CANARA BANK – GIFT CITY - GANDHINAGAR

TENDER SPECIFICATION

For

INTERNAL HVAC WORK AT 7TH FLOOR AT GIFT CITY - GANDHINAGAR

OFFICE ADDRESS - CANARA BANK- PREMISES & ESTATE SECTION- CIRCLE OFFICE – AHMEDABAD.

Volume-I:

System Description, Technical Specifications and Conditions of Contract

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JANUARY 2021

C O N T E N T S

VOLUME-I: CONDITIONS OF CONTRACT AND TECH. SPECIFICATIONS

VOLUME-II: BID FORM

INSTRUCTIONS TO TENDERER

1.1 Tenderershallstudytheentiredocumentforthefullmeaningandintentofthevarious specificationsandterms&conditionslaidthereunder.Incaseofanyqueries/difficulties or clarifications are required by the tenderer, the same may be obtained from the Consultant,priortopreparingtheoffer.

1.2 ProvisionshavebeenmadeinthebuildingstructureforaccommodatingEquipment, Ducting,andPipingetc.forHVACSystemasperConsultant'sdrawings.Tenderershall ensure that the offered equipment and ancillary work fits comfortably within the buildingstructurewithoutanyneedforchangesincivildesignofthebuilding.

1.3 Tendererisrequiredtovisitthesitepriortopreparingtheoffer.Duringthevisithe shouldascertainforhimselfvarioussiteconditionsasrelevanttothetechnicalitiesofthe workinvolvedandthelabourregulations/labourwelfarefacilitiesexistingnearthesite. Heshouldalsoenvisageforhimselfalldifficultiesthatmayariseduringtheexecutionof theContract.Thetenderershallpreparehisbidtakingintoconsiderationallthesite conditionsandotherrelevantinformationcollectedbyhim.

1.4 OffersshallremainopentoacceptancebytheOWNERSforaperiodof90daysfromthe date ofsubmission.

1.5 TenderermustsubmitofferonlybyfillinguptheBIDFORMinthetenderdocument,duly stampedandsignedbyanauthorizedperson.Thetechnicaldatasheetsshallbefilled completely.Incompletebidsshallnotbeconsidered.

1.6 Comprehensive technical literature and write-ups explaining the construction, functioningandadvantages/limitationsoftheofferedequipmentshallbesubmittedasa part of theoffer.

1.7 Tenderershallindicatedeviationsfromspecificationsandconditionsofcontractclearly in the "Deviation Schedule". Except for the deviations mentioned in the Deviation Schedule, all other specifications and conditions shall be considered to have been accepted by thetenderer.

1.8 Tenderershallsubmitalistofinstallationsexecutedandcommissionedusingequipment identicaltotheofferedequipment,forsimilarapplications,withinIndia,alongwiththe monthandyearofcommissioning,locationofinstallation,capacity/modelinstalled name/designation/telephoneno.Ofthepersonconcerned.

1.9 Thetenderdocumentshallbereturneddulycompletedalongwithenclosures.Each pageofthedocumentssubmittedshallbesignedbythetendererintokenofhishaving acquaintedhimselfwith,andagreedto,theConditionsofContract,andSpecifications. Anytenderwithanyofthedocumentsnotsosignedwillnotbeconsidered.

1.10 Ownerdoesnotbindhimselftoacceptthelowestoranytenderandreservestoitselfthe right to accept or reject any or all the tenders, either in whole or in part without assigninganyreasonsfordoingso.

1.11 The awarded bidder must submit all the needed certification of guarantee/warranty from the OEM (Original equipment Manufacture).

1.12 The awarded bidder must submit the shop drawing, General Arrangement drawing etc for approval before commissioning the work.

1.13 The awarded bidder must submit the technical drawings of AHU, ODU, required dampers, indoor units, electrical panels, control panels etc.

1.14 bidder must study the site with all aspect related to HVAC like Ducting, Conduits, Electrical supply, Main electrical panel, all required piping, water drainage pipe etc.

1.15 The awarded bidder must submit all all drawings related to HVAC including electrical arrangement, Ducting, Conduits, Electrical supply, Main electrical panel, all required piping, water drainage pipe, Thickness of pipes, diameter of pipe etc needed on site for HVAC in drawings.

1.16 The bidder must submit heat load calculation along with bid.

1.17 Bidder must visit the site and understand the location of Out door unit as per site condition.

1.18 The Awarded Bidder must submit Design Based Report (DBR) along with shop drawings.

1.19 The awarded bidder must comply and follow all the norms of platinum green rating building and work accordingly.

1.20 The awarded bidder must submit all the technical specification of material, equipment, machinery to be installed at site to EIC/Consultant for approval.

1.21 The awarded bidder must identify the location of Outdoor unit in building as per instruction of authority/client/consultant and need to show it in drawings with the needed electrical connection, general arrangement needed from the same, piping drawings etc and get it approved by EIC/consultant.

1.22 The awarded bidder must carry on all the testing for leakage and etc of ducts, joints, piping etc.

1.23 The awarded bidder must submit joinery detail of the ducts, pipes etc along with shop drawings.

1.24 The awarded bidder must get make his DBR certified by OEM.

1.25 The awarded bidder must submit Heat load calculation along with DBR before commissioning the work and certified the required temperature would be achieve.

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CHAPTER-1

SYSTEM DESCRIPTION & BASIS OF DESIGN

1.1 INTRODUCTION

CANARA BANK – office project located on 7th floor in Gift City- Gandhinagar.

The HVAC system for each of these building is described below:

THIS PROJECT IS PLATINUM RATED GREEN BUILDING SO ALL MATERIALS SPECS AS PER
GREEN BUILDING NOS & REQUIRED TEST CERTIFICATE FOR ALL MATERIAL

2.0 CANARA BANK OFFICE AREA – HVAC SYSTEM-

Total – 04 nos chilled water base AHU was installed in the same floor for Air conditioning of OFFICE AREA by L&T.. AHU detail as under…

1) AHU – 1 - 7777 cfm – 15.1 TR – 3.75 kw Motor
2) AHU – 2 - 11618 cfm – 23.0 TR – 5.63 kw Motor
3) AHU – 3 - 11335 cfm – 22.5 TR – 5.63 kw Motor
4) AHU – 4 - 7496 cfm – 15.0 TR – 3.75 kw Motor

TFA(Treatedfreshair)unittobe installed to providecoolandfilteredfresh airto allparts ofthepremisesatalltimes.

Designroomtemperaturewillbe24°C+-2 DEG c .Nohumiditycontrolwillbe provided.

The toilets will be provided with ducted exhaust system with in-line fans.

We will design & installed additional chilled water 4-way cassettes in some area as mention below

#	**INDOOR UNIT - TYPE - FOUR WAY CASSETTE**
	WITH CORD LESS REMOTE CONTROL
1	CAPACITY -2 TR - 4 NOS FOR CONFERENCE ROOM ,
2	CAPACITY -3.3 TR - 1 NOS FOR G.M ROOM
3	CAPACITY -2.5 TR - 1 NOS FOR V.CROOM
4	CAPACITY -1.75 TR - 2 NOS FOR D.G.M ROOM
5	CAPACITY -1.5 TR -1 NOS FOR TM ROOM

CHAPTER-2 -TECHNICALSPECIFICATIONSOF
EQUIPMENT/MATERIALS AND WORKMANSHIP STANDARDS

1.0 CHILLED WATER CASSETTE UNITS

CONSTRUCTION FEATURES

The CASSETTE AIR CONDITIONERS air-conditioners comprise of the indoor unit duly connected with the chilled water piping.

Indoor unit shall house air handling fan, cooling coil, insulated drain tray andfilter.

The unit shall be of heavy gauge steel, corrosion resistant, finished withsynthetic enamel paint and thermallyand acoustically insulated with resinbondedfibreglass or equivalent material. Suitable drain connection shallbeprovided for removal of condensate collected inside the drain tray undercooling coil. The access panels shall be easily removable.

COOLING COIL AND FILTER

The cooling coil shall be of direct expansion type with copper tubes andaluminium fins. This shall beminimum three (2) rows deep and with minimumthree (3) fins per centimetre. The air before it enters thecooling coil shall befiltered by dry and cleanable type filter.

2.0 FRESH AIRUNITS

UnitCabinet: Thecabinetshallbedoubleskintype,constructedoutofextruded aluminum hollowsectionframeworkanddoubleskinpanels.Frameworkandpanelsshallbefilledwith minimum45mmthickinjectedPUFoamof38-40kg/m3,withthermalbreak.Theframe profileshallalsohavecovingtoavoidsharpcornersinsidethecabinet.

Thepanelsshallbemadeoutof22-gaugeG.I.sheetandpowdercoatedontheouterside. Separatesectionsshallbeprovidedforhousingpre-filters&fans.

Hingedaccessdoorswithgasketsandhandlesdesignedforairtightclosingshallbeprovided foraccesstoallinternalequipment.Handholeswithairtightcoversshallbeprovidedfor measurementofairtemperaturesineachsection. Pressuresensorpointsshallbeprovided formeasurementofstaticpressureofairineachsection.Differentialpressuregaugeshallbe provided acrossfilter.

Viewport shall be provided in fan section, with ON/OFF switch for light, when AHU is operating.

FAU foundation drawing shall be provided by HVAC contractor.

Detailed specifications of each component of the FAU shall be as follows:

PreFilterssection: Preshallbepaneltype,madeoutofH.D.P.E.3-ply,syntheticwoven, washablemediahousedinaflangedaluminumcase. Thesefiltersshallhave90%efficiency down to 10microns.

Fan: FanshallbeimportedNICOTRA/KRUGER/PUNKERmake,centrifugal“Plugtype”with backward curved impeller, statically and dynamically balanced, supported on self-aligning typeballbearingsonbothendsoftheshaft.Driveshallbedirectdriven.Commonbase framehousingthefanandmotorshallbesupportedonsuitablevibrationisolators.Outlet velocityoffanshallnotbemorethan1800FPM.

FanMotor: FanmotorshallbeT.E.F.C.,IP55,SquirrelCageinductiontypesuitableforAC 415+/-10%,3phase,50HZpowersupplywith'F'classinsulation,andenergyefficiencyclass IE-3. Motorefficiencyshallbeminimum85%.Motorshallbesuitabletorunthrough VFD.

Dampers: Dampersshallbeopposedbladelouvertype.Louversshallbeaerofoiltype.The louvers and frame shall be made out of extruded aluminum and complete withsuitable lockingdevicehavingidentifiedforopenandcloseposition.

3.0 EXHAUST AIRUNIT

UnitCabinet: Thecabinetshallbedoubleskintype,constructedoutofextruded aluminum hollowsectionframeworkanddoubleskinpanels.Frameworkandpanelsshallbefilledwith minimum45mmthickinjectedPUFoamof38-40kg/m3,withthermalbreak.Theframe profileshallalsohavecovingtoavoidsharpcornersinsidethecabinet.

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Pre+BagFilters: Pre-Filtersshallbepaneltype,madeoutofH.D.P.E.3-plywashablefilter mediahousedinflangedcase. Thesefiltersshallhave95%efficiencydownto10micronsas per G4. Bag filters shall be 600mm long and the media shall be cleanable and rated for 5micronwithefficiencyof99%asperEU-6.

Dampers: Dampersshallbeopposedbladelouvertype.Louversshallbeaerofoiltype.The louvers and frame shall be made out of extruded aluminum and complete withsuitable lockingdevicehavingidentifiedforopenandcloseposition.

4.0 INLINE FAN(RECTANGULAR)

Inlinefanshallbeanoiseandvibrationfreedirectdrivencentrifugalfanencasedinsheet metalhousingwithnecessaryinspectioncover.Thecasingshallbemadeofgalvanizedsteel sheet.Thecasingshallhaveflangesatinletandoutletsuitableforconnectingtoduct.Thefan shallhavebuilt-inthermalcontactwithautomaticreset.ThefanshouldbeAMCAcertified& direct-driven by a totally enclosed motor suitable for operation on 415V 3-phasesupply dependinguponsize.Allfansshouldbecompletewithsuitablestarters.

5.0 CABINETFANS

Cabinetfanshallbeanoiseandvibrationfreedirectdrivencentrifugalfanencasedinsheet metalhousingwithnecessaryinspectioncover.Thecasingshallbemadeofgalvanizedsteel sheet.Thecasingshallhaveflangesatinletandoutletsuitableforconnectingtoduct.Thefan shallhavebuilt-inthermalcontactwithautomaticreset.ThefanshouldbeAMCAcertified& direct-driven by a totally enclosed motor suitable for operation on 415V 3-phasesupply dependinguponsize.Allfansshouldbecompletewithsuitablestarters.

6.0 ELECTRICAL PANEL

Thepanelboardshallbecubicalcompartmentalizedtypewithtopcableentry.Thepanel shallbefabricatedfromhighquality14gaugesheet,stiffenedandsuitablyreinforced.The steel sheet shall be painted with seven tank processes & the final coat shall be stove enameled. The housing shall be of sectionalized construction with space provided for separate vertical bus droppers & cable alley of minimum 200mm width for each panel section. The construction of the panel shall be dust & vermin proof. The bus-bars and connectionsshallbemadeofextrudedhighconductivityelectrolytic aluminum stripwith heat shrinkable PVC sleeves of appropriate phase colors. Adequate clearance as wellas properbracingshallbeprovidedtowithstandtheelectromagneticforcesproducedduring shortcircuits.Theneutralbus-barshallberatedfor50%ofthephaserating.Afulllength earthstripof60x10mm aluminum withtwoleadsshallbeprovidedthroughoutthelengthof thepanel.

MCCBs(MouldedCaseCircuitBreakers)shallbeusedforpowerswitching.TheMCCBsshall be able to carry the rated current continuously without excessive temperature rise or softening.Allcircuitbreakersshallbeofonemake.
Allmotorfeedersabove7.5KWshallbeprovidedwithammeters.Indicatinginstruments shallbetaut-bandtypeonly.

Minimumsizeofpowerwiringshallbe2.5mm^2copper/4.0mm^2 aluminum.Controlwiring shallbedonewith2.5mm2strandedcopperconductor,PVCinsulatedwires.

MPCB(MotorProtectionCircuitBreakers)shallbeprovidedforallmotors.Allsparecontacts shallbewireduptoterminalblock.

Circuitbreakersandlargeisolatingswitchesshallbepositionedasfaraspossibleclosetothe bus-barchambertoallowforeaseofcabling.Allequipmentsuchasmetersandindicating lightsshallbelocatedadjacentorontheunitwithwhichtheseareconnectedtoachievea neatandsymmetricalarrangement.Facilityshallbeprovidedforterminationofallnormal typesofcablesenteringfromaboveandclampsshallbeprovidedtosupporttheweightof cables.Nameplatestoindicatetheequipmentofcircuitcontrolledbyeachfeederswitches shallbefixedonthefeederdoors.

All Push Buttons shall have 2 NO & 2 NC contact.

Overallheightofpanelshallnotexceed2250mm.Theheightofswitchhandle/pushbutton shallnotbehigherthan1800mmfromfloor.

7.0 SHEET METAL DUCTINGWORK

a. MaterialSpecifications:

Ductsshallbemadeoutofgalvanizedsteelsheetsofductingquality.Thegalvanizedsheet shallhavethicknessasspecifiedbelowandzinccoatingofminimum180gms/sqm.

b. Fabrication ofDucts:

The ducts shall be fabricated as per following specifications:

Max. Side (mm)	Min. Thickness of Sheet(mm)	Weight (Kg/Sqm.)	Type of joints	Bracing
Up to 750	0.63	5.59	25mm x 3mm MS Angle Flange	None
751 to 1000	0.80	6.77	40mm x 3mm MSAngleFlange	25mm x 3mm MS Angle at 1200mm centers.
1001 to 1500	0.80	6.77	40mm x 3mm MSAngleFlange	40mm x 3mm MS Angle at 1200mm centers.
1501 to 2250	1.0	8.07	40mm x 6mm MSAngleFlange	40mm x 6mm MS Angle at 1200mm centers.

c. Installation ofDucts:

Ducts shall be supported on hangers as per following specifications:

Duct Size (mm)	Spacing of Supports(m)	Size of M.S. Angle(mm)	Dia. of Hanger Rod (mm)
Up to 750	2.4	40 x 40 x 3	10
751 to 1500	2.4	40 x 40 x 6	10
1501 to 2250	2.4	50 x 50 x 6	15

DucthangersshallbefixedtoR.C.C.slaboftheroofbymeansofanchorfastenersandM.S. anglecleats.HangersforductsrunningbelowpitchedsheetroofshallbefixedtoM.S.angle cleatsweldedtoroofstructure.Softneoprenerubbergasketofuniformthicknessandwidth shall be used as gasket between flange joints. The gasket will be fixed with a suitable adhesivetotheflange.

Galvanized hexagonal full threaded nut-bolts of minimum 6mm dia. shall be used for fastening the flanges. Spacing between two nut-bolts shall not exceed 125mm.

Allductsshallberigidandshallbeadequatelysupportedandbracedwhererequiredwith crossbreakingofM.S.anglebracingsofamplesizetokeeptheductstruetoshapeandto preventbuckling,vibrationorbreathing.

Ductingoverfalseceilingshallbesupportedindependentlyfromtheroofstructureabove.In nocaseductshallbesupportedfromthefalseceilinghangersorbepermittedtorestona hungceiling.

BottomlevelofallductsshouldbemaintainedasshowninthedrawingLevelingofducts shouldbecheckedwithaPVCtubewaterlevelfromareferencepoint.

Fans shall be connected to duct work by a double canvass sleeve. Each sleeve shall be minimum150mmlong,securelyboltedtoductandunits.Eachsleeveshallbemadesmooth andtheconnectingductworkrigidlyheldinlinewithunitinletoroutlet.

d. Dampers:

Dampersshallbeopposedbladetypelouvereddampersofrobustconstructionandtightfittingmadefromextrudedaluminum.Thedesign,methodofhandlingandcontrol,shallbe suitableforthelocationandservicerequired.

Dampersshallbeprovidedwithsuitablelinks,leversandquadrantsasrequiredfortheir properoperation,controlorsettinginanydesiredposition.Dampersandtheiroperating devicesshallbemaderobust,easilyoperableandaccessiblethroughsuitableaccessdoors. Everydampershallhaveindicationdeviceclearlyshowingthedamperposition,andalocking devicetolockthedamperinanyposition.

e. FireDampers

FiredampermadeoutofGalvanizedsheetsteelwithfusiblelink.Theframeofdampersmade outfrom18gaugegalvanizedsheetsteelandbladefrom22gauge.Thefusiblelinkshallbe ratedfor72ºC.Thefiredampershallcomplyto:

UL-555 Fire Rating
FireRating:1½hrs
MaxVelocity:2000FPM

f. Grilles &Diffusers:

Allgrillesshallbeconstructedoutofextruded aluminum sections,adjustablevanetypewith doubledeflectionconstruction,dulypowdercoated,andshallbeprovidedwithvolume controldampersmadeoutofextruded aluminumsectionandpaintedblack.

Supplyairgrilles/diffusersshallbeswirltypeprovidedwithvolumecontroldampermadeout ofextruded aluminumsectionandpaintedblack.Returnairgrilles/diffusersshallbewithout volume controldamper.

g. Balancing:

Aftercompletionofworkalljointsshallbevisuallyinspectedforpropergasketing&nut-bolt tightness.

Theentireairdistributionsystemshallbebalancedtosupplytheairquantitiesasrequiredin variouszonestomaintainthespecifiedairflow. Thefinalbalancingofairquantitythrough eachgrilleshallberecordedandsubmittedtotheCONSULTANTforapproval.

8.0 INSULATIONWORK

a. **ThermalInsulationofDucting**(Withclosedcellnitrilerubberfoam)

i. **MaterialSpecifications:**

Insulation Material: Closed Cell Fire retardant elastomeric Nitrile Rubber foam factory laminated with aluminum foil
Adhesive : As recommended bymanufacturer.

Application Procedure:

Clean the surface of the duct to be insulated free from dust grease and other matter.

Preparethepiecesofsheetasperthedimensionsoftheductandapplytheadhesiveonthe ductsurface,thesheetsurfaceaswellastheedgesofthesheets&leaveitfor2-3minutes fordrying.

Oncetheadhesiveishalfdryandtacky,bringboththeendsofinsulationwheretheadhesive isappliedincontactandstickthemwell.Ensurethatboththesurfacesarematchedproperly.

Applyself adhesiveblackcottontapeonallthejoints.Beforefixingthetapesitmustbe ensuredthatallthejointsaresealedproperly.

9.0 ELECTRICALWORK

a. **CablingWork:**

Theworkshallbecarriedoutinaccordancewithspecificationof IndianElectricityRulesas amendeduptodateandlocalMunicipalBye-Laws.

Thepowerwiringsystemshallbesuitablefor415V,3phase,50cycles,4wiresupply.Wiring formotorsshallbecarriedoutinPVCsheathedandsteelwireortapearmoredcable.

ThecontrolwiringshallbeinPVCinsulatedandPVCsheathed,multicore,strandedcopper cable(minimum1.5mm^2Cu)withtherequirednumberofcores.

Powercablesandwireshallbeofcopperor aluminumof1100Vgrade,controlwiresof copper660Vgradeandshallconfirmto IS:1554/IS:694.

Cablesshallbecarriedonwallsorinracksorincabletrayssuspendedfromhangersorlaidin trenches as required. Where more than one cable is running, proper spacing shall be providedtominimizethelossincurrentcarryingcapacity.

Specialcareshallbetakentoensurethatcablesarenotdamagedatbends.Theradiusof bendsshallnotbelessthanminimumspecifiedbythemanufacturertoensurethatnoundue stressiscausedtocable.

Wherecablespassthroughpipes,PVC/Neoprenerubberbushesshallbeprovidedatthe ends.Wherecablespassthroughfloorsorwalls,pipeinsertsshallbeprovidedandopening shall besealed.

Cablesshallterminatedusingweatherproofdoublecompressionbrassnickelplatedcable glandsandtinnedcoppercrimpedlugsshallbeprovided.

Conduits,whereused,shallbeofheavygaugePVC.Metalsaddlesofapprovedtypeshallbe used for fixing conduits on surface. Bends and elbows shall be of inspection typewhere required.Alljointsshallbewatertight.Conduitsshallbesecuredtotheswitches,junction boxesetc.,bythreadedcouplers.FlexiblePVCconduitsshallbeusedforconnectionswith vibratingequipment.

Suitable means to isolate each motor in case of emergency shall be provided as per IS:900.

b. **EarthingWork:**

Themainpanelshallbeconnectedtothemainearthing stationsbymeansofG.I.Stripsasper IndianelectricityrulesandIS:3043–1987.

Allelectricalequipmentshallbeprovidedwithtwoseparateearthconnections.Thecurrent carryingcapacityofearthconductorsshallbeasperIS:3043-1987.

All earthing connections shall be visible for periodical checking.

<u>Sizes of Earthing Conductors</u>:

<u>Equipment Earth ConductorSize</u>

Motorupto10HP G.I. Wire 10 gauge
Motor above10HP 25mmx3mmG.I.strip

c. **Testing&Commissioning:**

Beforecommissioningoftheequipmenttheentireinstallationshallbetestedinaccordance withIndianElectricityRulesandIS:732andtheTestReportofalicensedelectricalcontractor shall befurnished.

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LIST OF APPROVED MAKES

Sr. No.	Equipment/Material	Makes
1	DX Air Handling Units	: Citizen/Edgetech/Zeco/ Systemair
2	Air Cooled Condensing Unit	: MITSHUBISHI/ HITACHI/ DAIKIN/ VOLTAS
3	Chilled water Cassette Type Split AC	: DAIKIN/ MIDEA / TRANE / CARYAIRE
4	Fresh Air Units	: Citizen/Edgetech/Zeco
5	Exhaust Air Units	: Citizen/Edgetech/Zeco
6	Inline Fans (Rectangular)	: Kruger/Nicotra/Systemair/Greenheck
7	Cabinet Fans	: Kruger/Nicotra/Systemair/Greenheck
8	Temperature Controller	: Siemens/Danfoss/Honeywell
9	RH Controller	: Siemens/Danfoss/Honeywell
10	Temperature Sensors	: Siemens/Belimo/Schneider
11	RH Sensors	: Siemens/Belimo/Schneider
12	Velocity Sensors	: Siemens/Belimo/Schneider
13	MS Pipe	: Jindal/ TATA
14	Balancing valve	: Advance/ Arrow / Castle
15	Ball Valves	: Danfoss / RB / Leader
16	Y Strainer	: Trishul / Sant / Emerald
17	Flexible Duct	: UP Twiga
18	GI Sheet	: JINDAL/ TATA/Zeco
19	Insulation: Nitrile Rubber Foam	: Supreme/Paramount/ Armaflex
20	Damper	: Cosmos/ Ruskin Titus / Airmaster

21	Fire Dampers	: Cosmos/ Ruskin Titus / Airmaster
22	Aluminium Grilles & Diffusers	: Cosmos/ Ruskin Titus / Airmaster
23	Electric Power Cabling	: Polycab/RRKabel/CCI/Universal
24	Anchor Fasteners	: Hilti/Fisher
25	VAV BOX	: JCI/ COSMOS/RUSKIN TITUS
26	COPPER PIPE	: MAXFLOW/RAJCO/ MANDEV
27	CABLE/ SHILDEL CABLE	: FINOLEX/RR/ POLYCAB
28	UPVC – DRAIN PIPE	: PRINCE/ SUPREM

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CHAPTER-3

CONDITIONS OF CONTRACT
A. SPECIALCONDITIONS

1.0 DEFINITION OF TERMS

In this document, the definitions of terms will be as follows:

"**OWNER**"shallmean"**CANARA BANK- PREMISES & ESTATE SECTION- CIRCLE OFFICE – AHMEDABAD.**

"**CONTRACTOR**"shallmeanthetendererwhosetenderunderhasbeenacceptedand shallincludehisheirsandsuccessors.

“ARCHITECT”shallmean"**SARJAN ARCHITECH & PROJECT CONSULTANT – SURAT ”,detailsofwhichshallbe providedtosuccessfulcontractor**.

"**CONSULTANT**"shallmean**SARJAN ARCHITECH & PROJECT CONSULTANT-SURAT”,detailsofwhichshall beprovidedtosuccessfulcontractor**..

"**SPECIFICATIONS**"shallmeanthespecificationattachedalongwiththeconditionsof thecontract.

"**CONTRACT**"shallmeantheagreement betweentheOWNERandCONTRACTORforAir-conditioningwork.

"**SITE**"shallmeanthepremisesofM/s**CANARA BANK OFFICE - AT 7TH FLOOR AT GIFT CITY – GANDHINAGAR -** (Gujarat).

"**PLANT**"shallmeantheHVACPlantandallotheraccessories,suppliedandinstalledby the Contractor as specified & required for the proper & safe operation of the Air-conditioningplant.

"**TEST**" shall mean the tests as described in the specifications for checking the performance ofthe Plant.

2.1 PRICEBASIS

The Contract Prices for various parts of the contract shall be as follows:

- Supplypricesforfactorymadeequipmentshallbe FORsitebasis,inclusiveofall applicabletaxesandduties,packingforwarding,freightuptosite.

- For all ancillary work and installation and commissioning of equipment and complete system: Unit rates for supply, installation, testing and commissioning ofeachitemshallbegivenonWorksContractbasis,inclusiveofallmaterial, accessories, tools tackles, consumables and labour required for completing the job,exclusiveofapplicableTaxes.Contractorshallindicatethebreak-upof materialcontentandlabourcontentofeachunitrate.

Unit Rates shall be applicable to the finished work.

Billing shall be done as per measurement of actual executed work.

3.0 SCOPE OFCONTRACT

TheCONTRACTshallcovercompletejobofHVACsystemon"TURNKEY"workscontract basis,withresponsibilityofachievingspecifiedroomtemperatureandhumidityinthe conditionedspaces.

Quantitiesandratingsgiveninthe"ScheduleofQuantities"areestimatedfigures.The contractor shall cross check the design and drawings independently and shall be responsibleforinstallingnecessaryquantitiesforachievingperformanceofthesystem, as perdesign.

4.0 COMPLETIONPERIOD

Theentiresupply,installation,testingandcommissioningworkwillbecompletedbythe contractorwithin2-3 MONTHS fromthedateofawardofthecontract.

5.0 PENALTYFORDELAYEDCOMPLETION

Incasethecontractorfailstocompleteanypartoftheworkwithinthecompletion periodstipulatedinthecontract,thepricewillbereducedby0.5%ofcontractvalueper weekofdelay,subjecttoamaximumof5%ofentirecontractvalue.

6.1 PAYMENTTERMS

Bank Guarantee against performance of the contract

Withinoneweekoftheawardofcontract,ContractorshallsubmitaBankGuaranteeof 10%oftheagreedvalueofcontract,fromaScheduledBank,inaformatapprovedby theowner,validfortheagreedcompletionperiodplusdefectliabilityperiod,against satisfactoryexecutionofthecontract.Theagreedvalueofcontractshallincludethe priceofallequipmentandancillaryworkincludingalltaxes,duties,transportation, handling,erection,commissioningetc.TheBGwillbeextendedsuitableintheeventof adelayincompletionperiod.

Payments shall be made as per the following terms:

A) **AdvancePayment:**10%ofEstimatedContractValueagainstacceptanceofthe orderandaBankGuaranteeasdescribedabove.

B) **AgainstDeliveryofMaterial:**70%ofsupplypriceagainstdeliveryoffactorymade-readytoinstall-componentsorassemblies.
No payment shall be released against raw materials which are required to be processedatsitetoconvertthemintoinstallablecomponents.Forsuchitems, billingshallbedoneafterfabrication/assembly.

C) **Against Installation:** 10% of unit price against installation and measurements certified by Consultant/PMC.

D) **Final Payment:** 10% against satisfactory commissioning after 1 month from handing over the entire plant to Owner, against the final bill duly certified by PMC/CONSULTANT.

7.0 BILLING AND PAYMENTS

All bills are to be raised on the OWNER and shall be paid by the OWNER after certification by the ARCHITECT/PC/CONSULTANT.

Income Tax shall be deducted at source as per Income Tax Rules/Act, from each and every bill.

8.0 WORK AND SERVICES BY THE OWNER

The following work and services associated with the systems shall be provided by the OWNER through other agencies, to enable the CONTRACTOR carry out the contractual work:

a) All major masonry/building works such as construction of masonry ducts/shafts, trenches for pipes/cables, major openings in walls and slabs etc., major steel supporting structures for supporting of piping/ducting.

(Minor masonry work such as breaking and making good of openings for passage of ducts, pipes and cables, provision of suspenders/brackets etc. shall be done by the contractor).

b) False ceiling and Return air boxing work.

c) Temporary three phase power supply and water connection at one point on site for erection work.

d) Permanent incoming power supply (3ph, 415V, AC, 50Hz) and main earthing to the CONTRACTOR's electrical panels for trial runs and commissioning of the system.

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B. GENERALCONDITIONSOFCONTRACT

1.0 SCOPEOFCONTRACT

CONTRACTOR'sscopeshallincludethesupplyofmaterialsasmentionedintheschedule ofquantitiesandshowninthedrawings,installation,leaktesting,insulation,painting, trial runs, final adjustments and commissioning of the system and one year maintenanceservice.

Allitemswhetherspecificallymentionedornotbutwhichareusuallyrequiredtomake acompleteworkingplantandtoensuresafeandsatisfactoryoperationofthesame,are tobeprovidedbytheCONTRACTORwithoutanyextracharge.

Arrangementofalltools,tackles,consumable,appliances,apparatus,skilledorunskilled labour,materials,transportationofmaterialsandlabouruptotheworksite,payment ofalltaxes/duties,accommodationforlabourandsupervisorystaffatsite,arrangement oftemporarystorageformaterialsatsite,whichmayberequiredtocompletethework in accordance with the intent or purpose of the same, shall be in the scope of the CONTRACTOR(“Workingatallheights”)withoutanyextracharges.

2.0 SPECIFICATIONS

Thespecifications,drawingsandotherpartsofthiscontractaretobeconsideredas explanatorytoeachotherandshouldanythingappearinonethatisnotdescribedinthe other or should any discrepancy or misunderstanding arise on account of such discrepancyorinconsistency,thesiteinstructiongivenbythePMC/CONSULTANTshall prevail.

The CONTRACTOR shall execute the work according to such instructions and explanationsgivenbythedifferentpartsofthiscontract,evenifsuchworksarenot specificallyshownanddescribedtherein.

3.0 DRAWINGS &DOCUMENTATION

OnlythefinalapproveddrawingsissuedbyCONSULTANTshallbeusedforexecutionof thecontract.Nomodificationshallbemadewithouttheirpriorapprovalinwriting. Contractor awarded bidder must submit all all drawings related to HVAC including electrical arrangement, Ducting, Conduits, Electrical supply, Main electrical panel, all required piping, water drainage pipe needed on site for HVAC in drawings.

Aftercompletionofthework,theCONTRACTORshallassistCONSULTANTinpreparing the"as-built"drawingsofthecompletedwork,reflectingthedetailsoftheworkactually executed atsite.

4.0 SUPERVISION ATSITE

CONTRACTORshallensurethataresponsiblepersonfromhissideshallbepresentat sitecontinuouslywheneverhisworkisgoingonatsite.Thepersonshallbecompetent enoughtoguideallttheworkmenoftheCONTRACTORworkingatsite,plantheirwork

andensurethattheyworkasperttheplanning.Heshallalsobecompetentenough,and authorizedto,communicatewiththePMC/OWNER/CONSULTANTandothercontractors atsiteregardingthesiteco-ordinationanddaytodayschedulingofwork.

5.0 PROGRAMOFWORK&PROGRESSSCHEDULES

TheCONTRACTORshallsubmitafteracceptanceofthetender,adetailedBARCHART showingtheprogramandthesequenceinwhichtheCONTRACTORproposestocarry outtheworkwithdatesandestimatedcompletiontimesforvariouspartsofthework. SuchschedulesshallbeapprovedbythePMC/CONSULTANTbeforestartingthework andshallbebindingontheCONTRACTOR.

CONTRACTORshallfurnishweeklyprogressreportstothePMC/CONSULTANT,giving detailsofworkcompletedandbalance,bottlenecksandhold-ups,ifany.

6.0 INSPECTION&TESTSDURINGERECTION

ThePMC/CONSULTANTshallbeatlibertytoinspecttheworkduringinstallationand defectsfoundshallberemediedbytheCONTRACTORfreeofcost.

Allinstrumentsandservicesneededfortheinspection/testsshallbefurnishedbythe CONTRACTOR.Anydefectsanddeficienciesthatarenoticedduringthesetestswillhave tobeattendedbytheCONTRACTORathisowncost.

7.0 DEVIATIONS ATSITE

Beforeproceedingwiththeinstallationwork,theCONTRACTORshallstudythesite thoroughly, take actual measurements as necessary and point out requirement of variationsintheworkdetails,ifany,tomeetthesiteconditions.Suchvariationsshall, however,beeffectedwiththeknowledgeof,andafterthewrittenapprovalof,thePMC /CONSULTANT.

8.1 COMPLETION OFERECTION

Erection of an equipment/system package/ancillary work shall be considered as complete only if the following activities have been completed satisfactorily:

Equipment:

a) Leveling,alignmentofthebase-frame,tighteningofmountingbolts,alignmentof drives.
b) Installationofallaccessoriesandinstrumentswhichformapartoftheequipment.
c) Cleaningandchargingoflubricant.

System Packages:

a) Leveling,alignmentofthebase-frame,tighteningofmountingbolts,alignmentof drives.
b) Installationofallaccessoriesandinstrumentswhichformapartoftheequipment.
c) Cleaningandchargingoflubricant.
d) AssemblyofallcomponentsreceivedintheCKDconsignment.
e) Leaktesting/anyotherapplicabletesting.

Duct Work:

a) Assemblyofacompletesectionofductfromoneend-pointtoanother,includingall dampers,flexibleconnections,accessdoors,frames,bracingetc.
b) Levelingandalignment,fixingofallsupports.
c) Cleaningtheductsfrominsideandblankingoffopenendstemporarilytoprevent entryofdustanddirt,ifnecessary.

Piping Work:

a) Assemblyofallflanges,valvesandspecialties.
b) Fixingofallpermanentsupportsandremovaloftemporarysupports.
c) Hydraulictestingofthepipingasperspecifications.
d) Flushingoftheentirepipingtoremovedirtandmud.
e) Applicationofred-oxideprimeronallpipesandsupports.

Electrical Panels and Cabling:

a) Permanentsupportingandclampingofcablesinposition.

b) Fixing of glands and lugs and terminating the cable on the terminals of equipment/panel.

c) Leveling,alignmentandassemblyofsectionsofthepanelinitsfinallocationand fastening the same to foundation. Cleaning the panel from inside & outsideand verificationofallcomponents.

9.1 PRE-COMMISSIONINGTESTSANDTRIALRUNS

On completion of the installation, the CONTRACTOR shall Carry out various PRE-COMMISSIONING TESTS for each system as detailed below. Any defects or shortcomingfoundduringthetestsshallbespeedilyrectifiedormadegoodbythe CONTRACTORathisownexpenses.

The PRE-COMMISSIONING TESTS shall include but not be limited for:

a) Meagertestingoftheelectricalpanel,cablingandmotorwindings.

b) Testing and check the proper functioning of switchgear, starters, contractors, indicationlamps,safetycontrols.Verifycorrectnessoffuselinkratingsinstalled

c) Test operation of control circuits, safety interlocks and correctness of field instrumentconnections.

d) Operateallelectricmotorswithoutcouplingwiththeloadsforminimum4hours each. Check direction of rotation of each motor and correct the same, if necessary.

e) Ensurethatshaftsofmachinesarenotjammedandproperlubricantisfilled.Couple themotorscheckalignmentofthecoupling.Operatethemachineswithoutload andcheckthepropertfunctioningoflubricationsystemandotheraccessories.

f) Filltherespectivefluid(water/oiletc.)inthetanks/piping,operatethepumpsand circulatethefluidthroughallconnectedequipment.Checkandadjusttheflowas pertheoriginaldesignthroughallsuchcomponents.Purgeouttrappedairfromthe piping.Adjustvalvesandotherspecialtiesasnecessary.

g) Operateblowers,checkairdistributionsystemforleaksandadjustdesignairflowin all ducts and grilles/diffusers by operation of dampers. Install fine filtersafter flushingoutdustinthesystem.

h) Test the operation of all control and safety instruments and devices. Calibrate wherever applicable. Adjust the set points and verify the same by simulating trippingcondition.

i) Keeptheplantincontinuousoperationforatleast3daysfortrialrunandtake readingsofallperformanceparametersmaintained.Makeadjustments,ifrequired, untilsatisfactoryperformanceisachieved.Theplantmustberunforminimum24 hoursafteralladjustmentandsettingsarecompletedandsatisfactoryresultsare achieved.

10.0 COMMISSIONING AND HANDING OVER

Aftersuccessfulcompletionofthetrialrunoftheentireplant,includingallsub-systems, theCONTRACTORshallsubmitareportonthetrialruntotheCONSULTANTS,enclosing thelog-sheetsofreadingsnotedanddetailsofthesetpointsadjustedetc. CONSULTANTSshallreviewthereportand,iffoundsatisfactoryCONSULTANTSshall advisetheOWNERtotakeoverthebuildingforoperation.

UntiltheplantintakenoverbytheOWNERasmentionedabove,CONTRACTORshallbe responsibleforsafety,securityandoperationoftheplant.Hewillprovidenecessary staffforthesameandensurethatinsurancecoverisextendeduntilhandingoverthe plant toOWNER.

11.0 CO-ORDINATION WITH OTHER AGENCIES AT SITE

TheCONTRACTORshallco-operatewithothercontractorsemployedbytheOWNER/ CONSULTANT,compareplans,specificationsandtimeschedulewiththem,andexecute theworkaspertheprioritiesoftheprojectasawhole,CONTRACTORshallforwardto thePMCOWNER/CONSULTANTcopiesofallcorrespondenceanddrawingsexchanged withothercontractorsinthisregard.Failuretocheckplansandconditionswillrender theCONTRACTORresponsibleforbearingthecostofanysubsequentchanges.

12.0 DAMAGES, INJURIES AND COMPENSATION

The CONTRACTOR shall make good all damage to the Owner's building, property, equipment'sandarticles,how-so-everarisingfromtheerectionoftheequipment.The

CONTRACTOR shall indemnify and hold harmless the ONWER against all claims in respect of damage to any equipment in the course of installation work. The CONTRACTOR shall discharge all his obligations under the Indian Workmen's Compensation Act in so far as it effects the workmen in his employment.

13.0 SAFETY/SECURITY MEASURES

The CONTRACTOR and his employees shall follow all the regulations in force for controlled entry into the premises where the work is to be executed.

TheCONTRACTORshallmakeappropriatesecurityarrangementforthesafecustodyof materials,tools,tacklesandconsumablesinuseforerectionandalsotheentireplant untiltheinstallationistakenoverbytheowners.Anylossresultingduetonegligence onpartoftheCONTRACTORonthisaccountwillbemadegoodbytheCONTRACTORat hiscost.

14.0 INSURANCE

TheCONTRACTORwillinsuretheentireequipmentandmaterialsfortransit/storage duringerectionuptocommissioningandhandingovertotheowneragainstlosses, damages due to fire, earthquake, war, floods, insurrections etc. No claims will be admissible on thisaccount.

15.0 VARIATION IN WORK

TheOWNER/PMC/CONSULTANTshallhavethepowertoinstructtheCONTRACTORto makeanyalternation,omission,additionorvariationinthework(hereinafterreferred toasvariation)duringthecourseofexecutionofthework.

Thedifferenceinthecostduetosuchvariationshallbeaddedtoordeductedfromthe contract price, as the case may be, as agreed to between the PMC/OWNER/CONSULTANTandtheCONTRACTOR.

If the variation involves a claim for additional payments or would prevent the CONTRACTORfrommeetinganyofhisobligationsorguaranteesinthecontract,heshall informaboutthesametotheOWNER/PMC/CONSULTANTinwriting,beforestarting workonthesame,failingwhich,heshallnotbeentitledtoanymodificationsinhis obligationsorforadditionalpayment.Thevariationrequiredshall,nevertheless,be carried out by the CONTRACTOR. The matter in difference shall be settled by arbitration.

TheOWNER/PMC/CONSULTANTshallgivereasonablenoticetotheCONTRACTORto enablehimtomakearrangementsforeffectingthevariationinworkrequiredbyhim.

16.0 NEGLIGENCE

If the CONTRACTOR shall neglect to execute the work with due diligence or shall contravenetheprovisionsofthecontract,theOWNER/PMC/CONSULTANTmaygivea

notice,inwriting,totheCONTRACTOR,callinguponhimmakegoodtheneglector contravention complainedof.

IftheCONTRACTORfailstocomplywithsuchnotnoticewithinareasonableperiod,the OWNERshallhavetheoption,andbeatliberty,toterminatethecontract,or,totake outtheworkwhollyorpartlyoutoftheCONTRACTOR'shandsandcompleteiteitherby himselforthroughhisagentsatareasonableprice.TheOWNERshallthenheentitled to retain all balance payment which may be due to the CONTRACTOR until the completionoftheentireworkandthesettlementofaccountsbetweentheOWNERand theCONTRACTOR.

Thecostofexecutionofsuchwork,asaforesaid,willbeadjustedagainstthepayment duetotheCONTRACTOR.Ifthecostofexecutionshallexceedthebalancepayment due to the CONTRACTOR, the OWNER shall be at liberty to dispose off any of the CONTRACTOR'smaterialorconstructionoftheplantthatmaybeatsite,andapplythe proceedsforpaymentofthedifferenceofsuchcostorrecoverthebalancebyprocess oflaw,orfromanymoneysduetotheCONTRACTOR.

17.0 CLEAN-UP OF THE WORK SITE

DuringerectiontheCONTRACTORshallatalltimeskeeptheworkingandstorageareas freefromwasteorrubbish.Oncompletionoferectionheshallremovealltemporary structures,debrisandleavethepremisesinaneatandcleancondition.

18.0 DEFECT LIABILITY

The CONTRACTOR shall guarantee that all material, machinery and components, supplied,fabricated,storedatsite,designedandinstalledbyhimshallbefreefrom defectsduetofaultymaterialand/orworkmanshipandthattheplantshallperform satisfactorilyandthattheefficiencyofthesystemandthatofallthecomponentsshall notbelessthanthevalueslaiddowninthespecificationsandthecapacitiesshallbeat leastequalthosespecified.

The period of the guarantee shall be twelve (12) months from the date of commissioning&handingoveroftheplant,or,eighteen(18)monthsfromthereceipt ofthelastconsignmentatsite.Duringthisperiodanyorallcomponentsfoundtobe defectiveshallbereplacedorrepairedfreeofchargeandshortcomingsfoundinthe systemasspecifiedshallberemovedatnoextracost.

19.0 IMPORT LICENSE/PERMIT/STATUTORY COMPLIANCE

TheOWNERshallprovidenoimportlicenseand/orpermitforcontrolledmaterial.The CONTRACTORathisowncostshallcomplywithallstatutoryregulationsrequiredfor thiswork.

20.0 CONTRACTOR'S CONDITIONS OF CONTRACT

Any printed conditions and conditions contrary to these conditions of contract in Contractor'sofferwillbetreatedasnullandvoidunlessspecificallyagreedbythe OWNER inwriting.

21.0 SAFETY

Allequipmentsshallbecompletewithnecessarysafetydeviceswhereverapotential hazard to personnel exists, and with provisions for safe access of personnel toand aroundequipmentforoperationalandmaintenancefunctions.

Theseshallincludenotonlythoseusuallyfurnishedwithelementsofmachinerybutalso covers,guards,crossovers,stairways,ladders,platforms,handrailsetc.whichare necessaryforsafeoperationoftheplant.

22.0 LIABILITIES OF ESI/PF

AllstatutoryliabilitiesofpaymentofESI/PForotherstatutorypaymentsasmaybe applicablewillbebornebytheCONTRACTOR.

If for any reasons, the CONTRACTOR fails to obtain "No Dues Certificate" from ESI Office/Orfailstodeducthisemployeesshareof ESIfromwagesofhisemployeesand alsofailtocontributehis(Employer's)sharetowardsESIcontribution,thenOWNER shallarrangetopaytherespectiveamountattheprevailingrateincludinganypenalty thereof to ESI Authorities and shall deduct the amount so paid by them to ESI AuthoritiesfromtheRunning/FinalbilloftheCONTRACTOR.

23.0 LIABILITIES OF CONTRACT LABOUR ACT AND MINIMUM WAGES ACT

All legal liabilities concerning the labour employed by him at site shall be the responsibilityoftheCONTRACTOR.CONTRACTORshallensurethatallformalitieslike obtainingthecontractlabourlicense,paymentofwagesetc.asrequiredbylaware fulfilled by him at appropriate stipulated times. CONTRACTOR shall indemnify the OWNERagainstanypenalties/claimsbythecompetentauthoritywithrespecttothe labouremployedbytheCONTRACTORforworkunderthecontract.

24.0 ARBITRATION

Anydispute,disagreementorquestionarisingoutoforrelatingtoorinconsequenceof theagreementoffulfillmentorthevalidityofenforcementthereofwhichcannotbe settledmutuallyshall,withinthirtydays(orsuchlongerperiodasmaybemutually agreedupon)fromthedatethateitherpartyinformtheotherwritingthatsuchdispute ordisagreementexistsbesettledthrougharbitrationinaccordancewiththeprocedure laid down by the Indian Arbitration Act 1940. The awards to be declared by the Arbitratorsappointedundertheprovisionofthisclauseshallbespeakingawardgiving reasonsandcalculationsforeveryitemofclaim.

25.0 INCOME TAX DEDUCTION

Incometaxatapplicableratesshallbedeductedfromallpaymentsto CONTRACTOR as per statuaryrequirements.

26.0 NO CHILD LABOUR

No child labour shall be employed by the CONTRACTOR for carrying out any work related to the HVAC system.

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