Provide G I perforated cable trays with cover, G I support, earthing, protective devices, safeties, power & control cabling to all Pumps & Fans with termination, etc. Secondary Pump panel to be enclosed within. Panel capable of supporting all EMS interface. For System 1 (Cabling / earthing from all panel to all equipment shall be copper laid in GI tray with cover except for Chiller shall be Aluminium)	Lot	1			-

BILL OF QUANTITY**Supply, Installation, Testing , Commissioning & Three year's Comprehensive maintenance of HVAC system and other allied accessories for Retail Complex building at sector-21 of Naya Raipur**

Sr. No.	Description of Items	Unit	Total Quantity	Rate in INR(In Figure)	Rate in words (in INR)	Amount in INR
10.2	Floor mounted (IP 54) cubicle type compartmentalised dust & vermin proof Electrical Main Airconditioning central panel for system 2 duly painted by 7 Tank painting process in 14/16G with draw-out type ACB and MCCB, required to cater to Chillers, Cooling Towers, Pumps, Fans, etc in the Plant Room with Electrolytic tinned copper busbars, incoming outgoing feeders, starters, soft starters for each primary pump, indicating lamps, selector switches, internal cu. power & control cabling, auto / manual selector switch for start / stop, volt free contacts to receive EMS start / stop signal, AMP meter, Volt meter, KW meter. Provide G I perforated cable trays with cover, G I support, earthing, protective devices, safeties, power & control cabling to all Pumps & Fans with termination, etc. Secondary Pump panel to be enclosed within. Panel capable of supporting all EMS interface. (Cabling / earthing from all panel to all equipment shall be copper laid in GI tray with cover except for Chiller shall be Aluminium)	Lot	1			-
	10.SUB TOTAL OF ELELECTRICAL PANEL					-
11	Supply, Fabrication, Installation, Testing, Balancing and Commissioning of the following equipment and materials in accordance with Specifications, approved makes list and Tender Drawings and inclusive of taxes, duties, transportation, scaffolding, insurance till commissioning + additional 3 months. All electricals on terrace / exposed to weather to have IP 55 protection and cables laid on G.I perforated trays.					
11.1	SPLIT Air conditioners					
11.1.1	Supply, Installation, Testing and commissioning of approved makes Hi wall type SPLIT Air conditioners with outdoor condensing units, indoor units with cordless remote control, interconnecting refrigerant piping as per OEM recommendations, (approx. Cu. cabling & refrigerant piping 5 mtr with 13mm thick approved makes class 'O' microcelluer Closed cell Nitrile rubber tube insulation) controls, copper earthing, single phase preventer, copper power & control cabling, safeties, GI Coated condenser stand, all mounting arrangements etc.complete as directed by the engineer-in-charge. The unit shall be high efficiency unit for minimum power consumption. The rating of the unit shall be minimum 5 star. And CFC/HCFC Free Refrigerant.					
11.1.1.1	2.0 TR	No.	12.00			-
	11. SUB TOTAL OF SPLIT A/C					-
	Grand Total OF ITEM (1 TO 11)					-