SOCIAL SECURITY SYSTEM

PHILIPPINE BIDDING DOCUMENTS

Sixth Edition

Procurement of GOODS

EQUIPMENT FOR THE AIR – CONDITIONING AND VENTILATION SYSTEM FOR THE PROPOSED SSS MANILA AND SSS LAOAG BRANCHES

ITB-SSS-GOODS-2024-021

Government of the Republic of the Philippines
MAY 2024

ANTONIO V. TRINOS, JR.
TWG Chairperson

Table of Contents

Glossary of Acronyms, Terms, and Abbreviations

ABC – Approved Budget for the Contract.

BAC – Bids and Awards Committee.

Bid – A signed offer or proposal to undertake a contract submitted by a bidder in response to and in consonance with the requirements of the bidding documents. Also referred to as *Proposal* and *Tender*. (2016 revised IRR, Section 5[c])

Bidder – Refers to a contractor, manufacturer, supplier, distributor and/or consultant who submits a bid in response to the requirements of the Bidding Documents. (2016 revised IRR, Section 5[d])

Bidding Documents – The documents issued by the Procuring Entity as the bases for bids, furnishing all information necessary for a prospective bidder to prepare a bid for the Goods, Infrastructure Projects, and/or Consulting Services required by the Procuring Entity. (2016 revised IRR, Section 5[e])

BIR – Bureau of Internal Revenue.

BSP – Bangko Sentral ng Pilipinas.

Consulting Services – Refer to services for Infrastructure Projects and other types of projects or activities of the GOP requiring adequate external technical and professional expertise that are beyond the capability and/or capacity of the GOP to undertake such as, but not limited to: (i) advisory and review services; (ii) pre-investment or feasibility studies; (iii) design; (iv) construction supervision; (v) management and related services; and (vi) other technical services or special studies. (2016 revised IRR, Section 5[i])

CDA - Cooperative Development Authority.

Contract – Refers to the agreement entered into between the Procuring Entity and the Supplier or Manufacturer or Distributor or Service Provider for procurement of Goods and Services; Contractor for Procurement of Infrastructure Projects; or Consultant or Consulting Firm for Procurement of Consulting Services; as the case may be, as recorded in the Contract Form signed by the parties, including all attachments and appendices thereto and all documents incorporated by reference therein.

CIF – Cost Insurance and Freight.

CIP – Carriage and Insurance Paid.

CPI – Consumer Price Index.

DDP – Refers to the quoted price of the Goods, which means "delivered duty paid."

DTI – Department of Trade and Industry.

EXW – Ex works.

FCA – "Free Carrier" shipping point.

FOB – "Free on Board" shipping point.

Foreign-funded Procurement or Foreign-Assisted Project– Refers to procurement whose funding source is from a foreign government, foreign or international financing institution as specified in the Treaty or International or Executive Agreement. (2016 revised IRR, Section 5[b]).

Framework Agreement – Refers to a written agreement between a procuring entity and a supplier or service provider that identifies the terms and conditions, under which specific purchases, otherwise known as "Call-Offs," are made for the duration of the agreement. It is in the nature of an option contract between the procuring entity and the bidder(s) granting the procuring entity the option to either place an order for any of the goods or services identified in the Framework Agreement List or not buy at all, within a minimum period of one (1) year to a maximum period of three (3) years. (GPPB Resolution No. 27-2019)

GFI – Government Financial Institution.

GOCC – Government-owned and/or –controlled corporation.

Goods – Refer to all items, supplies, materials and general support services, except Consulting Services and Infrastructure Projects, which may be needed in the transaction of public businesses or in the pursuit of any government undertaking, project or activity, whether in the nature of equipment, furniture, stationery, materials for construction, or personal property of any kind, including non-personal or contractual services such as the repair and maintenance of equipment and furniture, as well as trucking, hauling, janitorial, security, and related or analogous services, as well as procurement of materials and supplies provided by the Procuring Entity for such services. The term "related" or "analogous services" shall include, but is not limited to, lease or purchase of office space, media advertisements, health maintenance services, and other services essential to the operation of the Procuring Entity. (2016 revised IRR, Section 5[r])

GOP – Government of the Philippines.

GPPB – Government Procurement Policy Board.

INCOTERMS – International Commercial Terms.

Infrastructure Projects – Include the construction, improvement, rehabilitation, demolition, repair, restoration or maintenance of roads and bridges, railways, airports, seaports, communication facilities, civil works components of information technology projects, irrigation, flood control and drainage, water supply, sanitation, sewerage and solid waste management systems, shore protection, energy/power and electrification facilities, national buildings, school buildings, hospital buildings, and other related construction projects of the government. Also referred to as *civil works or works*. (2016 revised IRR, Section 5[u])

LGUs – Local Government Units.

NFCC – Net Financial Contracting Capacity.

NGA – National Government Agency.

PhilGEPS - Philippine Government Electronic Procurement System.

Procurement Project – refers to a specific or identified procurement covering goods, infrastructure project or consulting services. A Procurement Project shall be described, detailed, and scheduled in the Project Procurement Management Plan prepared by the agency which shall be consolidated in the procuring entity's Annual Procurement Plan. (GPPB Circular No. 06-2019 dated 17 July 2019)

PSA – Philippine Statistics Authority.

SEC – Securities and Exchange Commission.

SLCC – Single Largest Completed Contract.

SSS – Social Security System

Supplier – refers to a citizen, or any corporate body or commercial company duly organized and registered under the laws where it is established, habitually established in business and engaged in the manufacture or sale of the merchandise or performance of the general services covered by his bid. (Item 3.8 of GPPB Resolution No. 13-2019, dated 23 May 2019). Supplier as used in these Bidding Documents may likewise refer to a distributor, manufacturer, contractor, or consultant.

UN – United Nations.

Section I. Invitation to Bid

REPUBLIC OF THE PHILIPPINES
SOCIAL SECURITY SYSTEM
East Avenue, Diliman, Quezon City
Tel. Nos. (632)8709-7198
E-mail: ussaptayo@sss.gov.ph*Website http://www.sss.gov.ph

Invitation to Bid
ITB-SSS-Goods-2024-021

EQUIPMENT FOR THE AIR – CONDITIONING AND VENTILATION SYSTEM FOR THE PROPOSED SSS MANILA AND SSS LAOAG BRANCHES

<table>
<tr><th rowspan="2">Approved Budget for the Contract (ABC) & Source of Fund</th><th rowspan="2">Delivery/ Completion Period</th><th rowspan="2">Price of Bid Documents (non-refundable)</th><th colspan="2">Schedule of Activities Date/Time</th></tr>
<tr><th>Pre-bid Conference</th><th>Deadline of submission and receipt of bids</th></tr>
<tr><td>₱ 14,884,858.00
Broken down as follows:</td><td rowspan="4">Within one hundred twenty (120) calendar days from receipt of Notice to Proceed and Signed Contract</td><td></td><td rowspan="4">May 23, 2024
(Thursday)
3:00 p.m.</td><td rowspan="4">June 13, 2024
(Thursday)
2:00 p.m.</td></tr>
<tr><td>Lot 1 – SSS Manila Branch
₱ 10,600,920.00</td><td>₱ 11,500.00</td></tr>
<tr><td>Lot 2 – SSS Laoag Branch
₱ 4,283,938.00</td><td>₱ 5,000.00</td></tr>
<tr><td colspan="3">Approved 2024 Corporate Operating Budget– CAPEX, with Code PAP 2024-0218 of the Annual Procurement Plan (APP)</td></tr>
</table>

1. The ***SOCIAL SECURITY SYSTEM*** now invites Bids for the above item. Delivery of the Goods is required within the period specified above. **Bidders should have completed within five (5) years prior to the date of submission and receipt of bids**, a contract similar to the Project. The description of an eligible Bidder is contained in the Bidding Documents, particularly, in Section II - Instruction to Bidders.

2. Bids received in excess of the ABC shall be automatically rejected at bid opening.

3. Bidding will be conducted through open competitive bidding procedures using a non-discretionary pass/fail criterion as specified in the 2016 Revised Implementing Rules and Regulations (RIRR) of Republic Act 9184 (RA) 9184, otherwise known as the "Government Procurement Reform Act".

   Bidding is restricted to Filipino citizens/sole proprietorships, partnerships, or organizations with at least sixty percent (60%) interest or outstanding capital stock belonging to citizens of the Philippines, and to citizens or organizations of a country the laws or regulations of which grant similar rights or privileges to Filipino citizens, pursuant to RA 5183.

4. Interested bidders may obtain further information from the *SSS* and inspect the Bidding Documents at the address in the last item of the ITB from Monday to Friday, 8:00 a.m. to 5:00 p.m.

5. A complete set of Bidding Documents may be acquired by interested bidders **starting 15 May 2024 up to the scheduled submission & receipt of bids** from the address stated in item 11 of the ITB and upon payment of the applicable fee for the Bidding Documents in the amount specified above.

   The mode of payment will be on a cash basis payable at the SSS Cash Department, Ground Floor, SSS Main Bldg., upon accomplishment of SSS Form R-6. The Bidding Documents shall be received personally by the prospective Bidder or his authorized representative.

   It may also be downloaded free of charge from the website of the Philippine Government Electronic Procurement System (PhilGEPS) and the website of the SSS, provided that Bidders shall pay the applicable fee for the Bidding Documents not later than the submission of their bids.

6. The SSS will hold a Pre-Bid Conference on the date and time specified above at the Bidding Room, 2nd Floor, SSS Main Bldg., East Avenue, Diliman, Quezon City which shall be open to prospective bidders, but attendance shall not be mandatory. To ensure completeness and compliance of bids, bidders are advised to send their authorized technical and/or administrative representatives who will prepare the bid documents.

   The Pre-Bid Conference will be conducted through online conference using Microsoft Teams. Kindly e-mail us on or before 22 May 2024, through e-mail address bac@sss.gov.ph, the following:

   a. Name of the representative and e-mail address; and
   b. Technical and administrative queries.

7. Bids must be duly received by the BAC Secretariat at the Bidding Room, 2nd Floor, SSS Main Building, East Avenue, Diliman, Quezon City on the deadline specified above. All Bids must be accompanied by a bid security in any of the acceptable forms and in the amount stated in the ITB Clause 14.

   Bid opening shall be on the date and time specified above at the Bidding Room, 2nd Floor, SSS Main Building, East Avenue, Diliman, Quezon City. Bids will be opened in the presence of the bidders' representatives who choose to attend at the address above. Late bids shall not be accepted.

8. References to the dates and times shall be based on Philippine Standard time. Should any of the above dates fall on a holiday, the deadline shall be extended to the same time of the immediately succeeding business day in Quezon City.

9. The SSS reserves the right to reject any and all bids, declare a failure of bidding, or not award the contract at any time prior to contract award in accordance with Sections 35.6 and 41 of the 2016 revised IRR of RA No. 9184, without thereby incurring any liability to the affected bidder or bidders.

10. The SSS assumes no obligation to compensate or indemnify parties for any expense or loss that they may incur as a result of their participation in the procurement process, nor does SSS guarantee that an award will be made as a result of this invitation. Furthermore, the SSS reserves the right to waive any defects or formality in the responses to the eligibility requirements and to this invitation and reserves the right to accept the proposal most advantageous to the agency.

11. For further information, please refer to:

    Bids & Awards Committee
    The Secretariat
    2nd Flr., SSS Main Bldg., East Ave., Diliman, Q.C.
    Tel # (632) 8922-1070; 8709-7198 local 5492/6382
    Email – bac@sss.gov.ph

12. Bidding Documents may be downloaded from PROCUREMENT tab at www.sss.gov.ph starting **15 May 2024**.

THE CHAIRPERSON
BIDS & AWARDS COMMITTEE

ref.: itb-sss-goods-2024-021-Equipment for Air-conditioning for Manila Laoag

Section II. Instructions to Bidders

1. Scope of Bid

The Procuring Entity, *Social Security System* wishes to receive Bids for the Equipment for the Air – Conditioning and Ventilation System for the Proposed SSS Manila and SSS Laoag Branches with identification number ITB-SSS-Goods-2024-021.

The Procurement Project (referred to herein as "Project") is composed of two (2) lots, the details of which are described in Section VII (Technical Specifications).

2. Funding Information

2.1. The GOP through the source of funding as indicated below for *CY2024* in the amount of Fourteen Million Eight Hundred Eighty-Four Thousand, Eight Hundred Fifty-Eight Pesos (₱14,884,858.00).

2.1. The source of funding is: Approved 2024 Corporate Operating Budget– CAPEX, with Code PAP 2024-0218 of the APP.

3. Bidding Requirements

The Bidding for the Project shall be governed by all the provisions of RA No. 9184 and its 2016 revised IRR, including its Generic Procurement Manuals and associated policies, rules and regulations as the primary source thereof, while the herein clauses shall serve as the secondary source thereof.

Any amendments made to the IRR and other GPPB issuances shall be applicable only to the ongoing posting, advertisement, or **IB** by the BAC through the issuance of a supplemental or bid bulletin.

The Bidder, by the act of submitting its Bid, shall be deemed to have verified and accepted the general requirements of this Project, including other factors that may affect the cost, duration and execution or implementation of the contract, project, or work and examine all instructions, forms, terms, and project requirements in the Bidding Documents.

4. Corrupt, Fraudulent, Collusive, and Coercive Practices

The Procuring Entity, as well as the Bidders and Suppliers, shall observe the highest standard of ethics during the procurement and execution of the contract. They or through an agent shall not engage in corrupt, fraudulent, collusive, coercive, and obstructive practices defined under Annex "I" of the 2016 revised IRR of RA No. 9184 or other integrity violations in competing for the Project.

5. Eligible Bidders

5.1. Only Bids of Bidders found to be legally, technically, and financially capable will be evaluated.

5.2. a. Foreign ownership exceeding those allowed under the rules may participate pursuant to:

i. When a Treaty or International or Executive Agreement as provided in Section 4 of the RA No. 9184 and its 2016 revised IRR allow foreign bidders to participate;

ii. Citizens, corporations, or associations of a country, included in the list issued by the GPPB, the laws or regulations of which grant reciprocal rights or privileges to citizens, corporations, or associations of the Philippines;

iii. When the Goods sought to be procured are not available from local suppliers; or

iv. When there is a need to prevent situations that defeat competition or restrain trade.

b. Foreign ownership limited to those allowed under the rules may participate in this Project.

5.3. Pursuant to Section 23.4.1.3 of the 2016 revised IRR of RA No.9184, the Bidder shall have an SLCC that is at least one (1) contract similar to the Project the value of which, adjusted to current prices using the PSA's CPI, must be at least equivalent to:

a. The Bidder must have completed a single contract that is similar to this Project, equivalent to at least fifty percent (50%) of the ABC.

5.4. The Bidders shall comply with the eligibility criteria under Section 23.4.1 of the 2016 IRR of RA No. 9184.

6. Origin of Goods

There is no restriction on the origin of goods other than those prohibited by a decision of the UN Security Council taken under Chapter VII of the Charter of the UN, subject to Domestic Preference requirements under **ITB** Clause 18.

7. Subcontracts

7.1. The Procuring Entity has prescribed that Subcontracting is not allowed.

8. Pre-Bid Conference

The Procuring Entity will hold a pre-bid conference for this Project on the specified date and time and either at its physical address **Bidding Room, 2nd Floor, SSS Main Bldg., East Avenue, Diliman, Quezon City and/or through online conference using Microsoft Teams** as indicated in paragraph 6 of the **IB.**

9. Clarification and Amendment of Bidding Documents

Prospective bidders may request for clarification on and/or interpretation of any part of the Bidding Documents. Such requests must be in writing and received by the Procuring Entity, either at its given address or through electronic mail indicated in the **IB**, at least ten (10) calendar days before the deadline set for the submission and receipt of Bids.

10. Documents comprising the Bid: Eligibility and Technical Components

10.1. The first envelope shall contain the eligibility and technical documents of the Bid as specified in **Section VIII (Checklist of Technical and Financial Documents)**.

10.2. The Bidder's SLCC as indicated in **ITB** Clause 5.3 should have been completed within **the last five years** prior to the deadline for the submission and receipt of bids.

10.3. If the eligibility requirements or statements, the bids, and all other documents for submission to the BAC are in foreign language other than English, it must be accompanied by a translation in English, which shall be authenticated by the appropriate Philippine foreign service establishment, post, or the equivalent office having jurisdiction over the foreign bidder's affairs in the Philippines. Similar to the required authentication above, for Contracting Parties to the Apostille Convention, only the translated documents shall be authenticated through an apostille pursuant to GPPB Resolution No. 13-2019 dated 23 May 2019. The English translation shall govern, for purposes of interpretation of the bid.

11. Documents comprising the Bid: Financial Component

11.1. The second bid envelope shall contain the financial documents for the Bid as specified in **Section VIII (Checklist of Technical and Financial Documents)**.

11.2. If the Bidder claims preference as a Domestic Bidder or Domestic Entity, a certification issued by DTI shall be provided by the Bidder in accordance with Section 43.1.3 of the 2016 revised IRR of RA No. 9184.

11.3. Any bid exceeding the ABC indicated in paragraph 1 of the **IB** shall not be accepted.

11.4. For Foreign-funded Procurement, a ceiling may be applied to bid prices provided the conditions are met under Section 31.2 of the 2016 revised IRR of RA No. 9184.

12. Bid Prices

12.1. Prices indicated on the Price Schedule shall be entered separately in the following manner:

a. For Goods offered from within the Procuring Entity's country:

i. The price of the Goods quoted EXW (ex-works, ex-factory, ex-warehouse, ex-showroom, or off-the-shelf, as applicable);

ii. The cost of all customs duties and sales and other taxes already paid or payable;

iii. The cost of transportation, insurance, and other costs incidental to delivery of the Goods to their final destination; and

iv. The price of other (incidental) services, if any, listed in the **BDS**.

b. For Goods offered from abroad:

i. Unless otherwise stated in the **BDS**, the price of the Goods shall be quoted delivered duty paid (DDP) with the place of destination in the Philippines as specified in the **BDS**. In quoting the price, the Bidder shall be free to use transportation through carriers registered in any eligible country. Similarly, the Bidder may obtain insurance services from any eligible source country.

ii. The price of other (incidental) services, if any, as listed in the **BDS.**

13. Bid and Payment Currencies

13.1. For Goods that the Bidder will supply from outside the Philippines, the bid prices may be quoted in the local currency or tradable currency accepted by the BSP at the discretion of the Bidder. However, for purposes of bid evaluation, Bids denominated in foreign currencies, shall be converted to Philippine currency based on the exchange rate as published in the BSP reference rate bulletin on the day of the bid opening.

13.2. Payment of the contract price shall be made in Philippine Pesos.

14. Bid Security

14.1. The Bidder shall submit a Bid Securing Declaration or any form of Bid Security in the amount indicated in the **BDS**, which shall be not less than the percentage of the ABC in accordance with the schedule in the **BDS**.

14.2. The Bid and bid security shall be valid for ***One Hundred Twenty (120) Calendar Days from the Date of the Bid Opening.*** Any Bid not accompanied by an acceptable bid security shall be rejected by the Procuring Entity as non-responsive.

15. Sealing and Marking of Bids

Each Bidder shall submit one copy of the first and second components of its Bid.

The Procuring Entity may request additional hard copies and/or electronic copies of the Bid. However, failure of the Bidders to comply with the said request shall not be a ground for disqualification.

If the Procuring Entity allows the submission of bids through online submission or any other electronic means, the Bidder shall submit an electronic copy of its Bid, which must be digitally signed. An electronic copy that cannot be opened or is corrupted shall be considered non-responsive and, thus, automatically disqualified.

16. Deadline for Submission of Bids

16.1. The Bidders shall submit on the specified date and time and either at its physical address or through online submission as indicated in paragraph 7 of the **IB.**

17. Opening and Preliminary Examination of Bids

17.1. The BAC shall open the Bids in public at the time, on the date, and at the place specified in paragraph 7 of the **IB**. The Bidders' representatives who are present shall sign a register evidencing their attendance. In case videoconferencing, webcasting or other similar technologies will be used, attendance of participants shall likewise be recorded by the BAC Secretariat.

In case the Bids cannot be opened as scheduled due to justifiable reasons, the rescheduling requirements under Section 29 of the 2016 revised IRR of RA No. 9184 shall prevail.

17.2. The preliminary examination of bids shall be governed by Section 30 of the 2016 revised IRR of RA No. 9184.

18. Domestic Preference

18.1. The Procuring Entity will grant a margin of preference for the purpose of comparison of Bids in accordance with Section 43.1.2 of the 2016 revised IRR of RA No. 9184.

19. Detailed Evaluation and Comparison of Bids

19.1. The Procuring BAC shall immediately conduct a detailed evaluation of all Bids rated "*passed*," using non-discretionary pass/fail criteria. The BAC shall consider the conditions in the evaluation of Bids under Section 32.2 of the 2016 revised IRR of RA No. 9184.

19.2. If the Project allows partial bids, bidders may submit a proposal on any of the lots or items, and evaluation will be undertaken on a per lot or item basis, as the case maybe. In this case, the Bid Security as required by **ITB** Clause 14 shall be submitted for each lot or item separately.

19.3. The descriptions of the lots or items shall be indicated in **Section VII (Technical Specifications)**, although the ABCs of these lots or items are indicated in the **BDS** for purposes of the NFCC computation pursuant to Section 23.4.2.6 of the 2016 revised IRR of RA No. 9184. The NFCC must be sufficient for the total of the ABCs for all the lots or items participated in by the prospective Bidder.

19.4. The Project shall be awarded as follows:

One Project having several items grouped into several lots, which shall be awarded as separate contracts per lot.

19.5. Except for bidders submitting a committed Line of Credit from a Universal or Commercial Bank in lieu of its NFCC computation, all Bids must include the NFCC computation pursuant to Section 23.4.1.4 of the 2016 revised IRR of RA No. 9184, which must be sufficient for the total of the ABCs for all the lots or items participated in by the prospective Bidder. For bidders submitting the committed Line of Credit, it must be at least equal to ten percent (10%) of the ABCs for all the lots or items participated in by the prospective Bidder.

20. Post-Qualification

Within a non-extendible period of five (5) calendar days from receipt by the Bidder of the notice from the BAC that it submitted the Lowest Calculated Bid, the Bidder shall submit its latest income and business tax returns filed and paid through the BIR Electronic Filing and Payment System (eFPS) and other appropriate licenses and permits required by law and stated in the **BDS**.

21. Signing of the Contract

21.1. The documents required in Section 37.2 of the 2016 revised IRR of RA No. 9184 shall form part of the Contract. Additional Contract documents are indicated in the **BDS**.

Section III. Bid Data Sheet

Bid Data Sheet

<table>
<tr><th>ITB Clause</th><th></th></tr>
<tr><td>5.3</td><td>For this purpose, contracts similar to the Project shall be:

a. Supply, delivery and installation of mechanical equipment particularly, Variable Refrigerant Flow (VRF) system, multi split and split type air conditioning systems.

b. Completed within five (5) years prior to the deadline for the submission and receipt of bids.</td></tr>
<tr><td>7.1</td><td>No further instruction</td></tr>
<tr><td>12</td><td>The price of the Goods shall be quoted DDP to the sites indicated in Section VI (Schedule of Requirements) for this Project.</td></tr>
<tr><td>14.1</td><td>The bid security shall be in the form of a Bid Securing Declaration, or any of the following forms and amounts:

<table>
<tr><th>Form of Bid Security</th><th>Amount of Bid Security (Not less than the Percentage of the ABC)</th></tr>
<tr><td>Cash or cashier’s/manager’s check issued by a Universal or Commercial Bank.</td><td rowspan="2">Two percent (2%)
or
Lot 1: ₱ 212,018.40
Lot 2: ₱ 85,678.76</td></tr>
<tr><td>Bank draft/guarantee or irrevocable letter of credit issued by a Universal or Commercial Bank: Provided, however, that it shall be confirmed or authenticated by a Universal or Commercial Bank, if issued by a foreign bank.</td></tr>
<tr><td>Surety bond callable upon demand issued by a surety or insurance company duly certified by the Insurance Commission as authorized to issue such security.</td><td>Five percent (5%)
or
Lot 1: ₱ 530,046.00
Lot 2: ₱ 214,169.90</td></tr>
</table>

* Bank issued securities must be issued by a universal/commercial bank.
* Surety Bonds must be accompanied by a certification from Insurance Commission that issuer is authorized to issue such security.
* Bid Securing Declaration must be notarized by a duly commissioned Notary Public.</td></tr>
<tr><td>19.3</td><td>The ABC of ₱ 14,884,858.00, broken down as follows:

<table>
<tr><th>Lot No.</th><th>Offices Covered</th><th>ABC</th></tr>
<tr><td>1</td><td>Manila Building Mechanical Works</td><td>₱ 10,600,920.00</td></tr>
<tr><td>2</td><td>Laoag Building Mechanical Works</td><td>₱ 4,283,938.00</td></tr>
</table>
</td></tr>
</table>

	Any bid with a financial component exceeding the ABC per lot indicated above shall not be accepted.
20.1	No further instruction
20.2	The Lowest Calculated Bidder shall submit the following: 1. Registration certificate from Securities and Exchange Commission (SEC) for corporation including Articles of Incorporation and General Information Sheet (GIS), Department of Trade and Industry (DTI) for sole proprietorship, or Cooperative Development Authority (CDA) for cooperatives or its equivalent document 2. Mayor's or Business permit issued by the city or municipality where the principal place of business of the prospective bidder is located, or the equivalent document for Exclusive Economic Zones or Areas; 3. Tax clearance per E.O. No. 398, s. 2005, as finally reviewed and approved by the Bureau of Internal Revenue (BIR) 4. Latest Audited Financial Statements 5. Latest income tax return corresponding to the Audited Financial Statements submitted, filed electronically (EFPS); 6. Quarterly VAT (business tax returns) per Revenue Regulations 3-2005 for the last six (6) months prior to the submission & opening of bids filed electronically (EFPS);
21.1	No further instruction

Section IV. General Conditions of Contract

1. Scope of Contract

This Contract shall include all such items, although not specifically mentioned, that can be reasonably inferred as being required for its completion as if such items were expressly mentioned herein. All the provisions of RA No. 9184 and its 2016 revised IRR, including the Generic Procurement Manual, and associated issuances, constitute the primary source for the terms and conditions of the Contract, and thus, applicable in contract implementation. Herein clauses shall serve as the secondary source for the terms and conditions of the Contract.

This is without prejudice to Sections 74.1 and 74.2 of the 2016 revised IRR of RA No. 9184 allowing the GPPB to amend the IRR, which shall be applied to all procurement activities, the advertisement, posting, or invitation of which were issued after the effectivity of the said amendment.

Additional requirements for the completion of this Contract shall be provided in the **Special Conditions of Contract** (**SCC).**

2. Advance Payment and Terms of Payment

2.1. Advance payment of the contract amount is provided under Annex "D" of the revised 2016 IRR of RA No. 9184.

2.2. The Procuring Entity is allowed to determine the terms of payment on the partial or staggered delivery of the Goods procured, provided such partial payment shall correspond to the value of the goods delivered and accepted in accordance with prevailing accounting and auditing rules and regulations. The terms of payment are indicated in the **SCC**.

3. Performance Security

Within ten (10) calendar days from receipt of the Notice of Award by the Bidder from the Procuring Entity but in no case later than the signing of the Contract by both parties, the successful Bidder shall furnish the performance security in any of the forms prescribed in Section 39 of the 2016 revised IRR of RA No. 9184.

4. Inspection and Tests

The Procuring Entity or its representative shall have the right to inspect and/or to test the Goods to confirm their conformity to the Project specifications at no extra cost to the Procuring Entity in accordance with the Generic Procurement Manual. In addition to tests in the **SCC**, **Section VII (Technical Specifications)** shall specify what inspections and/or tests the Procuring Entity requires, and where they are to be conducted. The Procuring Entity shall notify the Supplier in writing, in a timely manner, of the identity of any representatives retained for these purposes.

All reasonable facilities and assistance for the inspection and testing of Goods, including access to drawings and production data, shall be provided by the Supplier to the authorized inspectors at no charge to the Procuring Entity.

5. Warranty

5.1 In order to assure that manufacturing defects shall be corrected by the Supplier, a warranty shall be required from the Supplier as provided under Section 62.1 of the 2016 revised IRR of RA No. 9184.

5.2 The Procuring Entity shall promptly notify the Supplier in writing of any claims arising under this warranty. Upon receipt of such notice, the Supplier shall, repair or replace the defective Goods or parts thereof without cost to the Procuring Entity, pursuant to the Generic Procurement Manual.

6. Liability of the Supplier

The Supplier's liability under this Contract shall be as provided by the laws of the Republic of the Philippines.

If the Supplier is a joint venture, all partners to the joint venture shall be jointly and severally liable to the Procuring Entity.

Section V. Special Conditions of Contract

Special Conditions of Contract

GCC Clause	
1	**Scope of Works: General Requirements** The work to be done consists of *"**Equipment for the Air – Conditioning and Ventilation System for the Proposed SSS Manila and SSS Laoag Branches**"* complete in all details, of the Electrical and Mechanical Works, at the subject premises, and all work and materials incidental to the proper completion of the mechanical work. All works shall be in accordance with the governing Codes and Regulations and with the Specifications, except where the same shall conflict with such Codes, etc., which shall then govern. The requirements in regard to materials and workmanship specify the required standards for the furnishing of all labor, materials, and appliances necessary for the complete installation of the work specified herein and indicated on the drawings. These specifications are intended to provide a broad outline of the required services, but are not limited to include all details of design. In case of deviation of the given design specification and modifications and correction shall be at the look out of the contractor to make the necessary adjustment such that the desired cooling requirement can be delivered in order to attain the sufficient provision of air-conditioning system to cool the area and satisfy the operation. **A. MECHANICAL** 1. All works shall be properly coordinated with SSS Representative/s 2. Any works and materials specification changes shall be discussed prior to the approval of SSS Representative/s 3. Supply, delivery and installation of all brand new air-conditioning and ventilation equipment including all accessories necessary to make the system operational. 4. All air-conditioning and ventilation equipment and its refrigerant and electrical lines shall be installed in accordance with the manufacturer's recommendations. 5. All refrigerant line installations shall be properly welded and secured against leaks and shall be also provided with insulators, appropriate rigid supports to secure the equipment against movement that may cause any from damages to its supporting components/ parts and equipment itself. 6. All necessary accessories shall be provided to system installations to ensure safe and proper operation of the equipment. 7. All suction and discharge lines shall be insulated with Rubber Insulation Size 25mm minimum thickness. 8. Provision of Rubber Insulation with polyethylene tape for all piping lines. 9. Connect air-conditioning unit drains to the nearest condensate drain line stub-out with 25mm dia. minimum size. Extend drain line connections, if necessary. 10. The ACCU and FCU shall be properly installed on a steel pedestal/platform base complete with vibration isolating medium like neoprene rubber pad 11. Tools, testing equipment and instruction manuals and reference materials shall be provided prior to the proper Testing and Commissioning of the completed system. Test result shall be submitted to the Building Owner Representative. 12. Supply and installation of other essential, miscellaneous and incidental materials to complete the project 13. All areas affected during implementation of the project by chipping, dismantling works and other related activities shall be restored to original aesthetic condition at the owner's satisfaction and to the sole account of the contractor 14. The supplier shall be responsible for repairs, periodic maintenance including semi – annual cleaning and servicing, check – up of the supplied A/C units for the entire duration of the warranty period.

15. Preparation and submission of delivery receipts, sales invoice, original JO/ PO, as-built plans. installation and operation manuals, brochures, and the start-up test result and other documents required in the project

B. ELECTRICAL

1. All electrical materials shall be approved type and application.
2. All electrical materials shall be in accordance with the plans, specification and in compliance with the Philippine National Standards (PNS), latest edition of the Philippine Electrical Code (PEC) and applicable Local Codes/ Regulations/ Laws.
3. All roughing – in layout shall be concealed with PVC or RSC or IMC.
4. Use Liquid Tight Flexible conduit with appropriate wiring, fittings and supports from ECB towards the ACCU terminal/tapping lines
5. All areas affected during implementation of the project by chipping, dismantling works and other related activities shall be restored to original condition at the owner's satisfaction and to the sole account of the contractor.
6. All electrical pipe-fittings and insulation shall be provided with appropriate lock nut and bushing and appropriate supports with standards intervals.
7. Feeder and sub-feeder wiring shall be provided with adequate wire marker. Panels shall be provided with directory.
8. Testing, commissioning and proper documentations shall be made prior to turn-over of the completed project.

PERMITS

All permits required for this work shall be obtained by and at the expense of the Contractor. The Contractor shall furnish the SSS the certificates of inspection and approval from the proper government authorities after the completion of the work. The Contractor shall prepare all as-built plans and all other paperwork required by the approving authorities.

COORDINATION

The Contractor shall coordinate in every work with all other Contractors to whose apparatus he shall connect part of his work, and also provide in his work connections and facilities for the connection of their work. The Contractor is hereby called upon to prepare such drawings of details of his equipment, location of sleeves, inserts and supports as may be required for the assistance, and the coordination of his work with that of the existing installation. Upon demand, he shall furnish these drawings in adequate numbers for the information to all parties concerned, and shall coordinate the preparation of these drawings by consultation with other trades involved, before submitting them. The approval of such drawings will not relieve Contractor in any way from the responsibility of proper location and coordinating his work with the SSS.

WORKMANSHIP

The work through shall be executed in the best and most thorough manner under the direction of and to the satisfaction of the Engineers, who will jointly interpret the meaning of the drawings and specifications and shall have the power to reject any work and materials in their judgments, are not in full accordance therewith.

The Contractor shall have on file, for ready access and reference, a set of drawings indicating all work as actually installed incorporating in same all changes and additions. Open the termination of the Contract, he shall prepare set of tracings indication therein the electrical work as actually and finally installed. These drawings shall be turned over to the SSS.

STANDARD OF MATERIALS

All materials shall be new and shall conform with the standards of Philippine National Standards, (PNS) or the following; Underwriter's Laboratories, Inc., ASA, IEEE, NEMA, IPCEA and ASTM in every case where such a standard has been established for the particular type of materials in question. All materials on all system shall comply with the specifications, unless specifically exempted and all materials where not specified shall be of the best of their respective kind. Samples of any materials shall be submitted for approval as required by the Owner's Representative.

PROTECTION

Contractor shall effectual protect his own work from damage during and, as may be necessary after the installation; and he shall likewise protect adjoining existing installation from damage resulting from installation of this work.

CLEANING UP

The Contractor shall remove all dirt, debris, rubbish and waste materials caused by him in the process of his work. He shall also remove all tools, temporary power installation, scaffolding and surplus materials after completion and acceptance of his work.

All Mechanical works shall be done in accordance with the Technical Specifications issued by A.C. Ong Consulting Inc. under Annex "A" for Manila Branch and Annex "B" for Laoag Branch.

Delivery and Documents –

For purposes of the Contract, "EXW," "FOB," "FCA," "CIF," "CIP," "DDP" and other trade terms used to describe the obligations of the parties shall have the meanings assigned to them by the current edition of INCOTERMS published by the International Chamber of Commerce, Paris. The Delivery terms of this Contract shall be as follows:

The supply, delivery and installation of equipment shall be at the following locations:

LOT 1

Offices/Branches	Address
Manila Building	Apacible St. cor. Agoncillo St., Ermita, Malate, Manila

LOT 2

Offices/Branches	Address
Laoag Building	Barangay Buttong, Laoag City

The delivery terms applicable to this Contract are delivered as specified location per lot. Risk and title will pass from the Supplier to the Procuring Entity upon receipt and final acceptance of the Goods at their final destination.

Delivery of the Goods shall be made by the Supplier in accordance with the terms specified in Section VI (Schedule of Requirements).

For purposes of this Clause the Procuring Entity's Representative at the Project Site is Branch Support and Services Department.

Incidental Services –

The Supplier is required to provide all of the following services, including additional services, if any, specified in Section VI. Schedule of Requirements:

a. performance or supervision of on-site assembly and/or start-up of the supplied Goods;
b. furnishing of tools required for assembly and/or maintenance of the supplied Goods;
c. furnishing of a detailed operations and maintenance manual for each appropriate unit of the supplied Goods;
d. performance or supervision or maintenance and/or repair of the supplied Goods, for a period of time agreed by the parties, provided that this service shall not relieve the Supplier of any warranty obligations under this Contract; and
e. training of the Procuring Entity's personnel, at the Supplier's plant and/or on-site, in assembly, start-up, operation, maintenance, and/or repair of the supplied Goods.
f. Other additional incidental service requirements, as needed.

The Contract price for the Goods shall include the prices charged by the Supplier for incidental services and shall not exceed the prevailing rates charged to other parties by the Supplier for similar services.

Spare Parts –

The Supplier is required to provide all of the following materials, notifications, and information pertaining to spare parts manufactured or distributed by the Supplier:
Select appropriate requirements and delete the rest.

1. such spare parts as the Procuring Entity may elect to purchase from the Supplier, provided that this election shall not relieve the Supplier of any warranty obligations under this Contract; and
2. in the event of termination of production of the spare parts:
   i. advance notification to the Procuring Entity of the pending termination, in sufficient time to permit the Procuring Entity to procure needed requirements; and
   ii. following such termination, furnishing at no cost to the Procuring Entity, the blueprints, drawings, and specifications of the spare parts, if requested.

The spare parts and other components required are listed in **Section VI (Schedule of Requirements)** and the costs thereof are included in the contract price.

The Supplier shall carry sufficient inventories to assure ex-stock supply of consumable spare parts or components for the Goods for a period of **thirty (30) calendar days**.

Spare parts or components shall be supplied as promptly as possible, but in any case, within one (1) month of placing the order.

Packaging –

The Supplier shall provide such packaging of the Goods as is required to prevent their damage or deterioration during transit to their final destination, as indicated in this Contract. The packaging shall be sufficient to withstand, without limitation, rough handling during transit and exposure to extreme temperatures, salt and precipitation during transit, and open storage. Packaging case size and weights shall take into

	consideration, where appropriate, the remoteness of the Goods' final destination and the absence of heavy handling facilities at all points in transit. The packaging, marking, and documentation within and outside the packages shall comply strictly with such special requirements as shall be expressly provided for in the Contract, including additional requirements, if any, specified below, and in any subsequent instructions ordered by the Procuring Entity. The outer packaging must be clearly marked on at least four (4) sides as follows: Name of the Procuring Entity Name of the Supplier Contract Description Final Destination Gross weight Any special lifting instructions Any special handling instructions Any relevant HAZCHEM classifications A packaging list identifying the contents and quantities of the package is to be placed on an accessible point of the outer packaging if practical. If not practical the packaging list is to be placed inside the outer packaging but outside the secondary packaging. **Transportation –** Where the Supplier is required under Contract to deliver the Goods CIF, CIP, or DDP, transport of the Goods to the port of destination or such other named place of destination in the Philippines, as shall be specified in this Contract, shall be arranged and paid for by the Supplier, and the cost thereof shall be included in the Contract Price. Where the Supplier is required under this Contract to transport the Goods to a specified place of destination within the Philippines, defined as the Project Site, transport to such place of destination in the Philippines, including insurance and storage, as shall be specified in this Contract, shall be arranged by the Supplier, and related costs shall be included in the contract price. Where the Supplier is required under Contract to deliver the Goods CIF, CIP or DDP, Goods are to be transported on carriers of Philippine registry. In the event that no carrier of Philippine registry is available, Goods may be shipped by a carrier which is not of Philippine registry provided that the Supplier obtains and presents to the Procuring Entity certification to this effect from the nearest Philippine consulate to the port of dispatch. In the event that carriers of Philippine registry are available but their schedule delays the Supplier in its performance of this Contract the period from when the Goods were first ready for shipment and the actual date of shipment the period of delay will be considered force majeure. The Procuring Entity accepts no liability for the damage of Goods during transit other than those prescribed by INCOTERMS for DDP deliveries. In the case of Goods supplied from within the Philippines or supplied by domestic Suppliers risk and title will not be deemed to have passed to the Procuring Entity until their receipt and final acceptance at the final destination. **Intellectual Property Rights –** The Supplier shall indemnify the Procuring Entity against all third-party claims of infringement of patent, trademark, or industrial design rights arising from use of the Goods or any part thereof.

2.2	The terms of payment shall be as follows: One-time payment upon completion and acceptance of BSSD. The following requirements must also be complied with: 1. Testing and inspection of the units. (Annex A- Testing, Adjusting and Balancing of Mechanical Equipment) 2. Submission of complete documents: Delivery Receipts, Sales Invoice, signed & sealed As-built plans, Operation and Installation Manuals, Brochures, and Start-up test results and other documents required in the project. **Note: Applicable cost adjustment for this particular item shall be applied even without the necessary issuance of amendment to order.** In case the total length of actual installed refrigerant pipes is within (+/-) 10% as compared with the given lengths in the Bill of Quantities, no cost adjustment shall be imposed. 3. Issuance of Certificate of Completion and Acceptance by the implementing unit. Payment shall be credited to the LANDBANK or DBP or any choice of bank account subject to applicable bank charges of the winning bidder. The payment shall be subject to retention of Withholding Tax and other applicable taxes in accordance with existing Laws and BIR Rules and Regulations, to be remitted directly to the BIR by the SSS. Payment using Letter of Credit is not allowed. The obligation for the warranty shall be covered by either retention money in an amount equivalent to at least one percent (1%) of every progress payment, or a special bank guarantee equivalent to at least one percent (1%) of the total contract price.
4	The inspections and tests that will be conducted during implementation are indicated in **Annex A**- Testing, Adjusting and Balancing of Mechanical Equipment All tests shall be witnessed by SSS authorized representative/s.
5.1	Warranty Warranty period for all mechanical and electrical works installation is **one (1) year** for parts and services. SEMI ANNUAL service and maintenance shall be undertaken by the winning bidder within the warranty period.
5.2	Correction of defects in the warranty period shall be done **within three (3) days** after notification of defect was fir communicated (verbally or in writing) by SSS to the Supplier.

6	**Liability of the Supplier** 1. CONFIDENTIALITY. Neither party shall, without the prior written consent of the other, disclose or make available to any person, make public, or use directly or indirectly, except for the performance and implementation of the works, any confidential information, acquired from an information holder in connection with the performance of this Contract, unless: (i) the information is known to the disclosing party, as evidenced by its written records, prior to obtaining the same from the information holder and is not otherwise subject to disclosure restrictions on the disclosing party, (ii) the information is disclosed to the disclosing party by a third party who did not receive the same, directly or indirectly, from an information holder, and who has no obligation of secrecy with respect thereto, or (iii) required to be disclosed by law. The obligation of confidentiality by both parties, as provided herein, shall survive the termination of the Agreement. 2. MERGER AND CONSOLIDATION. In case of merger, consolidation or change of ownership of the SUPPLIER with other company, it is the responsibility of the surviving company/consolidated company/acquiring entity to inform SSS of the change in corporate structure/ownership. Failure to do so shall translate in such company assuming all liabilities of the acquired/merged company under the Agreement. 3. FORCE MAJEURE. SUPPLIER shall not be liable for forfeiture of its performance security, liquidated damages, or termination for default if and to the extent that SUPPLIER's delay in performance or other failure to perform its obligations under this Agreement is the result of a force majeure. For purposes of this Agreement the terms "force majeure" and "fortuitous event" may be used interchangeably. In this regard, a fortuitous event or force majeure shall be interpreted to mean an event which SUPPLIER could not have foreseen, or which though foreseen, was inevitable. It shall not include ordinary unfavorable weather conditions; and any other cause the effects of which could have been avoided with the exercise of reasonable diligence by SUPPLIER. Such events may include, but not limited to, acts of SSS in its sovereign capacity, wars or revolutions, fires, floods, epidemics, quarantine restrictions, and freight embargoes. If a force majeure situation arises, SUPPLIER shall promptly notify SSS in writing of such condition and the cause thereof. Unless otherwise directed by SSS in writing, SUPPLIER shall continue to perform its obligations under this Agreement as far as is reasonably practical and shall seek all reasonable alternative means for performance not prevented by the force majeure. 4. NON-ASSIGNMENT. SUPPLIER shall not assign its rights or obligations under this Agreement, in whole or in part, except with SSS's prior written consent. SUPPLIER shall not subcontract in whole or in part the PROJECT and deliverables subject of this Agreement without the written consent of SSS. 5. WAIVER. Failure by either party to insist upon the other strict performance of any of the terms and conditions hereof shall not be deemed a relinquishment or waiver of any subsequent breach or default of the terms and conditions hereof, which can only be deemed made if expressed in writing and signed by its duly authorized representative. No such waiver shall be construed as modification of any of the provisions of the Agreement or as a waiver of any past or future default or breach hereof, except as expressly stated in such waiver.

6. CUMULATIVE REMEDIES. Any and all remedies granted to the parties under the applicable laws and the Contract shall be deemed cumulative and may therefore, at the sole option and discretion, be availed of by the aggrieved party simultaneously, successively, or independently.

7. NO EMPLOYER-EMPLOYEE RELATIONSHIP. It is expressly and manifestly understood and agreed upon that the employees of SUPPLIER assigned to perform the PROJECT are not employees of SSS. Neither is there an employer-employee relationship between SSS and SUPPLIER.

   The Agreement does not create an employer-employee relationship between SSS and the SUPPLIER including its personnel; that the services rendered by the personnel assigned by SUPPLIER to SSS in the performance of its obligation under the contract do not represent government service and will not be credited as such; that its personnel assigned to SSS are not entitled to benefits enjoyed by SSS' officials and employees such as Personal Economic Relief Allowance (PERA), Representation and Transportation Allowance (RATA), ACA, etc.; that these personnel are not related within the third degree of consanguinity or affinity to the contracting officer and appointing authority of SSS; that they have not been previously dismissed from the government service by reason of an administrative case; that they have not reached the compulsory retirement age of sixty-five (65); and that they possess the education, experience and skills required to perform the job. The SUPPLIER hereby acknowledges that no authority has been given by SSS to hire any person as an employee of the latter. Any instruction given by SSS or any of its personnel to SUPPLIER's employees are to be construed merely as a measure taken by the former to ensure and enhance the quality of project performed hereunder. The SUPPLIER shall, at all times, exercise supervision and control over its employees in the performance of its obligations under the contract.

8. PARTNERSHIP. Nothing in the contract shall constitute a partnership between the parties. No party or its agents or employees shall be deemed to be the agent, employee or representative of any other party.

9. COMPLIANCE WITH SS LAW. SUPPLIER shall report all its employees to SSS for coverage and their contributions, as well as, all amortizations for salary/education/calamity and other SSS loans shall be updated. Should SUPPLIER fail to comply with its obligations under the provisions of the SS Law and Employees' Compensation Act, SSS shall have the authority to deduct any unpaid SS and EC contributions, salary, educational, emergency and/or calamity loan amortizations, employer's liability for damages, including interests and penalties from SUPPLIER's receivables under this Agreement.

   Further, prescription does not run against SSS for its failure to demand SS contributions or payments from SUPPLIER. Moreover, SUPPLIER shall forever hold in trust SS contributions or payments of its employees until the same is fully remitted to SSS.

10. COMPLIANCE WITH LABOR LAWS. SUPPLIER, as employer of the personnel assigned to undertake the PROJECT, shall comply with all its obligations under existing laws and their implementing rules and regulations on the payment of minimum wage, overtime pay, and other labor-related benefits as well as remittances or payment of the appropriate amount or contributions/payment (SSS, EC, Pag-IBIG, PhilHealth and taxes) with concerned government agencies/offices.

It is agreed further, that prior to the release of any payment by SSS to SUPPLIER, its President or its duly authorized representative, shall submit a sworn statement that all monies due to all its employees assigned to the PROJECT as well as benefits by law and other related labor legislation have been paid by SUPPLIER and that he/she assumed full responsibility thereof.

11. COMPLIANCE WITH TAX LAWS. SUPPLIER shall, in compliance with tax laws, pay the applicable taxes in full and on time and shall regularly present to SSS within the duration of the Contract, tax clearance from the Bureau of Internal Revenue (BIR) as well as copy of its income and business tax returns duly stamped by the BIR and duly validated with the tax payments made thereon. Failure by SUPPLIER to comply with the foregoing shall entitle SSS to suspend payment of the Contract Price.

    As required under Executive Order (EO) 398, s. 2005, SUPPLIER shall submit income and business tax returns duly stamped and received by the BIR, before entering and during the duration of this Agreement. SUPPLIER, through its responsible officer, shall also certify under oath that it is free and clear of all tax liabilities to the government. SUPPLIER shall pay taxes in full and on time and that failure to do so will entitle SSS to suspend or terminate this Agreement.

12. LIQUIDATED DAMAGES. If SUPPLIER fails to satisfactorily deliver any or all of the Goods and/or to perform the Services within the period(s) specified in the PBD inclusive of duly granted time extensions if any, SSS shall, without prejudice to its other remedies under this Agreement and under the applicable law, deduct from the Contract Price, as liquidated damages, the applicable rate of one tenth (1/10) of one (1) percent of the cost of the unperformed portion for every day of delay until actual delivery or performance. Once the amount of liquidated damages reaches ten percent (10%), SSS may rescind or terminate this Agreement, without prejudice to other courses of action and remedies open to it.

13. HOLD FREE and HARMLESS. SUPPLIER agrees to defend, indemnify, and hold SSS free and harmless from any and all claims, damages, expenses, fines, penalties and/or liabilities of whatever nature and kind, whether in law or equity, that may arise by reason of the implementation of the Agreement. In addition, SUPPLIER agrees to indemnify SSS for any damage as a result of said implementation.

    SUPPLIER hereby assumes full responsibility for any injury, including death, loss or damage which may be caused to SSS' employees or property or third person due to SUPPLIER's employees' fault or negligence, and further binds itself to hold SSS free and harmless from any of such injury or damage. SSS shall not be responsible for any injury, loss or damage which SUPPLIER or any of its employees may sustain in the performance of SUPPLIER's obligations under this Agreement.

14. SETTLEMENT OF DISPUTES. If any dispute or difference of any kind whatsoever shall arise between SSS and SUPPLIER in connection with or arising out of this Agreement, the Parties shall make every effort to resolve amicably such dispute or difference by mutual consultation.

	If after thirty (30) days, the Parties have failed to resolve their dispute or difference by such mutual consultation, then either SSS or SUPPLIER may give notice to the other Party of its intention to commence arbitration, in accordance with RA No. 876, otherwise known as the "Arbitration Law" and RA No. 9285, otherwise known as the "Alternative Dispute Resolution Act of 2004," in order to settle their disputes. No arbitration in respect of this matter may be commenced unless such notice is given. Notwithstanding any reference to arbitration herein, the Parties shall continue to perform their respective obligations under this Agreement unless they otherwise agree. 15. VENUE OF ACTIONS. In the event court action is necessary in order to promote Arbitration, such action shall be filed only before the proper courts of Quezon City, to the exclusion of all other venues. 16. GOVERNING LAW. The Agreement shall be governed by and interpreted according to the laws of the Republic of the Philippines. 17. AMENDMENTS. This Agreement may be amended only in writing and executed by the parties or their duly authorized representatives. 18. SEPARABILITY. If any one or more of the provisions contained in the contract or any document executed in connection herewith shall be invalid, illegal or unenforceable in any respect under any applicable law, then: (i) the validity, legality and enforceability of the remaining provisions contained herein or therein shall not in any way be affected or impaired and shall remain in full force and effect; and (ii) the invalid, illegal or unenforceable provision shall be replaced by the parties immediately with a term or provision that is valid, legal and enforceable and that comes closest to expressing the intention of such invalid illegal or unenforceable term of provision. 19. BINDING EFFECT. The Agreement shall be binding upon the Parties hereto, their assignee/s and successor/s-in-interest.

Section VI. Schedule of Requirements

The delivery schedule expressed as weeks/months stipulates hereafter a delivery date which is the date of delivery to the project site.

Item No.	Description	Quantity	Unit	Delivered, Weeks/Months
I.	***Lot 1- Equipment for the Air – Conditioning and Ventilation System for the Proposed SSS Manila Branch***			Within one hundred twenty (120) calendar days upon receipt of Notice to Proceed and Purchase Order
1.0	**Supply, Delivery and Installation of Brand New 39 TR VRF/VRV System complete with standard accessories**			
1.1	ACCU- A Cooling capacity: 137 Kw (39 TR) (48 HP) Location: ACCU Outdoor @ Roof Deck FCU served: FCU 1A to FCU 16A	1	assy	
1.2	FCU 1A, 5A, 6A, 7A, 14A, 15A Cooling Capacity : 3.7 Kw (1.0 TR) (1.5 Hp) Type of in-door units: Wall Mounted	6	assy	
1.3	FCU 2A, 3A, 4A, 8A, 16A, 17A Cooling Capacity : 13.5 Kw (4TR) (5 Hp) Type of in-door units: Floor Standing	6	assy	
1.4	FCU 9A, 10A, 11A, 12A, 13A Cooling Capacity : 7.1 Kw (2 TR) (2.5 Hp) Type of in-door units: Wall Mounted	5	assy	
2.0	**Supply, Delivery and Installation of Brand New 42 TR VRF/VRV System complete with standard accessories**			
2.1	ACCU B Cooling Capacity : 147 Kw (42 TR) (52 Hp) Location: ACCU Outdoor @ Roof Deck FCU served: FCU 1B to FCU 14A	1	assy	
2.2	FCU 1B, 2B, 3B, 4B, 5B, 12B, 13B, 14B Cooling Capacity : 13.5 Kw (4TR) (5 Hp) Type of in-door units: Floor Standing	8	assy	
2.3	FCU 6B, 8B Cooling Capacity : 3.7 Kw (1.0 TR) (1.5 Hp) Type of in-door units: Wall Mounted	2	assy	
2.4	FCU 7B, 9B, 10B, 11B Cooling Capacity : 7.1 Kw (2 TR) (2.5 Hp) Type of in-door units: Wall Mounted	4	assy	
3.0	**Supply, Delivery and Installation of Brand New Inverter Split Type Air – Conditioner with Horizontal Discharge Air – Cooled Condensing Unit complete with standard accessories**			
3.1	ACCU 1 / FCU 1 Cooling Capacity : 7.0 KW (2 TR) (3 Hp) Type of in-door units: Wall Mounted Location: out-door unit @ Roof Deck	1	set	
3.2	ACCU 2 / FCU 2, ACCU 3 / FCU 3, ACCU 4 / FCU 4, ACCU 7 / FCU 7, ACCU 8 / FCU 8 Cooling Capacity : 3.52 KW (1 TR) (1.5 Hp) Type of in-door units: Wall Mounted Location: out-door unit @ Roof Deck	5	sets	

Item No.	Description	Quantity	Unit	Delivered, Weeks/Months
3.3	ACCU 5 / FCU 5, ACCU 6 / FCU 6 Cooling Capacity : 5.28 KW (1.5 TR) (2 Hp) Type of in-door units: Wall Mounted Location: ACCU 5 out-door unit @ Roof Deck			
4.0	**Miscellaneous and Others for Items 1, 2 & 3**			
4.1	Supports, hangers, concrete pad, electrical connections	1	lot	
5.0	**Supply, Delivery and Installation of refrigerant piping and refrigerant piping insulation for VRF/VRV and split type air conditioners**			
5.1	Copper pipe, Hard drawn Type L	1	lot	
5.2	Copper pipe fittings	1	lot	
5.3	Refnet Branch Piping	27	pcs	
5.4	Pipe insulation Closed Cell Elastomeric (CCE) Rubber Insulation Class 1 x 20mm thick	1	lot	
5.5	Pipe Hangers and Supports (including saddles if any) Miscellaneous and Consumables	1	lot	
6.0	**Supply, Delivery and Installation of Brand New Ventilation Equipment complete with standard accessories**			
6.1	EF / 1.1 Type: Wall Mounted Airflow : 650 CMH Area Served: Genset Room @ GF	1	assy	
6.2	EF / 1.2, EF / 1.3 Type: Wall Mounted Airflow : 250 CMH Area Served: Electrical Room @ GF	1	assy	
6.3	EF / 1.4 Type: Ceiling Cassette Airflow : 400 CMH x 100 Pa. Static Pressure Area Served: Records Room @ GF	1	assy	
6.4	EF / 1.5, EF / 1.6 Type: Ceiling Cassette Airflow : 200 CMH x 70 Pa. Static Pressure Electrical Capacity : 230V, 1Ph, 60Hz Area Served: Supply Room @ GF, Utility Room @ GF	2	assy	
6.5	TEF / 1.1 Type: Cabinet in-Line Fan Airflow : 450 CMH x 100 Pa. Static Pressure Area Served: Employee Male & Female Toilet @ GF	1	assy	
6.6	TEF / 1.2 Type: Cabinet in-Line Fan Airflow : 700 CMH x 100 Pa. Static Pressure Area Served: Public Male & Female Toilet @ GF	1	assy	
6.7	WF / 1 Type: Wall Mounted Airflow : 100 CMH Area Served: Breast Feeding Room @ GF	1	assy	
6.8	FAF / 1.1, FAF / 1.2 Type: Cabinet in-Line Fan Airflow : 1700 CMH x 150 Pa. Static Pressure Room Served: Waiting Area, Offices @ GF	1	assy	
6.9	TEF / 2.1 Type: Ceiling Cassette Airflow : 85 CMH x 25 Pa. Static Pressure Area Served: Division Head @ 2F	1	assy	

Item No.	Description	Quantity	Unit	Delivered, Weeks/Months
6.10	TEF / 2.2 Type: Cabinet in-Line Fan Airflow : 600 CMH x 100 Pa. Static Pressure Area Served: Public Male & Female Toilet @ 2F	1	assy	
6.11	EF / 2.1 & 2.2 Type: Ceiling Cassette Airflow : 250 CMH x 100 Pa. Static Pressure Area Served: Records Room @ 2F	2	assy	
6.12	EF / 2.3 Type: Ceiling Cassette Airflow : 150 CMH x 70 Pa. Static Pressure Area Served: Supply Room @ 2F	1	assy	
6.13	EF / 2.4 Type: Ceiling Cassette Airflow : 85 CMH x 70 Pa. Static Pressure Area Served: Utility Room @ 2F	1	assy	
6.14	FAF / 2.1 Type: Cabinet in-Line Fan Airflow : 1200 CMH x 150 Pa. Static Pressure Area Served: OVP, Legal, Cluster, Admin @ 2F	1	assy	
6.15	FAF / 2.2 Type: Cabinet in-Line Fan Airflow : 600 CMH x 100 Pa. Static Pressure Area Served: AMS Section @ 2F	1	assy	
6.16	EF / 3.1, EF / 3.2 Type: Cabinet in-Line Fan Airflow : 1100 CMH x 150 Pa. Static Pressure Area Served: Records Room @ 3F	1	assy	
6.17	AC/1 and AC/2 Air curtain Airflow : 2600 CMH Location: Main Entrance / Exit	2	assy	
6.18	OF 3.1 and OF 3.5 Oscillating Fan	5	assy	
6.19	Miscellaneous & Others (Support, Pad, Electrical Connections, Etc.)	1	lot	
7.0	**Supply, Delivery & Installation of Ducting works for Ventilation System**			
7.1	G.I. Sheet Ga. # 24	1	lot	
7.2	Extras for bends, offset and other fittings	1	lot	
7.3	Vent Cap with Wire Mesh Ø 150 mm	1	unit	
7.4	Fresh Air Louver (FAL)			
7.4.1	550 x 550 mm	2	pcs	
7.4.2	450 x 450 mm	2	pcs	
7.5	Fresh Air Grill (FAG)			
7.5.1	250 x 250 mm	8	pcs	
7.5.2	200 x 200 mm	7	pcs	
7.6	Exhaust Air Louver (EAL)			
7.6.1	1200 x 150 mm	12	pcs	
7.6.2	450 x 450 mm	2	pcs	
7.6.3	350 x 350 mm	2	pcs	
7.6.4	250 x 250 mm	3	pcs	
7.6.5	150 x 150 mm	16	pcs	
7.6.6	100 x 100 mm	4	pcs	

Item No.	Description	Quantity	Unit	Delivered, Weeks/Months
7.7	Volume Damper			
7.7.1	200 x 200 mm	9	pcs	
7.7.2	200 x 150 mm	4	pcs	
7.7.3	150 x 150 mm	8	pcs	
7.7.4	150 x 100 mm	5	pcs	
7.7.5	100 x 100 mm	10	pcs	
7.8	Duct Accessories and Miscellaneous Duct Hangers and Supports Duct Sealants, Gasket, Tapes, Adhesives and other necessary consumables	1	lot	
8.0	Testing, Commissioning and Hand-over: - Refrigerant Line - Pressure leak test - Leak Test for Ducts - A/C System - Operation test Ventilation System - Operation test	1	lot	
9.0	Other Works: - Incidental Civil Works affected by mechanical installations - LGU Permits - Signed and Sealed As-Built Plans Temporary Facilities	1	lot	
II.	***Lot 2- Equipment for the Air – Conditioning and Ventilation System for the Proposed SSS Laoag Branch***			Within one hundred twenty (120) calendar days upon receipt of Notice to Proceed and Purchase Order
1.0	**Supply, Delivery and Installation of Brand New Inverter Split Type Air – Conditioner with Horizontal Discharge Air – Cooled Condensing Unit complete with standard accessories**			
1.1	ACCU 1 / FCU 1, ACCU 2 / FCU 2, ACCU 3 / FCU 3, ACCU 5 / FCU 5, ACCU 6 / FCU 6, ACCU 8 / FCU 8, ACCU 10 / FCU 10, ACCU 11 / FCU 11, ACCU 12 / FCU 12, ACCU 13 / FCU 13 Cooling Capacity : 7.0 KW (2 TR) (3 Hp) Type of in-door units: Wall Mounted	10	sets	
1.2	ACCU 4 / FCU 4, ACCU 16 / FCU 16 Cooling Capacity : 3.7 KW (1.05 TR) (1.5 Hp) Type of in-door units: Wall Mounted	2	sets	
1.3	ACCU 7 / FCU 7, ACCU 9 / FCU 9, ACCU 14 / FCU 14, ACCU 15 / FCU 15, ACCU 17 / FCU 17, ACCU 18 / FCU 18, ACCU 19 / FCU 19 Cooling Capacity : 14 KW (4 TR) (5 Hp) Type of in-door units: Floor Standing	7	sets	
2.0	Supply, Delivery and Installation of Brand New 4.04 TR VRF/VRV System complete with standard accessories			
2.1	ACCU A Cooling Capacity : 14.2 Kw (4.04 TR) (5 Hp) Location: ACCU Outdoor @ GF FCU served: FCU 1A , FCU 2A, FCU 3A	1	assy	
2.2	FCU 1A Cooling Capacity : 7.1 Kw (2 TR) (2.5 Hp) Type of in-door units: Wall Mounted	1	assy	
2.3	FCU 2A, 3A Cooling Capacity : 3.7 Kw (1.05 TR) (1.5 Hp) Type of in-door units: Wall Mounted	2	assy	

Item No.	Description	Quantity	Unit	Delivered, Weeks/Months
3.0	Supply, Delivery and Installation of Brand New 6.25 TR VRF/VRV System complete with standard accessories			
3.1	ACCU B Cooling Capacity : 22 Kw (6.25 TR) (8 Hp) Location: ACCU Outdoor @ GF FCU served: FCU 1B , FCU 2B, FCU 3B, FCU 4B	1	assy	
3.2	FCU 1B, FCU 3B Cooling Capacity : 3.7 Kw (1.05 TR) (1.5 Hp) Type of in-door units: Wall Mounted	2	assy	
3.3	FCU 2B, FCU 4B Cooling Capacity : 7.1 Kw (2 TR) (2.5 Hp) Type of in-door units: Wall Mounted	2	assy	
4.0	Miscellaneous and Others for Items 1, 2 & 3			
4.1	Supports, hangers, concrete pad, electrical connections	1	lot	
5.0	Supply, Delivery and Installation of refrigerant piping and refrigerant piping insulation for VRF/VRV and split type air conditioners			
5.1	Copper pipes Hard drawn Type L 1 length = 6 meters	1	lot	
5.2	Copper pipe fittings	1	lot	
5.3	Refnet Branch Piping	6	pc/s	
5.3	Pipe insulation Closed Cell Elastomeric (CCE) Rubber Insulation Class 1 x 20mm thick 1 length = 2 meters	1	lot	
5.4	Pipe Hangers and Supports (including saddles if any) Miscellaneous and Consumables	1	lot	
6.0	Supply, Delivery and Installation of Brand New Ventilation Equipment complete with standard accessories			
6.1	TEF/1 to TEF /6 Type: Ceiling Cassette Airflow : 180 CMH x 50 Pa. Static Pressure Room Served: Toilet (Male& Female)	6	unit/s	
6.3	EF / 1, EF /2, EF /3 Type: Ceiling Cassette Airflow : 400 CMH x 150 Pa. Static Pressure Room Served: Pump Room ,Electrical Room, Pantry	3	unit/s	
6.5	EF /4 Type: Wall Mounted Airflow : 1000 CMH Room Served: Records Room	1	unit/s	
6.6	EF /5 Type: Wall Mounted Airflow : 200 CMH Room Served: Records Room	1	unit/s	
6.7	TF /1 Type: Wall Mounted Airflow : 250 CMH Room Served: Breast Feeding Room	1	unit/s	
6.8	FA /1 to FA/2 Type: Centrifugal In-line Airflow : 1000 CMH X 150 Pa. Room Served: Waiting Area	2	unit/s	
6.9	AC/1 and AC/2 Air curtain Airflow : 2600 CMH Room Served: Waiting Area	2	unit/s	

Item No.	Description	Quantity	Unit	Delivered, Weeks/Months
6.10	OF1.1 and OF 1.2 Oscillating Fan	2	unit/s	
6.11	Miscellaneous & Others (Support, Pad, Electrical Connections, Etc.)	1	lot	
7.0	Supply, Delivery & Installation of Ducting works for Ventilation System			
7.1	G.I. Sheet Ga. # 24	1	lot	
7.2	Extras for bends, offset and other fittings	1	lot	
7.3	Fresh Air Louver (FAL)			
7.3.1	350 x 350 mm	2	pcs	
7.3.2	250 x 150 mm	4	pcs	
7.4	Fresh Air Louver (FAL) with Wire Mesh			
7.4.1	800 x 200 mm	1	pcs	
7.5	Fresh Air Grill (FAG)			
7.5.1	600 X 150 mm	1	pcs	
7.5.2	250 x 250 mm	6	pcs	
7.6	Exhaust Air Grill (EAG)			
7.6.1	200 x 200 mm	1	pcs	
7.6.2	150 x 150 mm	2	pcs	
7.6.3	100 x 100 mm	1	pcs	
7.7	Volume Damper			
7.7.1	150 mm diameter	6	pcs	
7.8	Duct Accessories and Miscellaneous Duct Hangers and Support Duct Sealants, Gasket, Tapes, Adhesives and other necessary consumables	1	lot	
8.0	Testing, Commissioning and Hand-over: - Refrigerant Line - Pressure leak test - Leak Test for Ducts - A/C System - Operation test Ventilation System - Operation test			
9.0	Other Works: - Incidental Civil Works affected by mechanical installations - LGU Permits - Signed and Sealed As-Built Plans Temporary Facilities			
III.	Warranty			1 year warranty upon acceptance of the project

Name: _____

Legal capacity:_____

Signature:_____

Duly authorized to sign the Bid for and behalf of: _____

Date: _____

Section VII. Technical Specifications

Technical Specifications

Item	Specification	Statement of Compliance	Annex
Bidders must state here either "Comply" or "Not Comply" against each of the individual parameters of each Specification stating the corresponding performance parameter of the equipment offered. ***Statements of "Comply" or "Not Comply" must be supported by evidence in a Bidders Bid and cross-referenced to that evidence****. Evidence shall be in the form of manufacturer's un-amended sales literature, unconditional statements of specification and compliance issued by the manufacturer, samples, independent test data etc., as appropriate.* ***A statement that is not supported by evidence or is subsequently found to be contradicted by the evidence presented will render the Bid under evaluation liable for rejection.*** *A statement either in the Bidder's statement of compliance or the supporting evidence that is found to be false either during Bid evaluation, post-qualification or the execution of the Contract may be regarded as fraudulent and render the Bidder or supplier liable for prosecution subject to the applicable laws and issuances.* ***All Mechanical works shall be done in accordance with the Technical Specifications issued by A.C. Ong Consulting Inc. under Annex "A" for Lot 1 and Annex "B" for Lot 2.***		
Lot 1: SSS Manila Branch			
1	**Supply, Delivery and Installation of Brand New VRF/VRV System complete with standard accessories.** ***Must submit brochures showing given parameters***		
1.1	ACCU Inverter Type Cooling capacity: 137 Kw (39 TR) (minimum) Electrical Capacity : 380V,3 Ph, 60Hz Rated Power Consumption: 46.31kW (maximum) Refrigerant: R-410A EER: 3.02 FCU connected: 16 units (minimum)		
1.2	ACCU Inverter Type Cooling capacity: 147 Kw (41 TR) (minimum) Electrical Capacity : 380V,3 Ph, 60Hz Rated Power Consumption: 49.48kW (maximum) Refrigerant: R-410A EER: 3.06 FCU connected: 14 units (minimum)		
1.3	Floor Standing FCU Cooling Capacity : 13.5 Kw (4TR) (5 Hp) (minimum) Electrical Capacity : 230V,1 Ph, 60Hz Rated Power Consumption: W (maximum)		
1.4	Wall Mounted FCU Cooling Capacity : 7.1 Kw (2 TR) (2.5 Hp) (minimum) Electrical Capacity : 230V,1 Ph, 60Hz Rated Power Consumption: 55W (maximum)		
1.5	Wall Mounted FCU Cooling Capacity : 3.6 Kw (1.0 TR) (1.5 Hp) (minimum) Electrical Capacity : 230V,1 Ph, 60Hz Rated Power Consumption: 30W (maximum)		

Item	Specification	Statement of Compliance	Annex
2	**Supply, Delivery and Installation of Brand New Inverter Split Type Air – Conditioner with Horizontal Discharge Air – Cooled Condensing Unit complete with standard accessories** ***Must submit brochures showing given parameters***		
2.1	Wall Mounted, Inverter, Split Type AC Rated Cooling Capacity: 7.1kW (24200 BTU/h) Airflow Rate (High): 780CFM (minimum) Refrigerant: R – 32 Rated Power Consumption: 2.14kW (maximum) Electrical Data: 220V, Single Phase, 60Hz COP/EER: 3.32 (minimum) Can accommodate 30 meters piping length		
2.2	Wall Mounted, Inverter, Split Type AC Rated Cooling Capacity: 5.2kW (17700 BTU/h) Airflow Rate (High): 636CFM (minimum) Refrigerant: R – 32 Rated Power Consumption: 1.32kW (maximum) Electrical Data: 220V, Single Phase, 60Hz COP/EER: 3.94 (minimum) Can accommodate 30 meters piping length		
2.3	Wall Mounted, Inverter, Split Type AC Rated Cooling Capacity: 3.5kW (11900 BTU/h) Airflow Rate (High): 537CFM (minimum) Refrigerant: R – 32 Rated Power Consumption: 790W (maximum) Electrical Data: 220V, Single Phase, 60Hz COP/EER: 4.43 (minimum) Can accommodate 20 meters piping length		
3	**Supply, Delivery and Installation of Brand New Ventilation Equipment complete with standard accessories** ***All given Air Flow Rates are the minimum requirements. Must submit brochures showing above or equal the minimum requirement.***		
3.1	Wall Mounted Exhaust Fan Airflow : 650 CMH Electrical Capacity : 230V, 1Ph, 60Hz		
3.2	Wall Mounted Exhaust Fan Airflow : 250 CMH Electrical Capacity : 230V, 1Ph, 60Hz		
3.3	Ceiling Cassette Exhaust Fan Airflow : 400 CMH x 100 Pa. Static Pressure Electrical Capacity : 230V, 1Ph, 60Hz		
3.4	Ceiling Cassette Exhaust Fan Airflow : 200 CMH x 70 Pa. Static Pressure Electrical Capacity : 230V, 1Ph, 60Hz		
3.5	Cabinet in-Line Fan Exhaust Fan Airflow : 450 CMH x 100 Pa. Static Pressure Electrical Capacity : 230V, 1Ph, 60Hz		
3.6	Cabinet in-Line Fan Exhaust Fan Airflow : 700 CMH x 100 Pa. Static Pressure Electrical Capacity : 230V, 1Ph, 60Hz		

Item	Specification	Statement of Compliance	Annex
3.7	Wall Mounted Fan Airflow : 100 CMH Electrical Capacity : 230V, 1Ph, 60Hz		
3.8	Cabinet in-Line Fresh Air Fan Airflow : 1700 CMH x 150 Pa. Static Pressure Electrical Capacity : 790 w, 230V, 1Ph, 60Hz		
3.9	Ceiling Cassette Toilet Exhaust Fan Airflow : 85 CMH x 25 Pa. Static Pressure Electrical Capacity : 230V, 1Ph, 60Hz		
3.10	Cabinet in-Line Exhaust Fan Airflow : 600 CMH x 100 Pa. Static Pressure Electrical Capacity : 230V, 1Ph, 60Hz		
3.11	Ceiling Cassette Exhaust Fan Airflow : 250 CMH x 100 Pa. Static Pressure Electrical Capacity : 230V, 1Ph, 60Hz		
3.12	Ceiling Cassette Exhaust Fan Airflow : 150 CMH x 70 Pa. Static Pressure Electrical Capacity : 230V, 1Ph, 60Hz		
3.13	Ceiling Cassette Exhaust Fan Airflow : 85 CMH x 70 Pa. Static Pressure Electrical Capacity : 230V, 1Ph, 60Hz		
3.14	Cabinet in-Line Fresh Air Fan Airflow : 1200 CMH x 150 Pa. Static Pressure Electrical Capacity : 230V, 1Ph, 60Hz		
3.15	Cabinet in-Line Fresh Air Fan Airflow : 600 CMH x 100 Pa. Static Pressure Electrical Capacity : 230V, 1Ph, 60Hz		
3.16	Cabinet in-Line Exhaust Fan Airflow : 1100 CMH x 150 Pa. Static Pressure Electrical Capacity : 230V, 1Ph, 60Hz		
3.17	Air curtain Airflow : 2600 CMH Electrical Capacity : 230V, 1Ph, 60Hz		
3.18	Oscillating Fan Electrical Specs : 230V, 1Ph, 60Hz		
4	**Supply, Delivery & Installation of Ducting works for Ventilation System** ***Bidders to submit a Certification that the following materials are to supplied based on the specifications stated at Annex "A". Only the winning bidder to submit product brochures or technical data sheets of materials under this section to be approved during project implementation.***		
4.1	G.I. Sheet- Ga. # 24		
4.2	Vent Cap with Wire Mesh- Ø 150 mm		
4.3	Fresh Air Louver (FAL) 550 x 550 mm 450 x 450 mm		
4.4	Fresh Air Grill (FAG) 250 x 250 mm 200 x 200 mm		
4.5	Exhaust Air Louver (EAL) 1200 x 150 mm 450 x 450 mm 350 x 350 mm		

Item	Specification	Statement of Compliance	Annex
	250 x 250 mm 150 x 150 mm 100 x 100 mm		
4.6	Volume Damper 200 x 200 mm 200 x 150 mm 150 x 150 mm 150 x 100 mm 100 x 100 mm		
Lot 2: SSS Laoag Branch			
1	**Supply, Delivery and Installation of Brand New Inverter Split Type Air – Conditioner with Horizontal Discharge Air – Cooled Condensing Unit complete with standard accessories** ***Must submit brochures showing given parameters***		
1.1	Floor Mounted, Inverter, Split Type AC Rated Cooling Capacity: 14.0kW (47800 BTU/h) Airflow Rate (High): 1200CFM (minimum) Refrigerant: R – 32 Rated Power Consumption: 5.45kW (maximum) Electrical Data: 220V, Single Phase, 60Hz COP/EER: 2.57 (minimum) Can accommodate 50 meters piping length		
1.2	Wall Mounted, Inverter, Split Type AC Rated Cooling Capacity: 7.1kW (24200 BTU/h) Airflow Rate (High): 780CFM (minimum) Refrigerant: R – 32 Rated Power Consumption: 2.14kW (maximum) Electrical Data: 220V, Single Phase, 60Hz COP/EER: 3.32 (minimum) Can accommodate 30 meters piping length		
1.3	Wall Mounted, Inverter, Split Type AC Rated Cooling Capacity: 3.5kW (11900 BTU/h) Airflow Rate (High): 537CFM (minimum) Refrigerant: R – 32 Rated Power Consumption: 790W (maximum) Electrical Data: 220V, Single Phase, 60Hz COP/EER: 4.43 (minimum) Can accommodate 20 meters piping length		
2	**Supply, Delivery and Installation of Brand New VRF/VRV System complete with standard accessories.** ***Must submit brochures showing given parameters***		
2.1	ACCU Inverter Type Cooling Capacity : 14.2 Kw (4.04 TR) (5 Hp) Electrical Capacity : 230V,1 Ph, 60Hz FCU connected: 3 units		
2.2	ACCU Inverter Type Cooling Capacity : 22 Kw (6.25 TR) (8 Hp) Electrical Capacity : 230V,3 Ph, 60Hz FCU connected: 4 units		

Item	Specification	Statement of Compliance	Annex
2.3	Wall Mounted FCU Cooling Capacity : 7.1 Kw (2 TR) (2.5 Hp) Electrical Capacity : 230V,1 Ph, 60Hz		
2.4	Wall Mounted FCU Cooling Capacity : 3.7 Kw (1.05 TR) (1.5 Hp) Electrical Capacity : 230V,1 Ph, 60Hz		
3	**Supply, Delivery and Installation of Brand New Ventilation Equipment complete with standard accessories** ***All given Air Flow Rates are the minimum requirements. Must submit brochures showing above or equal the minimum requirement.***		
3.1	Ceiling Cassette Toilet Exhaust Fan Airflow : 180 CMH x 50 Pa. Static Pressure Electrical Capacity : 230V, 1Ph, 60Hz		
3.2	Ceiling Cassette Exhaust Fan Airflow : 400 CMH x 150 Pa. Static Pressure Electrical Capacity : 230V, 1Ph, 60Hz		
3.3	Wall Mounted Exhaust Fan Airflow : 1000 CMH Electrical Capacity : 230V, 1Ph, 60Hz		
3.4	Wall Mounted Exhaust Fan Airflow : 200 CMH Electrical Capacity : 230V, 1Ph, 60Hz		
3.5	Wall Mounted Transfer Fan Airflow : 250 CMH Electrical Capacity : 230V, 1Ph, 60Hz		
3.6	Centrifugal In-line Fresh Air Fan Airflow : 1000 CMH X 150 Pa. Electrical Capacity : 230V, 1Ph, 60Hz		
3.7	Air curtain Airflow : 2600 CMH Electrical Capacity :230V, 1Ph, 60Hz		
3.8	Oscillating Fan Electrical Specs : 230V, 1Ph, 60Hz		
4	**Supply, Delivery & Installation of Ducting works for Ventilation System** ***Bidders to submit a Certification that the following materials are to supplied based on the specifications stated at Annex "B". Only the winning bidder to submit product brochures or technical data sheets of materials under this section to be approved during project implementation.***		
4.1	G.I. Sheet Ga. # 24		
4.2	Fresh Air Louver (FAL) 350 x 350 mm 250 x 150 mm		
4.3	Fresh Air Louver (FAL) with Wire Mesh 800 x 200 mm		
4.4	Fresh Air Grill (FAG) 600 X 150 mm 250 x 250 mm		

Item	Specification	Statement of Compliance	Annex
4.5	Exhaust Air Grill (EAG) 200 x 200 mm 150 x 150 mm 100 x 100 mm		
4.6	Volume Damper 150 mm diameter		

Name: _____

Legal capacity:_____

Signature:_____

Duly authorized to sign the Bid for and behalf of: _____

Date: _____

Section VIII. Checklist of Technical and Financial Documents

CHECKLIST OF TECHNICAL AND FINANCIAL DOCUMENTS

I. TECHNICAL COMPONENT ENVELOPE

Class "A" Documents

Legal Documents

☐ (a) Valid PhilGEPS Registration Certificate (Platinum Membership) (all pages) **in accordance with Section 8.5.2 of the IRR;**

Technical Documents

☐ (b) Statement of the prospective bidder of all its ongoing government and private contracts, including contracts awarded but not yet started, if any, whether similar or not similar in nature and complexity to the contract to be bid; **and**

☐ (c) Statement of the bidder's Single Largest Completed Contract (SLCC) similar to the contract to be bid, except under conditions provided for in Sections 23.4.1.3 and 23.4.2.4 of the 2016 revised IRR of RA No. 9184, within five (5) years period prior to the submission and opening of Bids; **and**

☐ (d) Original copy of Bid Security (Cash, Letter of Credit, Surety Bond). If in the form of a Surety Bond, submit also a certification issued by the Insurance Commission; **Or** Original copy of Notarized Bid Securing Declaration; **and**

☐ (e) Conformity with the Schedule of Requirements (Section VI) and Technical Specifications (Section VII), which may include production/delivery schedule, manpower requirements, and/or after-sales/parts, if applicable; **and**

☐ (f) Original duly signed Omnibus Sworn Statement (OSS);
and if applicable, Original Notarized Secretary's Certificate in case of a corporation, partnership, or cooperative; or Original Special Power of Attorney of all members of the joint venture giving full power and authority to its officer to sign the OSS and do acts to represent the Bidder.

Other documentary requirements under RA No. 9184 (as applicable)

For foreign bidders claiming by reason of their country's extension of reciprocal rights to Filipinos:

☐ (g) Copy of Treaty, International or Executive Agreement; **or**

☐ (h) Certification from the relevant government office of their country stating that Filipinos are allowed to participate in government procurement activities for the same item or product.

☐ (i) Certification from the DTI if the Bidder claims preference as a Domestic Bidder or Domestic Entity.

Class "B" Documents

☐ (j) If applicable, a duly signed joint venture agreement (JVA) in case the joint venture is already in existence;
or
duly notarized statements from all the potential joint venture partners stating that they will enter into and abide by the provisions of the JVA in the instance that the bid is successful.

Financial Documents

☐ (k) The Supplier's audited financial statements, showing, among others, the Supplier's total and current assets and liabilities, stamped "received" by the BIR or its duly accredited and authorized institutions, for the preceding calendar year which should not be earlier than two (2) years from the date of bid submission; **and**

☐ (l) The prospective bidder's computation of Net Financial Contracting Capacity (NFCC);

or

A committed Line of Credit from a Universal or Commercial Bank in lieu of its NFCC computation.

II. FINANCIAL COMPONENT ENVELOPE

☐ (m) Original of duly signed and accomplished Financial Bid Form; **and**

☐ (n) Original of duly signed and accomplished Price Schedule(s)/Bid Breakdown.

IMPORTANT REMINDERS

A) Each and every page of the **Bid Forms/Price Schedule(s)/Bid Breakdown**, under Section VIII: Checklist of Technical and Financial Documents hereof, shall be signed by the duly authorized representative/s of the Bidder. Failure to do so shall be a ground for the rejection of the bid.

B) Any interlineations, erasures, or overwriting shall be valid only if they are signed or initialed by the duly authorized representative/s of the Bidder.

C) Bid documents shall be compiled in a folder/binder with the Annexes properly labeled with tabs/separators.

D) Bidders shall submit their bids through their duly authorized representative enclosed in separate sealed envelopes, which shall be submitted simultaneously:

a) The first three individually sealed envelopes shall contain the folder/binder of the Eligibility Requirements and Technical Component of the bid; prepared in three copies labeled as follows:

Envelop (1): ORIGINAL – Eligibility Requirements and Technical Component
Envelop (2): COPY1 – Eligibility Requirements and Technical Component
Envelop (3): COPY2 – Eligibility Requirements and Technical Component

b) The next three individually sealed envelopes shall contain the folder/binder of the Financial Component of the bid; prepared in three copies labeled as follows:

Envelop (4): ORIGINAL – Financial Component
Envelop (5): COPY1 – Financial Component
Envelop (6): COPY2 – Financial Component

c) Bidders shall enclose, seal and mark the following:

Envelop (7): Envelope (1) and Envelope (4) enclosed in one sealed envelope marked "ORIGINAL–BID"

Envelop (8): Envelope (2) and Envelope (5) enclosed in one sealed envelope marked "COPY1–BID"

Envelop (9): Envelope (3) and Envelope (6) enclosed in one sealed envelope marked "COPY2–BID"

d) Envelopes (7) to (9) shall then be enclosed in a single sealed, signed final/outer envelope/package/box

e) All envelopes (Envelopes (1) to (9) and the final/outer envelope/package/box) shall indicate the following:

- addressed to the Procuring Entity's BAC
- name and address of the Bidder in capital letters
- name of the contract/project to be bid in capital letters
- bear the specific identification/reference code of this bidding process
- bear a warning "DO NOT OPEN BEFORE…" the date and time for the opening of bids

THE CHAIRPERSON
BIDS AND AWARDS COMMITTEE
2ND FLOOR, SSS MAIN BUILDING
EAST AVENUE, DILIMAN, QUEZON CITY

NAME OF BIDDER : _____
ADDRESS : _____

NAME OF PROJECT: _____
ITB REFERENCE NUMBER: _____

DO NOT OPEN BEFORE
(the date and time for the opening of bids)

E) Bids submitted after the deadline shall only be marked for recording purpose, shall not be included in the opening of bids, and shall be returned to the bidder unopened.

FORMS

FORM-01

Bid Form for the Procurement of Goods

BID FORM

Equipment for the Air-Conditioning and Ventilation System for the Proposed SSS Manila and SSS Laoag Branch
Lot 1: SSS Manila Branch

Date:_____
Project Identification No.: _____

To: SOCIAL SECURITY SYSTEM
East Avenue, Diliman, Quezon City

Having examined the Philippine Bidding Documents (PBDs) including the Supplemental or Bid Bulletin Numbers [insert numbers], the receipt of which is hereby duly acknowledged, we, the undersigned, offer to **Equipment for the Air-Conditioning and Ventilation System for the Proposed SSS Manila and SSS Laoag Branch Lot 1: SSS Manila Branch** in conformity with the said PBDs for the sum of [**total Bid amount in words and figures**] or the total calculated bid price, as evaluated and corrected for computational errors, and other bid modifications in accordance with the Price Schedules/Bid Breakdown attached herewith and made part of this Bid. The total bid price includes the cost of all taxes, such as, but not limited to: [specify the applicable taxes, e.g. (i) value added tax (VAT), (ii) income tax, (iii) local taxes, and (iv) other fiscal levies and duties], which are itemized herein or in the Price Schedules/Bid Breakdown,

If our Bid is accepted, we undertake:

a. to deliver the goods in accordance with the delivery schedule specified in the Schedule of Requirements of the Philippine Bidding Documents (PBDs);

b. to provide a performance security in the form, amounts, and within the times prescribed in the PBDs;

c. to abide by the Bid Validity Period specified in the PBDs and it shall remain binding upon us at any time before the expiration of that period.

[Insert this paragraph if Foreign-Assisted Project with the Development Partner:

Commissions or gratuities, if any, paid or to be paid by us to agents relating to this Bid, and to contract execution if we are awarded the contract, are listed below:

Name and address of agent	Amount and Currency	Purpose of Commission or gratuity

(if none, state "None")

Until a formal Contract is prepared and executed, this Bid, together with your written acceptance thereof and your Notice of Award, shall be binding upon us.

We understand that you are not bound to accept the Lowest Calculated Bid or any Bid you may receive.

We certify/confirm that we comply with the eligibility requirements pursuant to the PBDs.

The undersigned is authorized to submit the bid on behalf of [name of the bidder] as evidenced by the attached [state the written authority].

We acknowledge that failure to sign each and every page of this Bid Form, including the attached Schedule of Prices/Bid Breakdown, shall be a ground for the rejection of our bid.

Name: _____

Legal capacity:_____

Signature:_____

Duly authorized to sign the Bid for and behalf of: _____

Date: _____

FORM-01-A

Bid Form for the Procurement of Goods

BID FORM

Equipment for the Air-Conditioning and Ventilation System for the Proposed SSS Manila and SSS Laoag Branch
Lot 2: SSS Laoag Branch

Date:_____
Project Identification No.: _____

To: **SOCIAL SECURITY SYSTEM**
East Avenue, Diliman, Quezon City

Having examined the Philippine Bidding Documents (PBDs) including the Supplemental or Bid Bulletin Numbers [insert numbers], the receipt of which is hereby duly acknowledged, we, the undersigned, offer to **Equipment for the Air-Conditioning and Ventilation System for the Proposed SSS Manila and SSS Laoag Branch Lot 2: SSS Laoag Branch** in conformity with the said PBDs for the sum of [**total Bid amount in words and figures**] or the total calculated bid price, as evaluated and corrected for computational errors, and other bid modifications in accordance with the Price Schedules/Bid Breakdown attached herewith and made part of this Bid. The total bid price includes the cost of all taxes, such as, but not limited to: [specify the applicable taxes, e.g. (i) value added tax (VAT), (ii) income tax, (iii) local taxes, and (iv) other fiscal levies and duties], which are itemized herein or in the Price Schedules/Bid Breakdown,

If our Bid is accepted, we undertake:

a. to deliver the goods in accordance with the delivery schedule specified in the Schedule of Requirements of the Philippine Bidding Documents (PBDs);

b. to provide a performance security in the form, amounts, and within the times prescribed in the PBDs;

c. to abide by the Bid Validity Period specified in the PBDs and it shall remain binding upon us at any time before the expiration of that period.

[Insert this paragraph if Foreign-Assisted Project with the Development Partner:

Commissions or gratuities, if any, paid or to be paid by us to agents relating to this Bid, and to contract execution if we are awarded the contract, are listed below:

Name and address of agent	Amount and Currency	Purpose of Commission or gratuity

(if none, state "None")

Until a formal Contract is prepared and executed, this Bid, together with your written acceptance thereof and your Notice of Award, shall be binding upon us.

We understand that you are not bound to accept the Lowest Calculated Bid or any Bid you may receive.

We certify/confirm that we comply with the eligibility requirements pursuant to the PBDs.

The undersigned is authorized to submit the bid on behalf of [name of the bidder] as evidenced by the attached [state the written authority].

We acknowledge that failure to sign each and every page of this Bid Form, including the attached Schedule of Prices/Bid Breakdown, shall be a ground for the rejection of our bid.

Name: _____

Legal capacity:_____

Signature:_____

Duly authorized to sign the Bid for and behalf of: _____

Date: _____

FORM-02

Price Schedule(s)/Bid Breakdown

Lot 1: SSS Manila Branch

Name of Bidder _____ Invitation to Bid Number _____

ITEM NO.	DESCRIPTION	QTY	UNIT	UNIT COST (Mark Up and VAT Included)	TOTAL COST
1.0	**Supply, Delivery and Installation of Brand New 39 TR VRF/VRV System complete with standard accessories**				
1.1	ACCU- A Cooling capacity: 137 Kw (39 TR) (48 HP) Location: ACCU Outdoor @ Roof Deck FCU served: FCU 1A to FCU 16A	1	assy		
1.2	FCU 1A, 5A, 6A, 7A, 14A, 15A Cooling Capacity : 3.7 Kw (1.0 TR) (1.5 Hp) Type of in-door units: Wall Mounted	6	assy		
1.3	FCU 2A, 3A, 4A, 8A, 16A, 17A Cooling Capacity : 13.5 Kw (4TR) (5 Hp) Type of in-door units: Floor Standing	6	assy		
1.4	FCU 9A, 10A, 11A, 12A, 13A Cooling Capacity : 7.1 Kw (2 TR) (2.5 Hp) Type of in-door units: Wall Mounted	5	assy		
	SUB – TOTAL 1.0				
2.0	**Supply, Delivery and Installation of Brand New 42 TR VRF/VRV System complete with standard accessories**				
2.1	ACCU B Cooling Capacity : 147 Kw (42 TR) (52 Hp) Location: ACCU Outdoor @ Roof Deck FCU served: FCU 1B to FCU 14A	1	assy		
2.2	FCU 1B, 2B, 3B, 4B, 5B, 12B, 13B, 14B Cooling Capacity : 13.5 Kw (4TR) (5 Hp) Type of in-door units: Floor Standing	8	assy		
2.3	FCU 6B, 8B Cooling Capacity : 3.7 Kw (1.0 TR) (1.5 Hp) Type of in-door units: Wall Mounted	2	assy		
2.4	FCU 7B, 9B, 10B, 11B Cooling Capacity : 7.1 Kw (2 TR) (2.5 Hp) Type of in-door units: Wall Mounted	4	assy		
	SUB – TOTAL 2.0				
3.0	**Supply, Delivery and Installation of Brand New Inverter Split Type Air – Conditioner with Horizontal Discharge Air – Cooled Condensing Unit complete with standard accessories**				
3.1	ACCU 1 / FCU 1 Cooling Capacity : 7.0 KW (2 TR) (3 Hp) Type of in-door units: Wall Mounted Location: out-door unit @ Roof Deck	1	set		
3.2	ACCU 2 / FCU 2, ACCU 3 / FCU 3, ACCU 4 / FCU 4, ACCU 7 / FCU 7, ACCU 8 / FCU 8 Cooling Capacity : 3.52 KW (1 TR) (1.5 Hp) Type of in-door units: Wall Mounted Location: out-door unit @ Roof Deck	5	sets		
3.3	ACCU 5 / FCU 5, ACCU 6 / FCU 6	2	set		

ITEM NO.	DESCRIPTION	QTY	UNIT	UNIT COST (Mark Up and VAT Included)	TOTAL COST
	Cooling Capacity : 5.28 KW (1.5 TR) (2 Hp) Type of in-door units: Wall Mounted Location: ACCU 5 out-door unit @ Roof Deck				
	SUB – TOTAL 3.0				
4.0	**Miscellaneous and Others for Items 1, 2 & 3**				
4.1	Supports, hangers, concrete pad, electrical connections	1	lot		
	SUB – TOTAL 4.0				
5.0	**Supply, Delivery and Installation of refrigerant piping and refrigerant piping insulation for VRF/VRV and split type air conditioners**				
5.1	Copper pipe, Hard drawn Type L	1	lot		
5.2	Copper pipe fittings	1	lot		
5.3	Refnet Branch Piping	27	pcs		
5.3	Pipe insulation Closed Cell Elastomeric (CCE) Rubber Insulation Class 1 x 20mm thick	1	lot		
5.4	Pipe Hangers and Supports (including saddles if any) Miscellaneous and Consumables	1	lot		
	SUB – TOTAL 5.0				
6.0	**Supply, Delivery and Installation of Brand New Ventilation Equipment complete with standard accessories**				
6.1	EF / 1.1 Type: Wall Mounted Airflow : 650 CMH Area Served: Genset Room @ GF	1	assy		
6.2	EF / 1.2, EF / 1.3 Type: Wall Mounted Airflow : 250 CMH Area Served: Electrical Room @ GF	1	assy		
6.3	EF / 1.4 Type: Ceiling Cassette Airflow : 400 CMH x 100 Pa. Static Pressure Area Served: Records Room @ GF	1	assy		
6.4	EF / 1.5, EF / 1.6 Type: Ceiling Cassette Airflow : 200 CMH x 70 Pa. Static Pressure Electrical Capacity : 230V, 1Ph, 60Hz Area Served: Supply Room @ GF, Utility Room @ GF	2	assy		
6.6	TEF / 1.1 Type: Cabinet in-Line Fan Airflow : 450 CMH x 100 Pa. Static Pressure Area Served: Employee Male & Female Toilet @ GF	1	assy		
6.7	TEF / 1.2 Type: Cabinet in-Line Fan Airflow : 700 CMH x 100 Pa. Static Pressure Area Served: Public Male & Female Toilet @ GF	1	assy		
6.8	WF / 1 Type: Wall Mounted Airflow : 100 CMH Area Served: Breast Feeding Room @ GF	1	assy		

ITEM NO.	DESCRIPTION	QTY	UNIT	UNIT COST (Mark Up and VAT Included)	TOTAL COST
6.9	FAF / 1.1, FAF / 1.2 Type: Cabinet in-Line Fan Airflow : 1700 CMH x 150 Pa. Static Pressure Room Served: Waiting Area, Offices @ GF	1	assy		
6.10	TEF / 2.1 Type: Ceiling Cassette Airflow : 85 CMH x 25 Pa. Static Pressure Area Served: Division Head @ 2F	1	assy		
6.11	TEF / 2.2 Type: Cabinet in-Line Fan Airflow : 600 CMH x 100 Pa. Static Pressure Area Served: Public Male & Female Toilet @ 2F	1	assy		
6.12	EF / 2.1 & 2.2 Type: Ceiling Cassette Airflow : 250 CMH x 100 Pa. Static Pressure Area Served: Records Room @ 2F	2	assy		
6.13	EF / 2.3 Type: Ceiling Cassette Airflow : 150 CMH x 70 Pa. Static Pressure Area Served: Supply Room @ 2F	1	assy		
6.14	EF / 2.4 Type: Ceiling Cassette Airflow : 85 CMH x 70 Pa. Static Pressure Area Served: Utility Room @ 2F	1	assy		
6.15	FAF / 2.1 Type: Cabinet in-Line Fan Airflow : 1200 CMH x 150 Pa. Static Pressure Area Served: OVP, Legal, Cluster, Admin @ 2F	1	assy		
6.16	FAF / 2.2 Type: Cabinet in-Line Fan Airflow : 600 CMH x 100 Pa. Static Pressure Area Served: AMS Section @ 2F	1	assy		
6.17	EF / 3.1, EF / 3.2 Type: Cabinet in-Line Fan Airflow : 1100 CMH x 150 Pa. Static Pressure Area Served: Records Room @ 3F	1	assy		
6.18	AC/1 and AC/2 Air curtain Airflow : 2600 CMH Location: Main Entrance / Exit	2	assy		
6.19	OF 3.1 and OF 3.5 Oscillating Fan	5	assy		
6.20	Miscellaneous & Others (Support, Pad, Electrical Connections, Etc.)	1	lot		
	SUB – TOTAL 6.0				
7.0	Supply, Delivery & Installation of Ducting works for Ventilation System				
7.1	G.I. Sheet Ga. # 24	1	lot		
7.2	Extras for bends, offset and other fittings	1	lot		
7.3	Vent Cap with Wire Mesh Ø 150 mm	1	unit		
7.4	Fresh Air Louver (FAL)				
7.4.1	550 x 550 mm	2	pcs		
7.4.2	450 x 450 mm	2	pcs		

ITEM NO.	DESCRIPTION	QTY	UNIT	UNIT COST (Mark Up and VAT Included)	TOTAL COST
7.5	Fresh Air Grill (FAG)				
7.5.1	250 x 250 mm	8	pcs		
7.5.2	200 x 200 mm	7	pcs		
7.6	Exhaust Air Louver (EAL)				
7.6.1	1200 x 150 mm	12	pcs		
7.6.2	450 x 450 mm	2	pcs		
7.6.3	350 x 350 mm	2	pcs		
7.6.4	250 x 250 mm	3	pcs		
7.6.5	150 x 150 mm	16	pcs		
7.6.6	100 x 100 mm	4	pcs		
7.7	Volume Damper				
7.7.1	200 x 200 mm	9	pcs		
7.7.2	200 x 150 mm	4	pcs		
7.7.3	150 x 150 mm	8	pcs		
7.7.4	150 x 100 mm	5	pcs		
7.7.5	100 x 100 mm	10	pcs		
7.8	Duct Accessories and Miscellaneous Duct Hangers and Supports Duct Sealants, Gasket, Tapes, Adhesives and other necessary consumables	1	lot		
	SUB – TOTAL 7.0				
8.0	Testing, Commissioning and Hand-over: - Refrigerant Line - Pressure leak test - Leak Test for Ducts - A/C System - Operation test - Ventilation System - Operation test	1	lot		
	SUB – TOTAL 8.0				
9.0	Other Works: - Incidental Civil Works affected by mechanical installations - LGU Permits - Signed and Sealed As-Built Plans - Temporary Facilities	1	lot		
	SUB – TOTAL 9.0				
	TOTAL PROJECT COST				

Note:

1. Any bid exceeding the ABC of **₱ 10,600,920.00** shall not be accepted.
2. Fill up all required items/field in the bid breakdown. Failure to indicate any of the following shall mean outright disqualification since bid is considered Non-Responsive.
   - If the item is given for free, indicate dash (-), zero (0) or free
   - If the item is not applicable, indicate N/A
3. Please use the softcopy of the Bid Breakdown provided to the bidders.
4. All documents shall be signed, and each and every page thereof shall be initialed, by the duly authorized representative/s of the Bidder.
5. Bid proposal must be inclusive of all applicable taxes.
6. Warranty requirement is at no cost to SSS.

Name: _____
Legal capacity:_____
Signature:_____
Duly authorized to sign the Bid for and behalf of: _____
Date: _____

FORM-02-A

Price Schedule(s)/Bid Breakdown

Lot 2: SSS Laoag Branch

Name of Bidder _____ Invitation to Bid Number _____

ITEM NO.	DESCRIPTION	QTY	UNIT	UNIT COST (Mark Up and VAT Included)	TOTAL COST
1.0	**Supply, Delivery and Installation of Brand New Inverter Split Type Air – Conditioner with Horizontal Discharge Air – Cooled Condensing Unit complete with standard accessories**				
1.1	ACCU 1 / FCU 1, ACCU 2 / FCU 2, ACCU 3 / FCU 3, ACCU 5 / FCU 5, ACCU 6 / FCU 6, ACCU 8 / FCU 8, ACCU 10 / FCU 10, ACCU 11 / FCU 11, ACCU 12 / FCU 12, ACCU 13 / FCU 13 Cooling Capacity : 7.0 KW (2 TR) (3 Hp) Type of in-door units: Wall Mounted	10	sets		
1.2	ACCU 4 / FCU 4, ACCU 16 / FCU 16 Cooling Capacity : 3.7 KW (1.05 TR) (1.5 Hp) Type of in-door units: Wall Mounted	2	sets		
1.3	ACCU 7 / FCU 7, ACCU 9 / FCU 9, ACCU 14 / FCU 14, ACCU 15 / FCU 15, ACCU 17 / FCU 17, ACCU 18 / FCU 18, ACCU 19 / FCU 19 Cooling Capacity : 14 KW (4 TR) (5 Hp) Type of in-door units: Floor Standing	7	sets		
	SUB – TOTAL 1.0				
2.0	Supply, Delivery and Installation of Brand New 4.04 TR VRF/VRV System complete with standard accessories				
2.1	ACCU A Cooling Capacity : 14.2 Kw (4.04 TR) (5 Hp) Location: ACCU Outdoor @ GF FCU served: FCU 1A , FCU 2A, FCU 3A	1	assy		
2.2	FCU 1A Cooling Capacity : 7.1 Kw (2 TR) (2.5 Hp) Type of in-door units: Wall Mounted	1	assy		
2.3	FCU 2A, 3A Cooling Capacity : 3.7 Kw (1.05 TR) (1.5 Hp) Type of in-door units: Wall Mounted	2	assy		
	SUB – TOTAL 2.0				
3.0	Supply, Delivery and Installation of Brand New 6.25 TR VRF/VRV System complete with standard accessories				
3.1	ACCU B Cooling Capacity : 22 Kw (6.25 TR) (8 Hp) Location: ACCU Outdoor @ GF FCU served: FCU 1B , FCU 2B, FCU 3B, FCU 4B	1	assy		
3.2	FCU 1B, FCU 3B Cooling Capacity : 3.7 Kw (1.05 TR) (1.5 Hp) Type of in-door units: Wall Mounted	2	assy		
3.3	FCU 2B, FCU 4B Cooling Capacity : 7.1 Kw (2 TR) (2.5 Hp) Type of in-door units: Wall Mounted	2	assy		

ITEM NO.	DESCRIPTION	QTY	UNIT	UNIT COST (Mark Up and VAT Included)	TOTAL COST
	SUB – TOTAL 3.0				
4.0	Miscellaneous and Others for Items 1, 2 & 3				
4.1	Supports, hangers, concrete pad, electrical connections	1	lot		
	SUB – TOTAL 4.0				
5.0	Supply, Delivery and Installation of refrigerant piping and refrigerant piping insulation for VRF/VRV and split type air conditioners				
5.1	Copper pipes Hard drawn Type L 1 length = 6 meters	1	lot		
5.2	Copper pipe fittings	1	lot		
5.3	Refnet Branch Piping	6	pc/s		
5.3	Pipe insulation Closed Cell Elastomeric (CCE) Rubber Insulation Class 1 x 20mm thick 1 length = 2 meters	1	lot		
5.4	Pipe Hangers and Supports (including saddles if any) Miscellaneous and Consumables	1	lot		
	SUB – TOTAL 5.0				
6.0	Supply, Delivery and Installation of Brand New Ventilation Equipment complete with standard accessories				
6.1	TEF/1 to TEF /6 Type: Ceiling Cassette Airflow : 180 CMH x 50 Pa. Static Pressure Room Served: Toilet (Male& Female)	6	unit/s		
6.3	EF / 1, EF /2, EF /3 Type: Ceiling Cassette Airflow : 400 CMH x 150 Pa. Static Pressure Room Served: Pump Room ,Electrical Room, Pantry	3	unit/s		
6.5	EF /4 Type: Wall Mounted Airflow : 1000 CMH Room Served: Records Room	1	unit/s		
6.6	EF /5 Type: Wall Mounted Airflow : 200 CMH Room Served: Records Room	1	unit/s		
6.7	TF /1 Type: Wall Mounted Airflow : 250 CMH Room Served: Breast Feeding Room	1	unit/s		
6.8	FA /1 to FA/2 Type: Centrifugal In-line Airflow : 1000 CMH X 150 Pa. Room Served: Waiting Area	2	unit/s		
6.9	AC/1 and AC/2 Air curtain Airflow : 2600 CMH Room Served: Waiting Area	2	unit/s		
6.10	OF1.1 and OF 1.2 Oscillating Fan	2	unit/s		
6.11	Miscellaneous & Others (Support, Pad, Electrical Connections, Etc.)	1	lot		

ITEM NO.	DESCRIPTION	QTY	UNIT	UNIT COST (Mark Up and VAT Included)	TOTAL COST
	SUB – TOTAL 6.0				
7.0	Supply, Delivery & Installation of Ducting works for Ventilation System				
7.1	G.I. Sheet Ga. # 24	1	lot		
7.2	Extras for bends, offset and other fittings	1	lot		
7.3	Fresh Air Louver (FAL)				
7.3.1	350 x 350 mm	2	pcs		
7.3.2	250 x 150 mm	4	pcs		
7.4	Fresh Air Louver (FAL) with Wire Mesh				
7.4.1	800 x 200 mm	1	pcs		
7.5	Fresh Air Grill (FAG)				
7.5.1	600 X 150 mm	1	pcs		
7.5.2	250 x 250 mm	6	pcs		
7.6	Exhaust Air Grill (EAG)				
7.6.1	200 x 200 mm	1	pcs		
7.6.2	150 x 150 mm	2	pcs		
7.6.3	100 x 100 mm	1	pcs		
7.7	Volume Damper				
7.7.1	150 mm diameter	6	pcs		
7.8	Duct Accessories and Miscellaneous Duct Hangers and Support Duct Sealants, Gasket, Tapes, Adhesives and other necessary consumables	1	lot		
	SUB – TOTAL 7.0				
8.0	Testing, Commissioning and Hand-over: - Refrigerant Line - Pressure leak test - Leak Test for Ducts - A/C System - Operation test - Ventilation System - Operation test	1	lot		
	SUB – TOTAL 8.0				
9.0	Other Works: - Incidental Civil Works affected by mechanical installations - LGU Permits - Signed and Sealed As-Built Plans Temporary Facilities	1	lot		
	SUB – TOTAL 9.0				
	TOTAL PROJECT COST				

Note:

1. Any bid exceeding the ABC of **₱ 4,283,938.00** shall not be accepted.
2. Fill up all required items/field in the bid breakdown. Failure to indicate any of the following shall mean outright disqualification since bid is considered Non-Responsive.
   - If the item is given for free, indicate dash (-), zero (0) or free
   - If the item is not applicable, indicate N/A
3. Please use the softcopy of the Bid Breakdown provided to the bidders.
4. All documents shall be signed, and each and every page thereof shall be initialed, by the duly authorized representative/s of the Bidder.
5. Bid proposal must be inclusive of all applicable taxes.
6. Warranty requirement is at no cost to SSS.

Name: _____

Legal capacity:_____

Signature:_____

Duly authorized to sign the Bid for and behalf of: _____

Date: _____

FORM-03

Formula in the Computation of NFCC

Equipment for the Air-Conditioning and Ventilation System for the Proposed SSS Manila and SSS Laoag Branch
Lot 1: SSS Manila Branch

_____
NAME OF PROJECT

_____
NAME OF COMPANY

NFCC = 15 (Current Assets – Current Liabilities) – Value of All Outstanding Works under On-going Contracts including Awarded Contracts yet to be started)

YEAR	CURRENT ASSETS	CURRENT LIABILITIES
TOTAL		

Value of Outstanding Works under On-going Contracts:

CONTRACT DESCRIPTION	TOTAL CONTRACT AMOUNT AT AWARD	PERCENTAGE OF PLANNED AND ACTUAL ACCOMPLISHMENT	ESTIMATED COMPLETION TIME
TOTAL			

Use additional sheet/s, if necessary

FORMULA:

15 (_____ – _____) – _____ = _____
Current Assets minus Current Liabilities minus Total Outstanding Works **NFCC**

P_____
NFCC

Prepared and Submitted by:

_____
Signature over Printed Name

FORM-03-A

Formula in the Computation of NFCC

Equipment for the Air-Conditioning and Ventilation System for the Proposed SSS Manila and SSS Laoag Branch
Lot 2: SSS Laoag Branch

_____
NAME OF PROJECT

_____
NAME OF COMPANY

NFCC = 15 (Current Assets – Current Liabilities) – Value of All Outstanding Works under On-going Contracts including Awarded Contracts yet to be started)

YEAR	CURRENT ASSETS	CURRENT LIABILITIES
TOTAL		

Value of Outstanding Works under On-going Contracts:

CONTRACT DESCRIPTION	TOTAL CONTRACT AMOUNT AT AWARD	PERCENTAGE OF PLANNED AND ACTUAL ACCOMPLISHMENT	ESTIMATED COMPLETION TIME
TOTAL			

Use additional sheet/s, if necessary

FORMULA:

15 (_____ – _____) – _____ = _____
Current Assets minus Current Liabilities minus Total Outstanding Works **NFCC**

P_____
NFCC

Prepared and Submitted by:

_____
Signature over Printed Name

FORM-04

(Name of Bank)

COMMITTED LINE OF CREDIT CERTIFICATE

Date: _____

Social Security System (SSS)
SSS Main Building, East Avenue
Diliman, Quezon City

CONTRACT PROJECT : _____
COMPANY/FIRM : _____
ADDRESS : _____
BANK/FINANCING
INSTITUTION : _____
ADDRESS : _____
AMOUNT : _____

This is to certify that the above Bank/Financing Institution with business address indicated above, commits to provide the (Supplier/Distributor/Manufacturer/Contractor), if awarded the above-mentioned Contract, a credit line in the amount specified above which shall be exclusively used to finance the performance of the above-mentioned contract subject to our terms, conditions and requirements.

The credit line shall be available within fifteen (15) calendar days after receipt by the (Supplier/Distributor/Manufacturer/Contractor) of the Notice of Award and such line of credit shall be maintained until issuance of Certificate of Acceptance by the Social Security System.

This Certification is being issued in favor of said (Supplier/Distributor/Manufacturer/Contractor) in connection with the bidding requirement of (Name of Procuring Entity) for the above-mentioned Contract. We are aware that any false statements issued by us make us liable for perjury.

The committed line of credit cannot be terminated or cancelled without the prior written approval of Social Security System.

Name and Signature of Authorized Financing Institution Office

Office Designation

Concurred by:

Name & Signature of (Supplier/Distributor/Manufacturer/Contractor) Authorized Representative

Official Designation

SUBSCRIBED AND SWORN TO BEFORE ME this _____ day of _____ at _____ Philippines, Affiant exhibited to me his/her competent Evidence of Identity (as defines by the 2004 Rules on Notarial Practice _____issued on _____ at _____, Philippines.

NOTARY PUBLIC

Doc No. : _____
Page No. : _____
Book No. : _____
Series of : _____

(Note: The amount committed should be machine validated in the Certificate itself)

FORM-05

STATEMENT OF ON-GOING GOVERNMENT AND PRIVATE CONTRACTS

NAME OF CONTRACT	DATE OF CONTRACT	CONTRACT DURATION	OWNER'S NAME, ADDRESS, CONTACT NUMBERS AND E-MAIL ADDRESS	KINDS OF GOODS	AMOUNT OF CONTRACT	VALUE OF OUTSTANDING CONTRACT	REMARKS (Indicate "With NDA" or "Without NDA")

NOTE: INCLUDING PROJECTS WITH NON-DISCLOSURE AGREEMENT (NDA)

FORM-06

STATEMENT OF SINGLE LARGEST COMPLETED CONTRACT SIMILAR TO THE PROJECT TO BE BID EQUIVALENT TO AT LEAST 50% OF THE ABC WITH ATTACHED CERTIFICATE OF FINAL COMPLETION

Equipment for the Air-Conditioning and Ventilation System for the Proposed SSS Manila and SSS Laoag Branch
Lot 1: SSS Manila Branch

NAME OF CONTRACT	CONTRACT TERM	AMOUNT OF CONTRACT	CONTACT PERSON, CONTACT NO., ADDRESS, AND EMAIL ADDRESS

NOTE: SLCC SHOULD BE PROJECTS WITHOUT NON-DISCLOSURE AGREEMENT (NDA)

FORM-06-A

STATEMENT OF SINGLE LARGEST COMPLETED CONTRACT SIMILAR TO THE PROJECT TO BE BID EQUIVALENT TO AT LEAST 50% OF THE ABC WITH ATTACHED CERTIFICATE OF FINAL COMPLETION

Equipment for the Air-Conditioning and Ventilation System for the Proposed SSS Manila and SSS Laoag Branch
Lot 2: SSS Laoag Branch

NAME OF CONTRACT	CONTRACT TERM	AMOUNT OF CONTRACT	CONTACT PERSON, CONTACT NO., ADDRESS, AND EMAIL ADDRESS

NOTE: SLCC SHOULD BE PROJECTS WITHOUT NON-DISCLOSURE AGREEMENT (NDA)

FORM-07

Bid Securing Declaration Form

Equipment for the Air-Conditioning and Ventilation System for the Proposed SSS Manila and SSS Laoag Branch

Lot 1: SSS Manila Branch

REPUBLIC OF THE PHILIPPINES) CITY OF _____) S.S.

BID SECURING DECLARATION

Project Identification No.: ***[Insert number]***

To: *[Insert name and address of the Procuring Entity]*

I/We, the undersigned, declare that:

1. I/We understand that, according to your conditions, bids must be supported by a Bid Security, which may be in the form of a Bid Securing Declaration.

2. I/We accept that: (a) I/we will be automatically disqualified from bidding for any procurement contract with any procuring entity for a period of two (2) years upon receipt of your Blacklisting Order; and, (b) I/we will pay the applicable fine provided under Section 6 of the Guidelines on the Use of Bid Securing Declaration, within fifteen (15) days from receipt of the written demand by the procuring entity for the commission of acts resulting to the enforcement of the bid securing declaration under Sections 23.1(b), 34.2, 40.1 and 69.1, except 69.1(f),of the IRR of RA No. 9184; without prejudice to other legal action the government may undertake.

3. I/We understand that this Bid Securing Declaration shall cease to be valid on the following circumstances:

    a. Upon expiration of the bid validity period, or any extension thereof pursuant to your request;
    b. I am/we are declared ineligible or post-disqualified upon receipt of your notice to such effect, and (i) I/we failed to timely file a request for reconsideration or (ii) I/we filed a waiver to avail of said right; and
    c. I am/we are declared the bidder with the Lowest Calculated Responsive Bid, and I/we have furnished the performance security and signed the Contract.

IN WITNESS WHEREOF, I/We have hereunto set my/our hand/s this ____ day of *[month] [year]* at *[place of execution]*.

[Insert NAME OF BIDDER OR ITS AUTHORIZED REPRESENTATIVE]
[Insert signatory's legal capacity] Affiant

[Jurat]

[Format shall be based on the latest Rules on Notarial Practice]

GPPB Resolution No. 16-2020, dated 16 September 2020

FORM-07-A

Bid Securing Declaration Form

Equipment for the Air-Conditioning and Ventilation System for the Proposed SSS Manila and SSS Laoag Branch

Lot 2: SSS Laoag Branch

REPUBLIC OF THE PHILIPPINES) CITY OF _____) S.S.

BID SECURING DECLARATION

Project Identification No.: *[Insert number]*

To: *[Insert name and address of the Procuring Entity]*

I/We, the undersigned, declare that:

1. I/We understand that, according to your conditions, bids must be supported by a Bid Security, which may be in the form of a Bid Securing Declaration.

2. I/We accept that: (a) I/we will be automatically disqualified from bidding for any procurement contract with any procuring entity for a period of two (2) years upon receipt of your Blacklisting Order; and, (b) I/we will pay the applicable fine provided under Section 6 of the Guidelines on the Use of Bid Securing Declaration, within fifteen (15) days from receipt of the written demand by the procuring entity for the commission of acts resulting to the enforcement of the bid securing declaration under Sections 23.1(b), 34.2, 40.1 and 69.1, except 69.1(f),of the IRR of RA No. 9184; without prejudice to other legal action the government may undertake.

3. I/We understand that this Bid Securing Declaration shall cease to be valid on the following circumstances:

    a. Upon expiration of the bid validity period, or any extension thereof pursuant to your request;
    b. I am/we are declared ineligible or post-disqualified upon receipt of your notice to such effect, and (i) I/we failed to timely file a request for reconsideration or (ii) I/we filed a waiver to avail of said right; and
    c. I am/we are declared the bidder with the Lowest Calculated Responsive Bid, and I/we have furnished the performance security and signed the Contract.

IN WITNESS WHEREOF, I/We have hereunto set my/our hand/s this ____ day of *[month] [year]* at *[place of execution]*.

[Insert NAME OF BIDDER OR ITS AUTHORIZED REPRESENTATIVE]
[Insert signatory's legal capacity] Affiant

[Jurat]

[Format shall be based on the latest Rules on Notarial Practice]

GPPB Resolution No. 16-2020, dated 16 September 2020

FORM-08

Contract Agreement Form for the Procurement of Goods (Revised)

[Not required to be submitted with the Bid, but it shall be submitted within ten (10) days after receiving the Notice of Award]

CONTRACT AGREEMENT

Supply, Delivery and Installation of Equipment for the Air-Conditioning and Ventilation System for the Proposed SSS Manila and SSS Laoag Branches

ITB-SSS-Goods-2023-___

THIS AGREEMENT made between:

SOCIAL SECURITY SYSTEM, a government-owned and controlled corporation created pursuant to Republic Act No. 11199, with principal office address at SSS Building, East Avenue, Diliman, Quezon City, represented herein by its Approving Authority and (Position of Approving Authority), (Name of Approving Authority) and (Position of Signatory), (Name of signatory), duly authorized pursuant to Administrative Order _____, _____ (pertaining to Approving Authority) (Annex "A") and Office Order _____ , _____ (Annex "B") (pertaining to signatories), hereinafter referred to as the "SSS";

- a n d –

(NAME OF SUPPLIER), of legal age, Filipino, single/married, with principal address at _____, hereinafter referred to as the "Supplier".

If corporation

(NAME OF SUPPLIER), a corporation duly created and existing pursuant to the laws of the Republic of the Philippines, with principal office address at _____, represented herein by its (Position of Signatory), (Name of Signatory), duly authorized pursuant to _____, _____, hereinafter referred to as the "Supplier".

WHEREAS, the Entity invited Bids for certain goods and ancillary services, particularly [brief description of goods and services] (PROJECT) and has accepted a Bid by the Supplier for the supply of those goods and services in the sum of *[*contract price in words and figures in specified currency*]* (hereinafter called "the Contract Price").

NOW THIS AGREEMENT WITNESSETH AS FOLLOWS:

1. In this Agreement words and expressions shall have the same meanings as are respectively assigned to them in the Conditions of Contract referred to.

2. The following documents as required by the 2016 revised Implementing Rules and Regulations of Republic Act No. 9184 shall be deemed to form and be read and construed as integral part of this Agreement, *viz.*:

   a. Philippine Bidding Documents (PBDs);
      i. Schedule of Requirements;
      ii. Technical Specifications;
      iii. General and Special Conditions of Contract; and
      iv. Supplemental or Bid Bulletins, if any

   b. Supplier's bid, including the Eligibility requirements, Technical and Financial Proposals, and all other documents or statements submitted;

      Bid form, including all the documents/statements contained in the Bidder's bidding envelopes, as annexes, and all other documents submitted (*e.g.*, Bidder's response to request for clarifications on the bid), including corrections to the bid, if any, resulting from the Procuring Entity's bid evaluation;

   c. Performance Security;

   d. Notice of Award of Contract; and the Bidder's conforme thereto; and

   e. Other contract documents that may be required by existing laws and/or the Procuring Entity concerned in the PBDs. **Winning bidder agrees that additional contract documents or information prescribed by the GPPB that are subsequently required for submission after the contract execution, such as the Notice to Proceed, Variation Orders, and Warranty Security, shall likewise form part of the Contract.**

3. In consideration for the sum of *[total contract price in words and figures]* or such other sums as may be ascertained, *[Named of the bidder]* agrees to *[state the object of the contract]* in accordance with his/her/its Bid.

4. SSS agrees to pay the above-mentioned sum in accordance with the terms of the Bidding.

IN WITNESS whereof the parties hereto have caused this Agreement to be executed in accordance with the laws of the Republic of the Philippines on the date and place indicated in their respective acknowledgments.

[Insert Name and Signature]	*[Insert Name and Signature]*
[Insert Position of Signatory]	*[Insert Position of Signatory]*
for:	*for:*
SSS	*[Insert Name of Supplier]*

(In case of double acknowledgment which is usually used by the SSS)

SIGNED IN THE PRESENCE OF:

_____ _____

(Name of Certifying officer as to availability of funds)

(Position of Certifying Officer)

(Department/Office of Certifying Officer)

FUNDS AVAILABLE:

APP No.: _____

FIRST ACKNOWLEDGMENT

Republic of the Philippines)
_____…….) S.S.

BEFORE ME, a Notary Public for and in _____, Philippines, on this _____ day of _____ personally appeared:

Name	Competent Evidence of Identity	Date/Place of Issue

known to me to be the same person who executed the foregoing Agreement, consisting of _____ (___) pages, including this page and excluding annexes, and he/she/they acknowledged to me that the same is his/her/their free and voluntary act and deed as well as the free and voluntary act and deed of the principal he/she /they represent/s in this instance.

WITNESS MY HAND AND SEAL on the date and place first above written.

Doc. No. _____;
Page No. _____;
Book No. _____;
Series of 20__.

SIGNED IN THE PRESENCE OF:

_____ _____

SECOND ACKNOWLEDGMENT

Republic of the Philippines)
_____…….) S.S.

BEFORE ME, a Notary Public for and in _____, Philippines, on this _____ day of _____ personally appeared:

Name	Competent Evidence of Identity	Date/Place of Issue

known to me to be the same person who executed the foregoing Agreement, consisting of _____ (__) pages, including this page and excluding annexes, and he/she/they acknowledged to me that the same is his/her/their free and voluntary act and deed (if corporation to include succeeding phrase) as well as the free and voluntary act and deed of the principal he/she/they represent/s in this instance.

WITNESS MY HAND AND SEAL on the date and place first above written.

Doc. No. _____;
Page No. _____;
Book No. _____;
Series of 20__.

GPPB Resolution No. 16-2020, dated 16 September 2020

FORM-09

Omnibus Sworn Statement (Revised)

REPUBLIC OF THE PHILIPPINES)
CITY/MUNICIPALITY OF _____) S.S.

AFFIDAVIT

I, *[Name of Affiant]*, of legal age, *[Civil Status]*, *[Nationality]*, and residing at *[Address of Affiant]*, after having been duly sworn in accordance with law, do hereby depose and state that:

1. ***Select one, delete the other:***

   [If a sole proprietorship:] I am the sole proprietor or authorized representative of *[Name of Bidder]* with office address at *[address of Bidder]*;
   [If a partnership, corporation, cooperative, or joint venture:] I am the duly authorized and designated representative of *[Name of Bidder]* with office address at *[address of Bidder]*;

2. ***Select one, delete the other:***

   [If a sole proprietorship:] As the owner and sole proprietor, or authorized representative of *[Name of Bidder]*, I have full power and authority to do, execute and perform any and all acts necessary to participate, submit the bid, and to sign and execute the ensuing contract for *[Name of the Project]* of the *[Name of the Procuring Entity]*as shown in the attached duly notarized Special Power of Attorney;

   [If a partnership, corporation, cooperative, or joint venture:] I am granted full power and authority to do, execute and perform any and all acts necessary to participate, submit the bid, and to sign and execute the ensuing contract for *[Name of the Project]* of the *[Name of the Procuring Entity]*, as shown in the attached [state title of attached document showing proof of authorization (e.g., duly notarized Secretary's Certificate, Board/Partnership Resolution, or Special Power of Attorney, whichever is applicable*;)];*

3. *[Name of Bidder]* is not "blacklisted" or barred from bidding by the Government of the Philippines or any of its agencies, offices, corporations, or Local Government Units, foreign government/foreign or international financing institution whose blacklisting rules have been recognized by the Government Procurement Policy Board, **by itself or by relation, membership, association, affiliation, or controlling interest with another blacklisted person or entity as defined and provided for in the Uniform Guidelines on Blacklisting;**

4. Each of the documents submitted in satisfaction of the bidding requirements is an authentic copy of the original, complete, and all statements and information provided therein are true and correct;

5. *[Name of Bidder]* is authorizing the Head of the Procuring Entity or its duly authorized representative(s) to verify all the documents submitted;

6. ***Select one, delete the rest:***

   [If a sole proprietorship:] The owner or sole proprietor is not related to the Head of the Procuring Entity, Procurement Agent if engaged, members of the Bids and Awards Committee (BAC), the Technical Working Group, and the BAC Secretariat, the head of the Project Management Office or the end-user unit, and the project consultants by consanguinity or affinity up to the third civil degree;

   [If a partnership or cooperative:] None of the officers and members of *[Name of Bidder]* is related to the Head of the Procuring Entity, Procurement Agent if engaged, members of the Bids and Awards Committee (BAC), the Technical Working Group, and the BAC Secretariat, the head of the Project Management Office or the end-user unit, and the project consultants by consanguinity or affinity up to the third civil degree;

[If a corporation or joint venture:] None of the officers, directors, and controlling stockholders of *[Name of Bidder]* is related to the Head of the Procuring Entity, Procurement Agent if engaged, members of the Bids and Awards Committee (BAC), the Technical Working Group, and the BAC Secretariat, the head of the Project Management Office or the end-user unit, and the project consultants by consanguinity or affinity up to the third civil degree;

7. *[Name of Bidder]* complies with existing labor laws and standards; and

8. *[Name of Bidder]* is aware of and has undertaken the responsibilities as a Bidder in compliance with the Philippine Bidding Documents, which includes:

   a) Carefully examining all of the Bidding Documents;

   b) Acknowledging all conditions, local or otherwise, affecting the implementation of the Contract;

   c) Making an estimate of the facilities available and needed for the contract to be bid, if any; and

   d) Inquiring or securing Supplemental/Bid Bulletin(s) issued for the *[Name of the Project]*.

9. *[Name of Bidder]* did not give or pay directly or indirectly, any commission, amount, fee, or any form of consideration, pecuniary or otherwise, to any person or official, personnel or representative of the government in relation to any procurement project or activity.

10. **In case advance payment was made or given, failure to perform or deliver any of the obligations and undertakings in the contract shall be sufficient grounds to constitute criminal liability for Swindling (Estafa) or the commission of fraud with unfaithfulness or abuse of confidence through misappropriating or converting any payment received by a person or entity under an obligation involving the duty to deliver certain goods or services, to the prejudice of the public and the government of the Philippines pursuant to Article 315 of Act No. 3815 s.1930, as amended, or the Revised Penal Code.**

IN WITNESS WHEREOF, I have hereunto set my hand this __ day of ___, 20__ at _____, Philippines.

[Insert NAME OF BIDDER OR ITS AUTHORIZED REPRESENTATIVE]
[Insert signatory's legal capacity]
Affiant

[Jurat]

[Format shall be based on the latest Rules on Notarial Practice]

GPPB Resolution No. 16-2020, dated 16 September 2020

REPUBLIC OF THE PHILIPPINES]
NAME OF CITY] S.S

SECRETARY'S CERTIFICATE

I, **<NAME OF CORPORATE SECRETARY>**, of legal age, **<Civil Status>**, Filipino citizen and with business at **<Company Address>,** after being duly sworn, hereby depose and state that:

1. I am the Corporate Secretary of **<COMPANY NAME>,** a Corporation duly organized and existing under and by virtue of the laws of the Philippines, with principal office at <**Office Address>.**

2. As the Corporate Secretary, I have custody and access to the records of the Corporation.

3. I am familiar with the facts herein certified and duly authorized to certify the same.

4. I hereby certify that during a regular meeting of the Board of Directors of the Corporation held on **<Date of Meeting>,** at which meeting a quorum was present, the following Resolution**/s was/were** unanimously passed, approved and adopted:

    a) RESOLVED that **<COMPANY NAME>**, authorized and empowered the following to participate in the bidding for the <**PROJECT NAME>** of the **SOCIAL SECURITY SYSTEM:**

	NAME	POSITION/DESIGNATION	SIGNATURE
1.			
2.			

    b) **RESOLVED FURTHER that**, if awarded the Contract, the following **is/are** granted full power and authority to enter into contract with the S**OCIAL SECURITY SYSTEM:**

	NAME	POSITION/DESIGNATION	SIGNATURE
1.			
2.			

    c) **RESOLVED FURTHERMORE** that, the designated representative**/s** of the Corporation has/have the full power to perform any and all acts necessary and/or to represent the Corporation as fully and effectively as the Corporation might do if personally present, and hereby satisfying and confirming all the said representative**/s** shall lawfully do or cause to be done by virtue hereof.

IN WITNESS WHEREOF, I have hereunto set my hand this __ day of ____ at **<CITY>.**

_____
NAME & SIGNATURE of Corporate Secretary

SUBSCRIBE AND SWORN to before me this ___ day of _____ at **<CITY>**, affiant having exhibited to me his/her <Government Issued ID and details [issued by, date and place issued if applicable]).

Doc No. _____
Page No. _____
Book No. _____
Series of _____

a.c.ong CONSULTING INC.
Engineering + Management
ISO 9001:2015 Certified

SOCIAL SECURITY SYSTEM

6/F SSS Building, East Avenue, Quezon City

Proposed Three-storey SSS Building

Apacible Corner F. Agoncillo Street, Ermita, Malate, Manila

Technical Specifications - Mechanical

August 2019

Rolando M. Manaoat, PME
Mechanical Engineer

PRC No. : 4659
PTR No. : 7371938
Issued in : Makati City
Date : January 21, 2019

2/F LTA Building
118 Perea Street
Legaspi Village, 1229 Makati City
Metro Manila, Philippines

Tel: (632) 812 4935; 893 5827
Fax: (6 32) 813 5543
E-mail: acoconsulting@aco.com.ph
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ISO 9001:2015 Certified

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Document Status					
Rev No.	Author	Reviewer	Approved for Issue		
			Name	Signature	Date
0	JMA	RMM	A. C. Ong		AUG 2019

SUBMITTALS

PART 1: GENERAL

1.1 SECTION INCLUDES:

1.1.1. Submittal procedures

1.1.2 Construction progress schedules

1.1.3 Proposed Products list

1.1.4 Product Data

1.1.5 Shop Drawings

1.1.6 Samples

1.1.7 Design data

1.1.8 Test reports

1.1.9 Certificates

1.1.10 Manufacturer's instructions

1.1.11 Manufacturer's field reports

1.1.12 Erection drawings

1.1.13 Construction photographs

1.2 RELATED SECTIONS

A. Contract Closeout: Contract closeout submittals.

1.3 REFERENCES

A. AGC (Associated General Contractors of America) publication "The Use of CPM in Construction - A Manual for General Contractors and the Construction Industry".

1.4 SUBMITTAL PROCEDURES

A. Transmit each submittal with Architect/Engineer accepted form.

B. Sequentially number the transmittal form. Revise submittals with original number and a sequential alphabetic suffix.

C. Identify Project, Contractor, Subcontractor or supplier; pertinent drawing and detail number, and specification section number, as appropriate.

D. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of Products required, field dimensions, adjacent construction Work,

and coordination of information is in accordance with the requirements of the Work and Contract Documents.

E. Schedule submittals to expedite the Project, and deliver to Architect/Engineer at business address. Coordinate submission of related items.

F. For each submittal for review, allow 15 days excluding delivery time to and from the Contractor.

G. Identify variations from Contract Documents and Product or system limitations which may be detrimental to successful performance of the completed Work.

H. Provide space for Contractor and Architect/Engineer review stamps.

I. When revised for resubmission, identify all changes made since previous submission.

J. Distribute copies of reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with requirements.

K. Submittals not requested will not be recognized or processed.

1.5 CONSTRUCTION PROGRESS SCHEDULES

A. Submit initial schedule in duplicate within 15 days after date established in Notice to Proceed.

B. Revise and resubmit as required.

C. Submit revised schedules with each Application for Payment, identifying changes since previous version.

D. Submit network analysis diagram using the critical path method, as outlined in AGC - The Use of CPM in Construction.

E. Show complete sequence of construction by activity, identifying Work of separate stages and other logically grouped activities. Indicate the early and late start, early and late finish, float dates, and duration.

F. Indicate estimated percentage of completion for each item of Work at each submission.

G. Indicate submittal dates required for shop drawings, product data, samples, and product delivery dates, including those furnished by Owner and required by Allowances.

1.6 PROPOSED PRODUCTS LIST

A. Within 15 days after date of Notice to Proceed, submit list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.

B. For products specified only by reference standards, give manufacturer, trade name, model or catalog designation, and reference standards.

1.7 PRODUCT DATA

A. Product Data for Review:

1. Submitted to Architect/Engineer for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents.

2. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article above and for record documents purposes described in CONTRACT CLOSEOUT.

B. Product Data for Information:

1. Submitted for the Architect/Engineer's knowledge as contract administrator or for the Owner.

C. Product Data for Project Close-out:

1. Submitted for the Owner's benefit during and after project completion.

D. Submit the number of copies which the Contractor requires, plus three (3) copies which will be retained by the Architect/Engineer.

E. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.

F. Indicate Product utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

G. After review distribute in accordance with the Submittal Procedures article above and provide copies for record documents described in CONTRACT CLOSEOUT.

1.8 SHOP DRAWINGS

A. Shop Drawings For Review:

1. Submitted to Architect/Engineer for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents.

2. After review, produce copies and distribute in accordance with SUBMITTAL PROCEDURES article above and for record documents purposes described in CONTRACT CLOSEOUT.

B. Shop Drawings For Information:

1. Submitted for the Architect/Engineer's knowledge as contract administrator or for the Owner.

C. Shop Drawings For Project Close-out:

1. Submitted for the Owner's benefit during and after project completion.

2. Indicate special utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

3. Submit in the form of one reproducible transparency and one opaque reproduction.

1.9 SAMPLES

A. Samples For Review:

2. Submitted to Architect/Engineer for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents.

3. After review, produce duplicates and distribute in accordance with SUBMITTAL PROCEDURES article above and for record documents purposes described in CONTRACT CLOSEOUT.

B. Samples For Information:

1. Submitted for the Architect/Engineer's knowledge as contract administrator or for the Owner.

C. Samples For Selection:

1. Submitted to Architect/Engineer for aesthetic, color, or finish selection.

2. Submit samples of finishes in custom colors selected, textures, and patterns for Architect/Engineer selection.

3. After review, produce duplicates and distribute in accordance with SUBMITTAL PROCEDURES article above and for record documents purposes described in CONTRACT CLOSEOUT.

D. Submit samples to illustrate functional and aesthetic characteristics of the Product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.

E. Include identification on each sample, with full Project information.

F. Submit the number of samples specified in individual specification sections; two of which will be retained by Architect/Engineer.

G. Reviewed samples which may be used in the Work are indicated in individual specification sections.

H. Samples will not be used for testing purposes unless specifically stated in the specification section.

1.10 DESIGN DATA

A. Submit for the Architect/Engineer's knowledge as contract administrator or for the Owner.

B. Submit for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.

1.11 TEST REPORTS

A. Submit for the Architect/Engineer's knowledge as contract administrator or for the Owner.

B. Submit test reports for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.

1.12 CERTIFICATES

A. When specified in individual specification sections, submit certification by the manufacturer, installation/application Subcontractor, or the Contractor to Architect/Engineer, in quantities specified for Product Data.

B. Indicate material or Product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.

C. Certificates may be recent or previous test results on material or Product, but must be acceptable to Architect/Engineer.

1.13 MANUFACTURER'S INSTRUCTIONS

A. When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, to Architect/Engineer for delivery to Owner in quantities specified for Product Data.

B. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

1.14 MANUFACTURER'S FIELD REPORTS

A. Submit reports for the Architect/Engineer's benefit as contract administrator or for the Owner.

B. Submit report in duplicate within 30 days of observation to Architect/Engineer for information.

C. Submit for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.

1.15 ERECTION DRAWINGS

A. Submit drawings for the Architect/Engineer's for review and approval and benefit as contract administrator or for the Owner.

B. Submit for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.

C. Data indicating inappropriate or unacceptable Work may be subject to action by the Architect/Engineer or Owner.

1.16 CONSTRUCTION PHOTOGRAPHS

A. Photographs taken during the construction and progress reports submit by the contractor.

CONTRACT CLOSEOUT

PART 1 - GENERAL

1.1 SECTION INCLUDES

1.1.1 Closeout procedures.

1.1.2 Final cleaning.

1.1.3 Adjusting.

1.1.4 Project record documents.

1.1.5 Operation and maintenance data.

1.1.6 Spare parts and maintenance Products.

1.1.7 Warranties and bonds.

1.1.8 Maintenance service.

1.2 RELATED SECTIONS

A. Construction Facilities and Temporary Controls: Progress cleaning.

B. Starting of Systems: System start-up, testing, adjusting, and balancing.

1.3 CLOSEOUT PROCEDURES

A. Submit written certification that Contract Documents have been reviewed, Work has been inspected, and that Work is complete in accordance with Contract Documents and ready for Architect/Engineer's review.

B. Provide submittals to Architect/Engineer that are required by governing or other authorities.

C. Submit final Application for Payment identifying total adjusted Contract Sum, previous payments, and sum remaining due.

1.4 FINAL CLEANING

A. Execute final cleaning prior to final project assessment.

B. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.

C. Replace filters of operating equipment.

D. Clean debris from roofs, gutters, downspouts, and drainage systems.

E. Clean site; sweep paved areas, rake clean landscaped surfaces.

F. Remove waste and surplus materials, rubbish, and construction facilities from the site.

1.5 ADJUSTING

A. Adjust operating Products and equipment to ensure smooth and unhindered operation.

1.6 PROJECT RECORD DOCUMENTS

A. Maintain on site one set, but not limited of the following record documents; record actual revisions to the Work:

1. Drawings
2. Specifications
3. Addenda
4. Change Orders and other modifications to the Contract
5. Reviewed Shop Drawings, Product Data, and Samples
6. Manufacturer's instruction for assembly, installation, and adjusting

B. Ensure entries are complete and accurate, enabling future reference by Owner.

C. Store record documents separate from documents used for construction.

D. Record information concurrent with construction progress.

E. Specifications: Legibly mark and record at each Product section description of actual Products installed, including the following:

1. Manufacturer's name and product model and number
2. Product substitutions or alternates utilized.
3. Changes made by Addenda and modifications.

F. Record Drawings and Shop Drawings : Legibly mark each item to record actual construction including:

1. Measured depths of foundations in relation to finish first floor datum.
2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
4. Field changes of dimension and detail.
5. Details not on original Contract drawings.

G. Submit documents to Architect/Engineer with claim for final Application for Payment.

1.7 OPERATION AND MAINTENANCE DATA

A. Submit data bound in 8-1/2 x 11 inch (A4) text pages, three D side ring binders with durable plastic covers.

B. Prepare binder cover with printed title "OPERATION AND MAINTENANCE INSTRUCTIONS", title of project , and subject matter of binder when multiple binders are required.

C. Internally subdivide the binder contents with permanent page dividers, logically organized as described below; with tab titling clearly printed under reinforced laminated plastic tabs.

D. Contents: Prepare a Table of Contents for each volume, with each Product or system description identified, typed on 20 pound white paper, in three parts as follows:

1. Part 1: Directory, listing names, addresses, and telephone numbers of Architect/Engineer, Contractor, Subcontractors, and major equipment suppliers.

2. Part 2: Operation and maintenance instructions, arranged by process flow and subdivided by specification section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Identify the following:

   A. Significant design criteria.
   B. List of equipment.
   C. Parts list for each component.
   D. Operating instructions.
   E. Maintenance instructions for equipment and systems.
   F. Maintenance instructions for finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.

3. Part 3: Project documents and certificates, including the following:

   A. Shop drawings and product data.
   B. Air balance reports.
   C. Certificates.
   D. Originals of warranties
   E. Submit
   F. Submit one (1) draft copy of completed volumes 30 days prior to final inspection. This copy will be reviewed and returned after final inspection, with Architect/Engineer comments. Revise content of all document sets as required prior to final submission.
   E. Submit three sets of revised final volumes, within 15 days after final inspection.

1.8 SPARE PARTS AND MAINTENANCE PRODUCTS

A. Provide spare parts, maintenance, and extra Products in quantities specified in individual specification sections.

B. Deliver to Project site and place in location as directed; obtain receipt prior to final payment.

1.9 WARRANTIES AND BONDS

A. Provide notarized copies.

B. Execute and assemble transferable warranty documents from Subcontractors, suppliers, and manufacturers.

C. Provide Table of Contents and assemble in three D side ring binder with durable plastic cover.

D. Submit prior to final Application for Payment.

E. For items of Work delayed beyond date of Substantial Completion, provide updated submittal within days after acceptance, listing date of acceptance as start of warranty period.

1.10 MAINTENANCE SERVICE

A. Furnish service and maintenance of components indicated in specification sections for two year from date of Substantial Completion.

B. Examine system components at a frequency consistent with reliable operation. Clean, adjust, and lubricate as required.

C. Include systematic examination, adjustment, and lubrication of components. Repair or replace parts whenever required. Use parts produced by the manufacturer of the original component.

D. Maintenance service shall not be assigned or transferred to any agent or Subcontractor without prior written consent of the Owner.

TESTING, ADJUSTING, AND BALANCING

PART 1 - GENERAL

1.1 SECTION INCLUDES BUT NOT LIMITED INTO FOLLOWING

A. Testing, adjustment, and balancing of air systems.
B. Measurement of final operating condition of HVAC systems.
C. Sound measurement of equipment operating conditions.
D. Vibration measurement of equipment operating conditions.

1.2 REFERENCES

A. ASHRAE 111 - Practices for Measurement, Testing, Adjusting, and Balancing of Building Heating, Ventilation, Air-conditioning, and Refrigeration Systems.

B. SMACNA - HVAC Systems Testing, Adjusting, and Balancing.
C. NEBB - National Environmental Balancing Bureau
D. NFPA - National Fire Protection Agency
E. PSME CODE - Philippine Society of Mechanical Engineering Code
F. National Building Codes

1.3 SUBMITTALS

A. Submit under provisions of Submittal Procedure.
B. Submit name detail of adjusting and balancing agency for approval within 30 days after award of Contract.
C. Prior to commencing work, submit report forms or outlines indicating adjusting, balancing, and equipment data required.
D. Submit draft copies of report for review prior to final acceptance of Project. Provide final copies for Architect/Engineer and for inclusion in operating and maintenance manuals.
E. Provide reports in soft cover, letter size, 3-ring binder manuals, complete with index page and indexing tabs, with cover identification at front and side. Include set of reduced drawings with air outlets and equipment identified to correspond with data sheets, and indicating thermostat locations.
F. Include detailed procedures, agenda, sample report forms prior to commencing system balance.
G. Test Reports: Indicate data on forms prepared following mentioned in section 1.2, Submit data in S.I. Metric units.

1.4 PROJECT RECORD DOCUMENTS

A. Submit under provisions of Contract Closeout.

1.5 QUALITY ASSURANCE

A. Perform total system balance in accordance with section 1.2 - References.
B. Maintain two copies of each document on site.

1.6 QUALIFICATIONS

A. Agency: Company specializing in the testing, adjusting, and balancing of systems specified in this Section with minimum three years documented experience.

B. Perform Work under supervision of registered Professional Engineer experienced in performance of this Work and licensed at the place where the Project is located.

1.7 PRE-BALANCING CONFERENCE

A. Convene one week prior to commencing work of this section.

1.8 DUCT LEAKEAGE TEST

Submit test procedure will done by the contractor for approval according into following into above code & reference stated on section 1.2

PART 2 - EXECUTION

2.1 EXAMINATION

A. Verify that systems are complete and operable before commencing work. Ensure but not limited into the following conditions and requested by client/engineers:

1. Systems are started and operating in a safe and normal condition.
2. Temperature control systems are installed complete and operable.
3. Proper & sufficient thermal overload protection is in place for electrical equipment. (independent breaker is recommended for multiple indoor unit
4. Duct systems are clean of debris.
5. Fans are rotating correctly.
6. Air coil fins are cleaned and combed.
7. Air outlets are installed and connected.
8. Duct system leakage is minimized.

B. Submit field reports. Report defects and deficiencies noted during performance of services which prevent system balance.

C. Beginning of work means acceptance of existing conditions.

2.2 PREPARATION

A. Provide instruments required for testing, adjusting, and balancing operations. Make instruments available to Architect/Engineer to facilitate spot checks during testing.

B. Provide additional balancing devices as required.

I. Adjust outside air automatic dampers, outside air, return air, and exhaust dampers for design conditions.

J. Measure temperature conditions across outside air, return air, and exhaust dampers to check leakage.

K. Where modulating dampers are provided, take measurements and balance at extreme conditions.

L. Measure building static pressure and adjust supply, return, and exhaust air systems to provide required relationship between each to maintain approximately 0.05 inches (12.5 Pa) positive static pressure in clean rooms.

M. Check multi-zone units for motorized damper leakage. Adjust air quantities with mixing dampers set first for cooling, then heating, then modulating.

2.6 SCHEDULES

A. Equipment Requiring Testing, Adjusting, and Balancing

Fans
Air Inlets and Outlets
ACCU/FCU
Duct Branches

B. Report Forms

1. Title Page:
   a. Name of Testing, Adjusting, and Balancing Agency
   b. Address of Testing, Adjusting, and Balancing Agency
   c. Telephone number of Testing, Adjusting, and Balancing Agency
   d. Project name
   e. Project location
   f. Project Architect
   g. Project Engineer
   h. Project Contractor
   i. Project altitude
   j. Report date

2. Summary Comments:
   a. Design versus final performance
   b. Notable characteristics of system
   c. Description of systems operation sequence
   d. Summary of outdoor and exhaust flows to indicate amount of building pressurization
   e. Nomenclature used throughout report
   f. Test conditions

3. Instrument List:
   a. Instrument
   b. Manufacturer
   c. Model number

d. Serial number
e. Range
f. Calibration date

4. Electric Motors:
   a. Manufacturer
   b. Model/Frame
   c. HP/BHP
   d. Phase, voltage, amperage; nameplate, actual, no load
   e. RPM
   f. Service factor
   g. Starter size, rating, heater elements
   h. Sheave Make/Size/Bore

5. Air Moving Equipment
   a. Location
   b. Manufacturer
   c. Model number
   d. Serial number
   e. Arrangement/Class/Discharge
   f. Air flow, specified and actual
   g. Return air flow, specified and actual
   h. Outside air flow, specified and actual
   i. Total static pressure (total external), specified and actual
   j. Inlet pressure
   k. Discharge pressure
   l. Sheave Make/Size/Bore
   m. Number of Belts/Make/Size
   n. Fan RPM

6. Exhaust Fan Data:
   a. Location
   b. Manufacturer
   c. Model number
   d. Serial number
   e. Air flow, specified and actual
   f. Total static pressure (total external), specified and actual
   g. Inlet pressure
   h. Discharge pressure
   i. Sheave Make/Size/Bore
   j. Number of Belts/Make/Size
   k. Fan RPM

7. Duct Traverse:
   a. System zone/branch
   b. Duct size
   c. Area
   d. Design velocity
   e. Design air flow
   f. Test velocity
   g. Test air flow
   h. Duct static pressure
   i. Air temperature
   j. Air correction factor

11. Duct Leak Test:
    a. Description of ductwork under test
    b. Duct design operating pressure
    c. Duct design test static pressure
    d. Duct capacity, air flow
    e. Maximum allowable leakage duct capacity times leak factor
    f. Test apparatus
        1. Blower
        2. Calibrated
    g. Test static pressure
    i. Leakage

12. Flow Measuring Station:
    a. Identification/number
    b. Location
    c. Size
    d Manufacturer
    e. Model number
    f. Serial number
    g. Design Flow rate
    h. Design pressure drop
    i. Actual/final pressure drop
    j. Actual/final flow rate
    k. Station calibrated setting

13. Air Distribution Test Sheet:
    a. Air terminal number
    b. Room number/location
    c. Terminal type
    d. Terminal size
    e. Area factor
    f. Design velocity
    g. Design air flow
    h. Test (final) velocity
    i. Test (final) air flow
    j. Percent of design air flow

14. Sound Level Report:
    a. Location
    b. Octave bands - equipment off
    c. Octave bands - equipment on

15. Vibration Test:
    a. Location of points:
        1. Fan bearing, drive end
        2. Fan bearing, opposite end
        3. Motor bearing, center (if applicable)
        4. Motor bearing, drive end
        5. Motor bearing, opposite end
        6. Casing (bottom or top)
        7. Casing (side)
        8. Duct after flexible connection (discharge)
        9. Duct after flexible connection (suction)

b. Test readings:

1. Horizontal, velocity and displacement
2. Vertical, velocity and displacement
3. Axial, velocity and displacement

c. Normally acceptable readings, velocity and acceleration

d. Unusual conditions at time of test

e. Vibration source (if non-complying)

AIR CONDITIONING SYSTEMS

PART 1 - GENERAL

1.1 APPLICABLE PUBLICATIONS:

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

1.1.1 Air Conditioning and Refrigeration Institute (ARI) Publications:

210-81	Unitary Air Conditioning Equipment
260-75	Application, Installation and Servicing of Unitary Systems
360 -83	Commercial and Industrial Unitary Air-Conditioning Equipment

1.1.2 Air Moving and Conditioning Association (AMCA) Publications:

210-74	Laboratory Methods of Testing Fans for Rating
99-83	Standard Handbooks
210-74	Laboratory Methods of Testing Fans for Rating

1.1.3 American Society of Heating, Refrigerating, and Air- Conditioning Engineers (ASHRAE) Inc. Publications:

1983	Equipment, Handbook and Product Directory
1980	Systems, Handbook and Product Directory
15-78	Safety Code for Mechanical Refrigeration

1.1.4 American Society for Testing and Materials (ASTM) Publications:

A386-78	Zinc-Coating (Hot-Dip) on Assembled Steel Products
B117-85	Salt Spray (Fog) Testing
B209-83	Aluminum-Alloy Sheet and Plate
B280-83	Seamless Copper Tube for Air Conditioning and Refrigeration Field Service
F 872-84	Filter Units, Air Conditioning: Viscous-Impingement Type Cleanable

1.1.5 National Electrical Manufacturer's Association (NEMA) Publications:

MG-1-1978	Motors and Generators (Rev. 82)

ICS-1978 Industrial Controls, Devices, Controllers and Assembles (Rev. 83)

1.1.6 National Fire Protection Association (NFPA) Publications:

70-81 National Electrical Code

90A-81 Air Conditioning and Ventilating Systems

91-04 Exhaust System for Air Conveying of Gases, etc.

1.1.7 Underwriters Laboratories (UL) Publications:

109-78 Tube Fittings for Flammable and Combustible Fluid Refrigeration Services and Marine Use

873-79 Temperature Indicating and Regulating Equipment

1.2 GENERAL REQUIREMENTS: "Mechanical General Requirements", with the following additions and modifications, applies.

1.3 DESCRIPTION OF WORK: The work includes the following:

1.4 SUBMITTALS: The contractor shall submit all other items for approval.

1.4.1 Manufacturer's Data:

a. Split/Multi-split Inverter Type Units (Indoor and Outdoor Unit)
b. FCU (Wall and Ceiling Mounted Type)
c. Floor Standing
d. ACCU
e. Refrigeration piping & accessories

1.4.2 Certified Test Reports

a. VRF / Split / Multi-Split Type Units (Indoor and Outdoor Unit)
b. Fans / Blower data

1.4.3 Operation and Maintenance Manuals

a. VRF / Split / Multi-Split Type Units (Indoor and Outdoor Unit)

1.4.4 Posted Operating Instructions:

a. VRF / Split / Multi-Split Type Units (Indoor and Outdoor Unit)

1.4.5 Manufacturer's Recommended Procedures:

a. Installation, including evacuation and charging procedures
b. Start-up and initial operation

1.4.6 Report of Start-Up and Initial Readings

1.5 CORROSION PREVENTION: Unless specified otherwise, equipment fabricated from ferrous metals that do not have a zinc coating conforming to ASTM A386 or a duplex coating of zinc and paint shall be treated for prevention of rust with a factory coating or paint system that will withstand 125 hours in a salt-spray fog test except that equipment located outdoors shall be tested for 500 hours. The salt spray fog test shall be in accordance with ASTM B 117 using a 20 percent sodium chloride solution. Immediately after completion of the test, the coating shall show no signs of blistering, wrinkling or cracking, no loss of adhesion, and the specimen shall show no signs of rust creepage beyond 3 mm on either side of the scratch mark. The film thickness of the factory coating or paint system applied on the equipment shall be not less than film thickness used on the test specimen.

1.6 SAFETY STANDARDS:

1.6.1 Design, Manufacture and Installation of Mechanical Refrigeration Equipment: ASHRAE 15-78.

1.6.2 Machinery Guards: Fully guard drives mechanisms, or other moving parts in accordance with ANSI B15.1. Provide guards fabricated of steel and expanded metal, rigidly mounted, and readily removed without disassembly.

PART 2 - PRODUCTS

2.1 General: The air conditioning system shall be designed, constructed, and rating tested in accordance with ARI Standard 430. Units shall be ARI certified.

2.2 Performance Rating: Cooling capacity of unit shall meet the total heat requirements indicated. Submittal shall include catalog selection data, which accounts for entering air conditions at evaporator, and condenser air conditions.

2.3 Air Conditioner; Split / Multi-Split Type: The unit shall be a multi-split system full inverter controlled compressor capable of changing the speed linearly to follow variations in cooling load. The indoor units shall be constructed for indoor installation and the outdoor unit shall be completely weather- proofed for outdoor installation. Both indoor and outdoor units shall be properly assembled, internally piped and wired, thoroughly tested, and charged with R32 refrigerant at the factory or any modern type refrigerant.

Cooling capacity - The total capacity of the multi-system full inverter controlled compressor (KW) shall be as shown on the equipment schedule.

2.3.1 Indoor Units:

Units shall have capacities at the operating conditions specified. They shall include an evaporator coil, expansion valve, centrifugal type air circulation blower, permanent type air filter, condensate drip pan and insulated decorative cabinet with discharge plenum, supply and return air grilles.

a. Refrigeration Cycle – The refrigeration cycle shall be equipped with heat exchanger, an electronic expansion valve, solenoid valves and flare connections.

b. Indoor Fan and Fan Motor – The indoor fan shall be the multi-blade centrifugal type, statically and dynamically balanced and direct driven by an electric motor. The motor bearing shall be permanently lubricated. The fan shall deliver air flow indicated on the schedule, nominal air flow for the model selected. They shall be provided with a combination fan switch and thermostat. Three operating positions can be selected according to the required conditions. Fan motor shall be equipped with overload protection.

c. Indoor Heat Exchanger – The heat exchanger shall be multi-pass, cross-finned tube type, equipped with highly-efficient aluminum fins, mechanically bonded to seamless, oxygen free copper tubes. The fins shall be spaced at no more than 12 fins per 25.4 mm. The face area shall not be less than the manufacturer's recommendation. The coil shall be cleaned, dehydrated and tested for leakage at the factory.

2.3.2 Outdoor Unit:

Unit shall be air cooled, split type multi system air conditioner consisting of one, two or three outdoor unit and multiple indoor units, each having capability to cool independently for the requirements of the rooms, connectible to multiple indoor units that can be joined to one refrigerant circuit and controlled individuality.

a. Full Inverter controlled compressor shall be capable of changing the speed linearly to follow variations in cooling and heating load. Outdoor unit shall be suitable for mix-match connection of the following type of indoor units.
   - Floor Standing Type
   - Wall Mounted Type
   - Ceiling Mounted

b. Capacity

   Unit shall have a total capacity as shown on the equipment schedule of the plans.

c. Refrigerant circuit

   - The refrigerant circuit shall include an accumulator, plural electronic expansion valves, one or two oil separators, a receiver and liquid and gas shut off valves. Filter drier and crankcase heaters shall be furnished.

   - The outdoor unit shall either scrolled / swing type conventional compressors and multiple inverter type compressors. The indoor unit shall be equipped with an electronic control valve to control refrigerant flow individually.

   - Refrigerant shall be R410a, R32 or any available modern refrigerant.

d. Safety Devices

   The following safety devices shall be part of the outdoor unit; high pressure switch, fused crankcase heater, fusible plug, thermal protectors for compressor and fan motor, over current protection for inverter, short recycling protection timer.

e. Oil Recovery System

Unit shall be equipped with an oil recovery system to ensure stable operation with long refrigerant piping

f. Controls

- Outdoor unit shall have a minimum of 21 capacity steps to meet load fluctuation and indoor unit individual control in case of inverter series
- Computerized PID control shall be used to maintain a correct room temperature.
- Unit shall be equipped with a self diagnosis circuit for easy maintenance and service
- The indoor unit shall be operated individually and each having a remote controller with an ON/OFF switch, a fan speed selector, a timer, a thermostat setting button and LCD which indicates temperature setting, operation mode, malfunction code and filter cleaning timing etc.
- The remote controller shall memorize the latest malfunction code for easy maintenance.
- Up to 20 indoor units can be controlled by one remote controller in case of group control operation

2.3.3 Related Accessories

a. The following accessories shall be provided:

- Piping branches and headers with insulation for quick work and smooth refrigerant flow
- Remote control devices for operation and monitoring of indoor unit from remote
- Multi-function centralized controller

b. The monitoring function shall be capable of indicating operation and trouble signals of the indoor and outdoor unit to the remote

2.3.4 Outdoor unit shall be provided with anti-corrosion treatment. Cabinet shall be constructed of galvanized steel sheet, baked with synthetic paint. The service panel shall be easily removable for service access to the electrical components and the compressor.

2.3.5 Fans: Statically and dynamically balanced, with air capacities horsepower, fan types, fan arrangement, and pressure ratings as indicated. Fan bearing life shall be minimum 200,000 hours at operating conditions. Provide guard (bird) screens for outdoor inlets and outlets. Equip with automatic back-draft damper where indicated. Housing and fan wheel shall be aluminum or steel.

a. Floor Standing Type - shall be design for quiet operation and shall match any interior design with a wide air flow wing installed turning to both sides of the air outlet to allow the air distribution in every four corners of the panel. The unit shall be provided with shutter to conceal the air outlet with the louvers when the operation is stopped. The louvers shall cover the air outlet horizontally providing a neat appearance. There shall be provision for fresh air duct connection. Install drain to meet local sanitation codes. Unit shall be provided with condensate pump installed as standard from the factory.

b. Wall Mounted Type Indoor Unit - shall be design for quiet operation, slim compact and highly performance diagonal flow cone type fan to minimize the noise. A long life filter (mildew-proof) shall be fitted as a standard with no maintenance for 2,500 hours of operation for ordinary offices.

c. Ceiling Suspended Type Indoor Unit - shall be design for quiet operation with auto-louver to automatically controls upward and downward motion of air flow and grille that serves as a shutter when stopped. A long life filter (mildew-proof) shall be fitted as a standard with no maintenance for 2,500 hours of operation. The fan shall be of a silent type with integral vibration isolators.

2.4 CLEANING, PAINTING, AND IDENTIFICATION: Cleaning, painting, and identification of piping shall be as specified under Section entitled "Painting of Building (Field Painting)".

2.5 IDENTIFICATION TAGS AND PLATES: Provide equipment, gages, thermometers, valves, and controllers with tags numbered and stamped for their use. Plates and tags shall be of brass or suitable nonferrous material, securely mounted or attached. Minimum letter and numeral size shall be 3 mm.

PART 3 - EXECUTION

3.1 INSTALLATION: Application and installation practices for unitary air-conditioning systems shall conform to the requirements of ARI 260.

3.1.1 General: Install equipment and components in a manner to insure proper and sequential operation of the equipment and its control. Installation of the system should strictly comply with the manufacturer's recommended installation practice. Manufacturer's representative should check and verify the installation to ensure it is in accordance with their recommendations. Preliminary refrigerant pipe sizes are depicted in the plan and requires to make necessary final pipe sizing that conform to their recommendation. Installation of equipment not covered herein or in the manufacturer's representative. Provide proper foundations for mounting of equipment, accessories, appurtenances, piping and controls including, but not limited to, supported vibration isolators, stands, guides, anchors, clamps and brackets. Foundations for equipment shall conform to equipment manufacturer's recommendation, unless otherwise shown on the drawings. Set anchor bolts and sleeves accurately using properly constructed templates. Anchor bolts shall be of adequate length and provided with welded-on plates on the head end embedded in the concrete. Level equipment base, using jacks or steel wedges, and neatly grouted-in with a non-shrinking type of mortar grout. Locate equipment so that working space is available for all necessary servicing such as shaft removal, disassembling compressor cylinders and pistons, replacing or adjusting drives, motors, or shaft seals, access to water valves and head of shell and tube equipment, tube cleaning or replacement, access to automatic controls, refrigerant charging, lubricator, oil draining and working clearance under overhead lines. Provide electric isolation between dissimilar metals for the purpose of minimizing galvanic corrosion.

3.1.2 Air Conditioning System: Install system as indicated, in accordance with the requirements of ASHRAE 15-78, and as recommended in the manufacturer's installation and operational instructions. All electrical control devices shall be enclosed in the indoor and outdoor units. The refrigeration cycle shall be equipped with solenoid valves and flare connections to changeover the cycle in mediating between outdoor unit and indoor unit.

3.1.3 Electrical Work: Electric motor driven equipment specified herein shall be provided complete with motors, motor starters, and controls. Electrical equipment and wiring shall be provided with complete "Interior Wiring Systems". Motor starters shall be provided complete with properly sized thermal overload protection and other appurtenances necessary for the motor control specified. Provide manual or automatic control and protective devices required for the operation, herein specified and any control wiring required for controls and devices but not indicated.

3.1.4 Refrigerant Piping: Piping and fitting installation shall conform to the requirements of ASME B31.1. Pipe shall be cut accurately to measurements established at the jobsite, and worked into place without springing or forcing, completely clearing all windows, doors, and other openings. Cutting or other weakening of the building structure to facilitate piping installation will not be permitted without written approval. Pipe or tubing shall be cut square, shall have burrs removed by reaming, and shall permit free expansion and contraction without causing damage to the building structure, pipe, joints, or hangers. Changes in direction shall be made with fittings, except that bending of pipe 100 mm (4 inches) and smaller will be permitted, provided a pipe bender is used and wide weep bends are formed. Mitering or notching pipe or other similar construction to form elbows or tees will not be permitted. The centerline radius of bends shall not be less than 6 diameters of the pipe. Bent pipe showing kinks wrinkles, flattening, or other malformations will not be accepted. Piping shall be installed 4 mm per m (1/2 inch per 10 feet) of pipe in the direction of flow to ensure adequate oil drainage. Open ends of refrigerant lines or equipment shall be properly capped or plugged during installation to keep moisture, dirt, or other foreign material out of the system. Equipment piping shall be in accordance with the equipment manufacturer's recommendations and the contract drawings. Equipment and piping arrangements shall fit into space allotted and allow adequate acceptable clearances for installation, replacement, entry, servicing, and maintenance.

3.1.5 FANS: Installation shall conform to NFPA 91, AMCA and SMACNA Round Industrial Duct Construction Standards, and SMACNA Rectangular Industrial Duct Construction Standards. Provide mounting and supports for equipment and accessories, including structural supports, hangers, vibration isolators, stands, clamps and brackets, access doors, and dampers. Install accessories in accordance with manufacturer's instructions.

3.1.5.1 Installation of Supports:

3.1.5.1.1 Selection: Selection of equipment support system shall take into account the best practice recommendations and requirements of SMACNA Round Industrial Duct Construction Standards, SMACNA Rectangular Industrial Duct Construction Standards, and NFPA 91; location and precedence of work under other sections; interferences of

various piping and electrical work; facility equipment; building configuration; structural and safety factor requirements; vibrations and imposed loads under normal and abnormal service conditions. Indicated support sizes, configurations, and spacing are the minimal type of supporting component required for normal loads. Where installed loads are excessive for the normal support spacing, provide heavier duty components or reduce the element spacing. After system start-up, replace or correct support elements, which vibrate and cause noise or possible fatigue failure.

3.2 FIELD TESTS AND INSPECTIONS

3.2.1 Tests: All tests shall be performed and the Contractor shall furnish materials and equipment required for test. Tests after installation and prior to acceptance shall be performed in the presence of the Engineer and subject to his approval. Equipment and material certified as having been successfully tested by the manufacturer in accordance with referenced specifications and standards will not require retesting before installation. Equipment and materials not tested at the place of manufacturer will be tested before or after installation, as applicable, where necessary to determine compliance with referenced specifications and standards.

3.2.1.1 Leak Testing: Upon completion of installation of the air conditioning equipment, test all factories as well as field refrigerant piping with an electronic-type leak detector to acquire leak tight refrigerant systems. If leaks are detected at the time of installation or during the guarantee period, remove the entire refrigerant charge from the system, correct the leaks and retest the system.

3.2.1.2 Evacuation, Dehydration, and Charging: After system is found to be without leaks, evacuate the system using a reliable gage and a vacuum pump capable of pulling a vacuum of at least 1 mm Hg absolute. Evacuate system in strict accordance with the triple-evacuation and blotter method or in strict accordance with equipment manufacturer's printed instructions. System leak testing, evacuation, dehydration, and charging with refrigerant shall comply with the requirements contained in ARI Standard 260.

3.2.1.3 Start-Up and Operation Tests: Follow the manufacturer's start-up and initial operation procedures and place the system under all modes of operation to ensure that it is functioning correctly. Adjust safety and automatic control instruments as necessary to ensure proper operation and sequence. Initial operation period shall be not less than 8 hours. The air conditioner manufacturer/vendor shall perform the start-up and should verify and confirm the complete installation. Manufacturer should issue acceptance of the installed system that the system is fully functional and operational according to the need of the project.

3.2.1.4 Performance Tests: Upon completion of evacuation, charging, start-up, final leak testing, and proper adjustment of controls, the system shall be performance tested to demonstrate that it complies with the performance and capacity requirements of the specifications and plans. Test the system for not less than 8 hours, during which time hourly readings shall be recorder. At the end of the test period, the readings shall be averaged and the average shall be considered to be the system performance.

REFRIGERANT PIPING AND SPECIALTIES

PART 1 : GENERAL

1.1 SECTION INCLUDES

A. Piping.

B. Refrigerant.

C. Moisture and liquid indicators.

D. Valves.

E. Strainers.

F. Check valves.

G. Pressure relief valves.

H. Filter-driers.

I. Solenoid valves.

J. Expansion valves.

K. Receivers.

L. Flexible connections.

1.2 REFERENCES

A. ARI 495 - Refrigerant Liquid Receivers.

B. ARI 710 - Liquid Line Dryers.

C. ARI 730 - Flow-Capacity Rating and Application of Suction-Line Filters and Filter-Driers

D. ARI 750 - Thermostatic Refrigerant Expansion Valves.

E. ARI 760 - Solenoid Valves for Use With Volatile Refrigerants.

F. ASHRAE 15 - Safety Code for Mechanical Refrigeration.

G. ASHRAE 34 - Number Designation of Refrigerants.

H. ASME B16.22 - Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.

I. ASME B16.26 - Cast Copper Alloy Fittings For Flared Copper Tubes.

J. ASME B31.5 - Refrigeration Piping.

K. ASTM B280 - Seamless Copper Tube for Air Conditioning and Refrigeration Field Service.

L. MSS SP58 - Pipe Hangers and Supports - Materials, Design and Manufacturer.

M. MSS SP69 - Pipe Hangers and Supports - Selection and Application.

N. MSS SP89 - Pipe Hangers and Supports - Fabrication and Installation Practices.

1.3 SYSTEM DESCRIPTION

A. Where more than one piping system material is specified ensure system components are compatible and joined to ensure the integrity of the system is not jeopardized. Provide necessary joining fittings. Ensure flanges, union, and couplings for servicing are consistently provided.

B. Provide pipe hangers and supports in accordance with ASTM B31.5 MSS SP69 unless indicated otherwise.

C. Liquid Indicators:

D. Valves

E. Refrigerant Charging Packed Angle Valve: Use in liquid line between receiver shut-off valve and expansion valve.

F. Strainers:

G. Pressure Relief Valves: Use on ASME receivers and pipe to outdoors.

H. Permanent Filter Driers:

1. Use in low temperature systems.
2. Use in systems utilizing hermetic compressors.

I. Replaceable Cartridge Filter Driers:

1. Use vertically in liquid line adjacent to receivers.
2. Use filter driers for each solenoid valve.

J. Solenoid Valves:

K. Receivers:

1. Use on systems 10 tons ,36 kW and larger, sized to accommodate pump down charge.
2. Use on systems with long piping runs.

L. Flexible Connectors: Utilize at or near compressors where piping configuration does not absorb vibration.

1.4 PROJECT RECORD DOCUMENTS

Record exact locations of equipment and refrigeration accessories on record drawings.

1.5 QUALIFICATIONS

A. Installer: Company specializing in performing the work of this section with minimum three (3) years documented experience.

B. Design piping system under direct supervision of a Professional Engineer experienced in design of this work and licensed at the place where the Project is located.

1.6 REGULATORY REQUIREMENTS

A. Conform to ASME B31.9 for installation of piping system.

B. Products Requiring Electrical Connection: Listed and classified by UL, as suitable for the purpose indicated.

PART 2 - PRODUCTS

2.1 PIPING

A. Copper Tubing: ASTM B280, Type ACR hard drawn or annealed.

1. Fittings: ASME B16.22 wrought copper.
2. Joints: Braze, AWS A5.8 BCuP silver/phosphorus/copper alloy with melting range 640 to 805 degrees C.

B. Copper Tubing to 22 mm OD: ASTM B88, Type K, annealed.

1. Fittings: ASME B16.26 cast copper.
2. Joints: Flared.

D. Pipe Supports and Anchors:

1. Conform to ASME B31.5 .
2. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.
3. Hanger Rods: Mild steel threaded both ends, threaded one end, or continuous threaded.

PART 3 - EXECUTION

3.1 PREPARATION

A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.
B. Remove scale and dirt on inside and outside before assembly.
C. Prepare piping connections to equipment with flanges or unions.

3.2 INSTALLATION

A. Install refrigeration specialties in accordance with manufacturer's instructions.
B. Route piping in orderly manner, with plumbing parallel to building structure, and maintain gradient.
C. Install piping to conserve building space and not interfere with use of space.
D. Group piping whenever practical at common elevations and locations. Slope piping one percent in direction of oil return.
E. Inserts:

1. Provide inserts for placement in concrete formwork.
2. Provide inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.
3. Where concrete slabs form finished ceiling, locate inserts flush with slab surface.

F. Where pipe support members are welded to structural building frame, brush clean, and apply one coat of zinc rich primer to welding.

G. Prepare unfinished pipe, fittings, supports, and accessories ready for finish painting. Refer to Section Painting.

H. Insulate piping.

O. Follow ASHRAE 15 procedures for charging and purging of systems and for disposal of refrigerant.

P. Fully charge completed system with refrigerant after testing.

Q. Provide electrical connection to solenoid valves.

3.3 FIELD QUALITY CONTROL

A. Test refrigeration system in accordance with ASME B31.5.

3.4 SCHEDULES

A. Pipe Hanger Spacing

Pipe Size, mm	Maximum Hanger Spacing, m	Hanger Rod, mm
12 to 32	2	9
38 to 50	3	9
62 to 75	3	13
100 to 150	3	15
200 to 300	4.25	22

THERMAL INSULATION FOR MECHANICAL SYSTEMS

PART 1 - GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only. At the discretion of the Government, the manufacturer of any material supplied will be required to furnish test reports pertaining to any of the tests necessary to assure compliance with the standard or standards referenced in this specification.

ASHRAE 90.1 - IP	(2007; Supplement 2008; Errata 2009; Errata 2009) Energy Standard for Buildings Except Low-Rise Residential Buildings, I-P Edition
ASHRAE 90.2	(2007) Energy Efficient Design of Low-Rise Residential Buildings
ASTM A 167	(1999; R 2004) Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip
ASTM B 209	(2007) Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate
ASTM C 1136	(2008) Standard Specification for Flexible, Low Permeance Vapor Retarders for Thermal Insulation
ASTM C 1290	(2006e1) Standard Specification for Flexible Fibrous Glass Blanket Insulation Used to Externally Insulate HVAC Ducts
ASTM C 534/C 534M	(2008) Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form
MSS SP-69	(2003; R 2004) Standard for Pipe Hangers and Supports - Selection and Application
MICA Insulation Stds	(1999) National Commercial & Industrial Insulation Standards
NFPA 96	(2007) Ventilation Control and Fire Protection of Commercial Cooking Operations

1.2 SYSTEM DESCRIPTION

1.2.1 General

Provide field-applied insulation and accessories on mechanical systems as specified herein; factory-applied insulation is specified under the piping, duct or equipment to be insulated. Insulation of heat distribution systems and chilled water systems outside of buildings shall be as specified in Section UNDERGROUND ELECTRICAL DISTRIBUTION SYSTEM. Field applied insulation materials required for use on Government-furnished items as listed in the SPECIAL CONTRACT REQUIREMENTS shall be furnished and installed by the Contractor.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval/information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section SUBMITTAL PROCEDURES:

Submit the three SD types, SD-02 Shop Drawings, SD-03 Product Data, and SD-08 Manufacturer's Instructions at the same time for each system.

SD-02 Shop Drawings

Pipe Insulation Systems and Associated Accessories
Duct Insulation Systems and Associated Accessories
Equipment Insulation Systems and Associated Accessories

A booklet containing completed MICA Insulation Stds plates detailing each insulating system for each pipe, duct, or equipment insulating system, after approval of materials and prior to applying insulation.

a. The MICA plates shall detail the materials to be installed and the specific insulation application. Submit all MICA plates required showing the entire insulating system, including plates required to show insulation penetrations, vessel bottom and top heads, legs, and skirt insulation as applicable. The MICA plates shall present all variations of insulation systems including locations, materials, vapor proofing, jackets and insulation accessories.

b. If the Contractor elects to submit detailed drawings instead of edited MICA Plates, the detail drawings shall be technically equivalent to the edited MICA Plate submittal.

SD-03 Product Data

Pipe Insulation Systems
Duct Insulation Systems
Equipment Insulation Systems

A complete list of materials, including manufacturer's descriptive technical literature, performance data, catalog cuts, and installation instructions. The product number, k-value, thickness and furnished accessories including adhesives, sealants and jackets for each mechanical system requiring insulation shall be included. The product data must be copywrited, have an identifying or publication number, and shall have been published prior to the issuance date of this solicitation. Materials furnished under this section of the specification shall be submitted together in a booklet and in conjunction with the MICA plates booklet (SD-02). Annotate the product data to indicate which MICA plate is applicable.

SD-08 Samples

Thermal Insulation

After approval of materials, actual sections of installed systems, properly insulated in accordance with the specification requirements, shall be displayed. Such actual sections must remain accessible to inspection throughout the job and will be reviewed from time to time for controlling the quality of the work throughout the construction site. Each material used shall be identified, by indicating on an attached sheet the specification requirement for the material and the material by each manufacturer intended to meet the requirement. The Contracting Officer will inspect display sample sections at the jobsite. Approved display sample sections shall remain on display at the jobsite during the construction period. Upon completion of construction, the display sample sections will be closed and sealed.

Pipe Insulation Display Sections: Display sample sections shall include as a minimum an elbow or tee, a valve, dielectric waterways and flanges, a hanger with protection shield and insulation insert, or dowel as required, at support point, method of fastening and sealing insulation at longitudinal lap, circumferential lap, butt joints at fittings and on pipe runs, and terminating points for each type of pipe insulation used on the job, and for hot pipelines and cold pipelines, both interior and exterior, even when the same type of insulation is used for these services.

Duct Insulation Display Sections: Display sample sections for rigid and flexible duct insulation used on the job. A temporary covering shall be used to enclose and protect display sections for duct insulation exposed to weather.

SD-08 Manufacturer's Instructions

Pipe Insulation Systems
Duct Insulation Systems
Equipment Insulation Systems

Submit a booklet containing manufacturer's published installation instructions for the insulation systems in coordination with the submitted MICA Insulation Stds plates booklet. Annotate their installation instructions to indicate which product data and which MICA plate are applicable. The instructions must be copywrited, have an identifying or publication number, and shall have been published prior to the issuance date of this solicitation.

1.4 DELIVERY, STORAGE, AND HANDLING

Materials shall be delivered in the manufacturer's unopened containers. Materials delivered and placed in storage shall be provided with protection from weather, humidity, dirt, dust and other contaminants. The Contracting Officer may reject insulation material and supplies that become dirty, dusty, wet, or contaminated by some other means. Packages or standard containers of insulation, jacket material, cements, adhesives, and coatings delivered for use, and samples required for approval shall have manufacturer's stamp or label attached giving the name of the manufacturer and brand, and a description of the material. Insulation packages and containers shall be asbestos free.

PART 2 - PRODUCTS

2.1 STANDARD PRODUCT

Provide materials which are the standard products of manufacturers regularly engaged in the manufacture of such products and that essentially duplicate items that have been in satisfactory use for at least 2 years prior to bid opening. Provide insulation systems in accordance with the approved MICA National Insulation Standards plates as supplemented by this specification. Provide field-applied insulation for heating, ventilating, and cooling (HVAC) air distribution systems and piping systems which are located within, on, under, and adjacent to buildings; and for plumbing systems.

2.2 MATERIALS

Provide insulation that meets or exceed the requirements of ASHRAE 90.1 – IP/ASHRAE 90.2. Insulation exterior shall be cleanable, grease resistant, non-flaking and non-peeling. Materials shall be compatible and shall not contribute to corrosion, soften, or otherwise attack surfaces to which applied in either wet or dry state. Materials to be used on stainless steel surfaces shall meet ASTM C 795 requirements. Materials shall be asbestos free and conform to the following:

2.2.1 Wire

Soft annealed ASTM A 580/A 580M Type 302, 304 or 316 stainless steel, 16 or 18 gauge.

2.2.2 Insulation Bands

Insulation bands shall be 1/2 inch wide; 26 gauge stainless steel.

2.2.3 Sealants

Sealants shall be chosen from the butyl polymer type, the styrene-butadiene rubber type, or the butyl type of sealants. Sealants shall have a maximum moisture vapor transmission of 0.02 perms, and a maximum flame spread index of 25 and a maximum smoke developed index of 50 when tested in accordance with ASTM E 84.

2.3 DUCT INSULATION SYSTEMS

2.3.1 Duct Insulation

Provide factory-applied [cellular glass polyisocyanurate or phenolic foam/elastomeric insulation. Provide factory applied elastomeric closed cell or phenolic foam insulation

according to manufacturer's recommendations for insulation with manufacturer's standard reinforced fire-retardant vapor barrier, with identification of installed thermal resistance (R) value and out-of-package R value.]

2.3.1.1 Rigid Insulation

Rigid mineral fiber in accordance with ASTM C 612, Class 2 (maximum surface temperature 400 degrees F), 3 pcf average, 1-1/2 inch thick, Type IA, IB, II, III, and IV. Alternately, minimum thickness may be calculated in accordance with ASHRAE 90.2/ASHRAE 90.1 – IP.

2.3.1.2 Blanket Insulation

Blanket flexible mineral fiber insulation conforming to ASTM C 553, Type 1, Class B-3, 3/4 pcf nominal, 2.0 inches thick or Type II up to 250 degrees F. Also ASTM C 1290 Type III may be used. Alternately, minimum thickness may be calculated in accordance with ASHRAE 90.2/ASHRAE 90.1 - IP.

2.3.2 Kitchen Exhaust Ductwork Insulation

Minimum insulation thickness of 2 inches, blocks or boards, either mineral fiber conforming to ASTM C 612, Class 5, 20 pcf average or calcium silicate conforming to ASTM C 533, Type II. Provide vapor barrier for outside air connection to kitchen exhaust hood.

2.3.3 Acoustical Duct Lining

For ductwork indicated or specified in Section AIR SUPPLY, DISTRIBUTION, VENTILATION, AND EXHAUST SYSTEM to be acoustically lined, provide external insulation in accordance with this specification section and in addition to the acoustical duct lining.

2.3.4 Duct Insulation Jackets

2.3.4.1 All-Purpose Jacket

Provide insulation with insulation manufacturer's standard reinforced fire-retardant jacket with or without integral vapor barrier as required by the service. In exposed locations, provide jacket with a white surface suitable for field painting.

2.3.4.2 Metal Jackets

a. Aluminum Jackets: ASTM B 209, Temper H14, minimum thickness of 27 gauge (0.016 inch), with factory-applied polyethylene and kraft paper moisture barrier on inside surface. Provide smooth surface jackets for jacket outside dimension 8 inches and larger. Provide corrugated surface jackets for jacket outside dimension 8 inches and larger. Provide stainless steel bands, minimum width of 1/2 inch.

b. Stainless Steel Jackets: ASTM A 167 or ASTM A 240/A 240M; Type 304, minimum thickness of 33 gauge (0.010 inch), smooth surface with factory-applied polyethylene and kraft paper moisture barrier on inside surface. Provide stainless steel bands, minimum width of 1/2 inch.

2.3.4.3 Vapor Barrier/Weatherproofing Jacket

Vapor barrier/weatherproofing jacket shall be laminated self-adhesive (minimum 2 mils adhesive, 3 mils embossed) less than 0.0000 permeability, greater than 3 ply, standard grade, silver, white, black and embossed or greater than 8 ply (minimum 2.9 mils adhesive), heavy duty white or natural).

2.3.5 Weatherproof Duct Insulation

Provide ASTM C 591 Type I, polyurethane or polyisocyanate board insulation, minimum density of 1.7 pcf ASTM C 552, cellular glass thermal insulation ASTM C 534/C 534M Grade 1, Type II, flexible cellular insulation], and weatherproofing as specified in manufacturer's instruction.

2.4 EQUIPMENT INSULATION SYSTEMS

Insulate equipment and accessories as specified in Tables 4 and 5. In outside locations, provide insulation 1/2 inch thicker than specified. Increase the specified insulation thickness for equipment where necessary to equal the thickness of angles or other structural members to make a smooth, exterior surface.

PART 3 - EXECUTION

3.1 APPLICATION - GENERAL

Insulation shall only be applied to unheated and uncooled piping and equipment. Flexible elastomeric cellular insulation shall not be compressed at joists, studs, columns, ducts, hangers, etc. The insulation shall not pull apart after a one hour period; any insulation found to pull apart after one hour, shall be replaced.

3.1.1 Installation

Except as otherwise specified, material shall be installed in accordance with the manufacturer's written instructions. Insulation materials shall not be applied until [tests] [tests and heat tracing] specified in other sections of this specification are completed. Material such as rust, scale, dirt and moisture shall be removed from surfaces to receive insulation. Insulation shall be kept clean and dry. Insulation shall not be removed from its shipping containers until the day it is ready to use and shall be returned to like containers or equally protected from dirt and moisture at the end of each workday. Insulation that becomes dirty shall be thoroughly cleaned prior to use. If insulation becomes wet or if cleaning does not restore the surfaces to like new condition, the insulation will be rejected, and shall be immediately removed from the jobsite. Joints shall be staggered on multi layer insulation. Mineral fiber thermal insulating cement shall be mixed with demineralized water when used on stainless steel surfaces. Insulation, jacketing and accessories shall be installed in accordance with MICA Insulation Stds plates except where modified herein or on the drawings.

3.2 DUCT INSULATION SYSTEMS INSTALLATION

Install duct insulation systems in accordance with the approved MICA Insulation Stds plates as supplemented by the manufacturer's published installation instructions.

Except for oven hood exhaust duct insulation, corner angles shall be installed on external corners of insulation on ductwork in exposed finished spaces before covering with jacket. [Duct insulation shall be omitted on exposed supply and return ducts in air conditioned spaces [where the difference between supply air temperature and room air temperature is less than 15 degrees F] unless otherwise shown.] Air conditioned spaces shall be defined as those spaces directly supplied with cooled conditioned air (or provided with a cooling device such as a fan-coil unit) and heated conditioned air (or provided with a heating device such as a unit heater, radiator or convector).

3.2.1 *Duct Insulation Thickness*

Duct insulation thickness shall be in accordance with Table 4.

Table 4 - Minimum Duct Insulation (inches)

Cold Air Ducts	2.0
Relief Duct	1.5
Fresh Air Intake Ducts	1.5
Warm Air Ducts	2.0
Fresh Air Intake Ducts	1.5

FANS & BLOWERS

PART 1 - GENERAL

1.1 Fans shall be of the type, size, arrangement and capacity as indicated in the schedule and/or as shown on the drawings.

1.2 Unless specify, fans performance rating data shall be tested accordance with AMCA Standard 210-85 (Air Movement and Control Association), ANSI/ASHRAE Standard 51-1985 Laboratory Methods of Testing Fans for Rating". Sound ratings shall conform to AMCA Standard 300-85. "Reverberant Room Method for Sound Testing of Fans".

1.3 A computer printout of fan performance rating corresponding to the AMCA licensed data, with corrected ratings for altitude and temperature, fan operating speed, bearing life, etc., shall be submitted for approval.

1.4 All fans shall be dynamically trim-balanced to ISO 1940 and AMCA 204/3-G2.5 quality grade after assembly. A computer printout with the vibration spectrum analysis shall be attached to the fans.

1.4 Fan motors shall comply in all respects with continuous rating in accordance with IEC34 or equivalent. Motor bearing shall be of ball or roller type, grease or lubricant sealed for life. Fan and drive shall earthed to prevent accumulation of static charge.

1.5 Kitchen exhaust fan shall be of :

A. Bifurcated Axial or
B. SISW Centrifugal direct or belt driven type
C. Inline Smokespill Cabinet Fan.
D. DIDW Centrifugal and Direct Drive
E. Axial Flow Fan

where belts or motor are in the air stream are not acceptable.

PART 2 : PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

It should be comply according to the Codes and References Section.

2.2 AXIAL FLOW FANS (DIRECT DRIVE)

A. Fans shall be licensed to bear the AMCA Air and Sound Certified Ratings Seal. The test standard used shall be ANSI/AMCA 210-85. ANSI/ASHRAE Standard 51-1985 "Laboratory Method of Testing Fans for Rating" and AMCA 300 "Reverberant Room Method for Sound Testing of fans".

B. Fans shall be oven-baked with polyester coating for minimum thickness of 60 microns or hot-dipped galvanized. To achieve the minimum and equal clearance between the blade tips and casing, tube casing shall maintain its roundness by means of using one piece of sheet metal with 90° edge flanging up.

C. Fan motor base support shall be properly secured (locked and sealed) to the fan housing and be of adjustable type to have precise control of motor shaft central position as well as running clearance between blade tips and casing. Motor (KW/HP) shall be able to be changed or upgraded at site without changing fan housing or ducting construction.

D. Fans supplied shall be complete with factory fabricated mounting bracket (ceiling or foot mounted) and suction/discharge matching flanges as accessories.

All hubs shall be cast Aluminum alloy (Grade LM2) unless for Smoke Extractor Fans where high temperature (250°C/2Hrs) air is expected then Aluminum alloy or steel fan impeller blades are required. Otherwise impeller blade material with Polypropylene (PP), Glass reinforced Polypropylene (PPG) and Glass-reinforced Polyamid (PAG), to provide self-balancing, anti-static, anti-sparkling characteristics is preferable.

E. Running clearance between blade tips and casing shall not exceed 1% of the impeller diameter and 2% for smoke spill high temperature fan where mechanical expansion coefficient is different from normal ambient temperature. Fan manufacturer shall provide the fan assembled with the same clearance between blade tips and casing of the tested prototype. Note that the air performance and pressure loss are greatly affected by the clearance.

F. Impellers shall be secured to the drive shaft by a key and keyway. Axial location shall be provided by a collar or shoulder on the drive shaft together with a retaining washer and screw fitted into a tapped hole at the end of the shaft and locked in position. Blades shall be secured in place to the angel setting by setscrews, locking nuts or setting pins.

Fan motor shall be totally enclosed and external terminal box of at least IP55 shall be provided.

Fans speed shall not exceed 1800 RPM.

All fans after assembly shall be dynamically trim balanced to ISO1940 and AMCA 204/3-G2.5 quality grade. A computer printout with vibration spectrum analysis shall be attached to the fans.

2.3 IN-LINE CENTRIFUGAL DUCT FAN

A. Fan shall be of SISW forward or backward curved centrifugal direct driven type.

B. Casing shall be of Galvanized steel with Oven-baked epoxy coating. Impeller material shall be either Galvanized Steel or Glass Reinforced Polypropylene.

C. Motor shall be external rotor type for power supply 220-240V/60Hz/Single Phase.

2.4 BIFURCATED FAN

A. Axial Bifurcated fan shall have the motor isolated from the air stream. The fans shall have a built in central chamber ventilated to the external ambient containing the direct drive motor.

B. The hub shall be specially cast in one piece to suit the required distance between impeller and motor shaft.

C. Fan casing shall be carefully controlled to ensure smooth flow of the air to avid turbulent airflow and noise.

2.5. BELT DRIVEN FANS

A. Fan impellers shall be driven by V-belts with the pulley keyed to the shaft and retained by taper-bushes.

B. Motor mounting plate shall be supported using four threaded rods for belt tensioning. Belt tunnel shall be sealed fro the air stream and belt guards with proper ventilation should be provided.

2.6 CENTRIFUGAL FANS

A. Fans forward or backward or Airfoil curved, SISW or DIDW, shall be licensed to bear the AMCA Air and Sound Certified Ratings Seal. The test standard used shall be ANSI/AMCA 210-85, NASI/ASHRAE Standard 51-1985 "Laboratory Method of Testing Fans for Rating" and AMCA 300 "Reverberant Room Method for Sound Testing of Fans".

B. All fans shall be dynamically trim-balanced to ISO 1940 and AMCA 204/3-G2.5 quality grade after assembly. A computer printout with vibration spectrum analysis shall be attached to the fans.

C. Fans shall be oven-baked with polyester coating for minimum thickness of 60 microns, unless the housing scroll and side frame is constructed from galvanized steel sheet (G.I.), Stainless Steel, Aluminum and etc.

D. Fan housing shall be of an appropriate thickness to prevent vibration and drumming. The fan scroll shall be attached to the side plate by means of continuous lock seam or intermittent spot welding. The wheel and inlet cone shall be aerodynamically designed and constructed to provide maximum performance and efficiency as published by the manufacturer.

E. Fans must be physically capable of operating safely at every point of rating at or below the "minimum performance" limit fir that class as defined in AMCA standard 99-2408-69 "Performance Class of Operating Limits of Centrifugal Fans".

F. Shaft size shall be carefully calculated and designed such that maximum operating speed (RPM) shall not exceed 75% of the first critical speed. For any application that is not a standard product form catalogue of the fan manufacturer detailed calculation of critical speed characteristics shall be submitted for approval

G. Shafts shall be made of carbon steel (C45) machined and polished to tolerance of standard ISO 286-2 – grade g6 Protective coat of anti-rusting shall be applied to all bare surfaces of the shaft at the factory.

H. Bearing shall be of self-alignment (concentric) type with adaptor sleeve bearing. Bearing of eccentric locking collar with grub screw type are not acceptable. Bearing shall be maintenance free with permanently lubricated sealed ball bearing type. Bearing life shall be at least 75,000 hours based on basic rating life L10 of ISO 281 standard. Calculation sheet of bearing life shall be submitted for approval.

I. Motor installed shall be of a minimum 130% of the fan power absorbed (Brake horsepower) and shall have sufficient torque available for starting and continuous operation.

J. Belts and pulleys shall be sized for minimum 150% of the installed motor horsepower. The belt speed shall not exceed 30m/s. The pulley shall be of Taper Lock SPZ, SPA, SPB or SPC type. Conventional type of pulley is not acceptable. Both fan and motor pulley shall be balanced to the quality grade G.2.5

K. Fan outlet velocity shall not exceed 10% of the main duct air velocity designed (0.1" per 100 ft or 1 Pascal per meter duct length) Pressure Loss is as referred to in SMACNA Standard unless otherwise specified.

L. A computer printout on fan performance rating corresponding to the AMCA licenced data with corrected rating for altitude and temperature fan operating speed bearing life etc. Shall be submitted for approval

2.7. CABINET

A. Fan contained within cabinet shall be licensed to bear the AMCA Air and Sound Certified rating Seal.

B. Fan shall be of DIDW forward or Backward curved with fan scroll belt drive or direct drive assembled within a cabinet.

C. Cabinet shall be constructed of Galvanized Steel material with 220 g/m2 coating.

D. Cabinet shall e of "Panel Construction" assembled together by means of fasteners for easy of dismantling for service and maintenance. Welded cabinets are not acceptable.

E. Cabinet design shall be capable of adding acoustic insulation (i.e. double skin arrangement) if requested for noise reduction.

2.8. DIRECT DRIVE TYPE

A. Fans shall be of DIDW Forward Curved centrifugal type with fan scroll within a Cabinet.

B. Fan speed shall not exceed 1800 RPM.

C. Motor shall be for power supply 220-240 V/60Hz/Single Phase

2.9. IN-LINE CENTRIFUGAL DUCT FAN

A. Fan shall be of SISW forward or backward curved centrifugal direct driven type.

B. Casing shall be of Galvanized steel with Oven-baked epoxy coating. Impeller material shall be either Galvanized Steel or Glass Reinforced Polypropylene.

C. Motor shall be external rotor type for power supply 220-240V/60Hz/Single Phase.

2.10. PROPELLER FAN

A. Fan shall be of the ring-mounted type and the blades constructed from heavy gauge metal. An aerodynamically designed bell mouth constructed from heavy gauge metal shall be provided. The fan speed shall not exceed 1800RPM at 60Hz Operation.

B. Propeller fans shall be direct driven type the motor either a single phase capacitor start-run or a three-phase squirrel cage induction type. The motor shall have inbuilt inherent protection against overloading. Motor with shaded pole or centrifugal switch type is not acceptable

C. Bearing shall be maintenance free permanently lubricated type. Fans shall be complete with wire guards. External grilles, fan chambers and volume control damper shall be provided where indicated in the specification drawings.

AIR INLETS AND OUTLETS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Diffusers.
B. Registers/grilles.
C. Door grilles.
D. Louvers.

1.2 RELATED SECTIONS

A. Section - Painting: Painting of ductwork visible behind outlets and inlets.

1.3 REFERENCES

A. ARI 650 - Air Outlets and Inlets.
B. ASHRAE 70 - Method of Testing for Rating the Air Flow Performance of Outlets and Inlets.
C. SMACNA - HVAC Duct Construction Standard - Metal and Flexible.
D. NFPA 90A - Installation of Air Conditioning and Ventilating Systems.

1.4 SUBMITTALS

A. Submit under provisions of Section Submittal Procedures.
B. Product Data: Provide data for equipment required for this project. Review outlets and inlets as to size, finish, and type of mounting prior to submission. Submit schedule of outlets and inlets showing type, size, location, application, and noise level.
C. Samples: Submit two of each required air outlet and inlet type.

1.5 PROJECT RECORD DOCUMENTS

A. Submit under provisions of Section Contract Closeout.
B. Record actual locations of air outlets and inlets.

1.6 QUALITY ASSURANCE

A. Test and rate air outlet and inlet performance in accordance with ADC Equipment Test Code 1062 and ASHRAE 70.
B. Test and rate louver performance in accordance with AMCA 500.

1.7 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum three (3) years documented experience.

1.8 MOCKUP

A. Provide mockup of typical interior ceiling module with supply and return air outlets under provisions if applicable.
B. Mockup may not remain as part of the Work.

PART 2 - PRODUCTS

2.1 RECTANGULAR CEILING DIFFUSERS

A. Type: Square and rectangular, adjustable pattern ,diffuser to discharge air in four way pattern with sectorizing baffles where indicated.
B. Frame: Snap-in type.
C. Fabrication: Aluminum with baked enamel off-white finish.
D. Accessories: Combination splitter damper and multi-louvered equalizing grid with damper adjustable from diffuser face.

2.2 CEILING SUPPLY REGISTERS/GRILLES

A. Type: Streamlined and individually adjustable curved blades to discharge air along face of grille.
B. Frame: 32 mm margin with concealed mounting and gasket.
C. Fabrication: Aluminum extrusions with factory off-white enamel finish.
D. Damper: Integral, gang-operated, opposed blade type with removable key operator, operable from face.

2.3 WALL EXHAUST AND RETURN REGISTERS/GRILLES

A. Type: Streamlined blades, 19 mm minimum depth, 19 mm maximum spacing, with spring or other device to set blades, horizontal face.
B. Frame: 32 mm margin with concealed mounting.
C. Fabrication: Steel and aluminum with 20 gage (0.90 mm) minimum frame, with factory baked enamel finish , color to be selected.
D. Damper: Integral, gang-operated, opposed blade type with removable key operator, operable from face.
E. Gymnasiums: Provide front pivoted or welded in place blades, securely fastened to be immobile.

2.4 DOOR GRILLES

A. Type: V-shaped louvers of 20 gage (0.90 mm) thick steel, 25 mm deep on 13 mm centers.
C. Frame: 20 gage (0.90 mm) steel with auxiliary frame to give finished appearance on both sides of door, with factory prime coat finish.

2.5 LOUVERS

A. Type: 100 mm deep with blades on 45 degree slope , heavy channel frame, birdscreen with 13 mm square mesh for exhaust and 19 mm for intake.
B. Fabrication: 12 gage (2.50 mm) thick extruded aluminum, welded assembly, with factory baked enamel finish color to be selected.
C. Mounting: Furnish with exterior , flat flange for installation.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Check location of outlets and inlets and make necessary adjustments in position to conform with architectural features, symmetry, and lighting arrangement.

C. Install diffusers to ductwork with air tight connection.

D. Provide balancing dampers on duct take-off to diffusers, and grilles and registers, despite whether dampers are specified as part of the diffuser, or grille and register assembly.

E. Paint ductwork visible behind air outlets and inlets matte black.

HEAT RECOVERY SYSTEM

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. ENERGY RECOVERY VENTILATOR.

1.2 REFERENCES

ASHRAE 15	(1994) Safety Code for Mechanical Refrigeration
ASHRAE 52.1	(1992) Gravimetric and Dust-Spot Procedures for Testing Air-Cleaning Devices Used in General Ventilation for Removing Particulate Matter
ASHRAE 68	(1986) Laboratory Method of Testing In-Duct Sound Power Measurement Procedures for Fans
ASHRAE 70	(1991) Method of Testing for Rating the Performance of Air Outlets and Inlets
ASHRAE 84	(1991) Method of Testing Air-to-Air Heat Exchangers
NFPA 70	(1999) National Electrical Code
NFPA 90A	(1996) Installation of Air Conditioning and Ventilating Systems
SMACNA HVAC Duct Const Stds	(1995; Addenda Nov 1997) HVAC Duct Construction Standards - Metal and Flexible
SMACNA Leakage Test Mnl	(1985) HVAC Air Duct Leakage Test Manual.

1.3 SUBMITTALS

A. Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with SUBMITTAL PROCEDURES.

B. Spare parts data for each item of equipment provided, after approval of the detail drawings and not later than before the date of beneficial occupancy. The data shall include a complete list of spare parts and supplies with current unit prices and source of supply

C. Detail drawings consisting of a complete list of equipment and material, including manufacturer's descriptive and technical literature, performance charts and curves, catalog cuts, drawings, and installation instructions.

D. Drawings shall contain complete piping and wiring drawings, schematic diagrams, and any other details required to demonstrate that the system has been coordinated and will properly function as a unit.

E. Drawings shall show proposed layout and anchorage of equipment and appurtenances, and equipment relationship to other parts of the work including clearances required for maintenance and operation.

F. Each major item of equipment shall have the manufacturer's name, address, type or style, model or serial number, and catalog number on a plate secured to the item of equipment.

PART 2 - PRODUCTS

2.1. Casing should be Galvanized steel plate.

2.2. Insulation Material - It should be Self-extinguishable polyurethane foam

2.3. Heat Exchange System and Material - It should be air to air cross flow total heat (Sensible Heat + Latent Heat) exchange, with Specially processed non-flammable paper material.

2.4. Air Filter - Should be Multi-directional fibrous fleeces.

2.5. Accesories - In large models in particular (1500 - 2000 m^3 / h models), if the supply air grille SAG is installed near the main unit, the noise of the main unit may be heard from the discharge grille via the duct, and this will result in a marjed increased in noise.

2.5.1. Use a sound-muffling box, flexible duct and sound-muffling air supply/discharge grilles.

2.5.2. Decentralized installation of discharge grilles.

2.5.3. Use ceiling materials with high sound insulating properties (high transmission loss).

CAPACITY (CMH)	95 - 150	155 - 350	295 - 650	670 - 1000	1260 - 2000
CONNECTION DUCT DIAMETER	100 Ø	150 Ø	200 Ø	250 Ø	350 Ø
UNIT AMBIENT CONDITION	-15°C-50°C DB, 80 % RH or less				

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Check location of outlets and inlets and make necessary adjustments in position to conform with architectural features, symmetry, and lighting arrangement.

C. Install diffusers to ductwork with air tight connection.

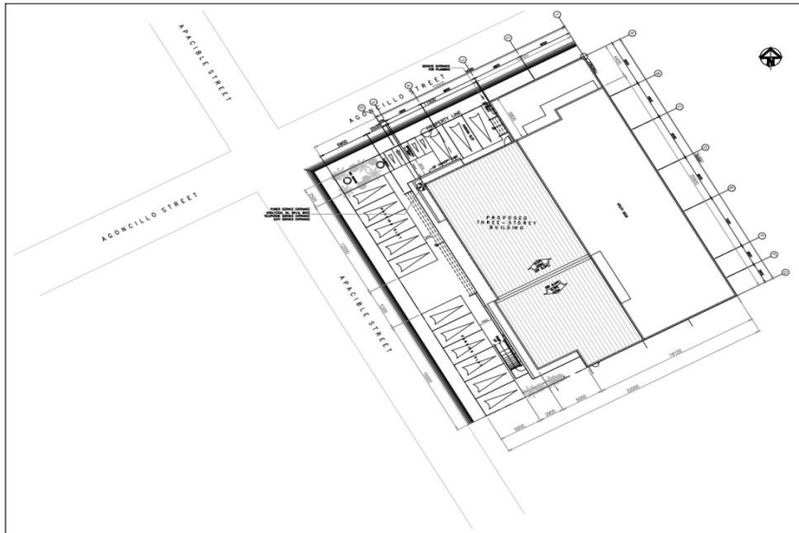
D. Provide balancing dampers on duct take-off to diffusers, and grilles and registers, despite whether dampers are specified as part of the diffuser, or grille and register assembly.

E. Obtain locally (ON when temperature is at or below -10°C) and (OFF when temperature is at or more than 5°C) for Thermostat.

F. Examine fully an installation place and specification for using electric heater based on the standard and regulation of each country.

G. Use a non-inflammable connecting duct to the electric heater. Be sure to allow 2 m or more between the electric heater and the (Energy Recovery Ventilator) ERV for safety.

H. For ERV (Energy Recovery Ventilator), use a different power supply from that of the electric heater and install a circuit breaker for each.



1 M-001 SCALE 1:300M

SITE DEVELOPMENT PLAN

1 M-001 SCALE NTS

VICINITY MAP

GENERAL NOTES:

1. THESE DRAWINGS ARE SCHEMATIC IN NATURE AND ARE NOT INTENDED TO SHOW ALL POSSIBLE CONDITIONS. (DO NOT SCALE FOR EQUIPMENT, DEVICE OR MATERIAL LOCATION). IT IS INTENDED THAT A COMPLETE HVAC SYSTEM BE PROVIDED WITH ALL NECESSARY EQUIPMENT, APPURTENANCES, AND CONTROLS, COMPLETELY COORDINATED WITH ALL DISCIPLINES. DOCUMENTS STRICTLY CONFORM WITH ALL PARAMETERS GIVEN IN THESE DOCUMENTS. ANY ITEMS AND LABOR REQUIRED FOR A COMPLETE ACMV SYSTEM IN ACCORDANCE WITH ALL APPLICABLE CODES, STANDARDS, AND THESE CONTRACT DOCUMENTS SHALL BE FURNISHED WITHOUT INCURRING ANY ADDITIONAL COST TO THE CONTRACT. CAREFULLY REVIEW ALL CONTRACT DOCUMENTS AND THE DESIGN OF OTHER TRADES BEFORE PREPARING SHEET METAL AND PIPING SHOP DRAWINGS. EACH TRADE SHALL PREPARE ITS OWN FABRICATION AND INSTALLATION DRAWINGS FOR COORDINATION WITH ALL OTHER DISCIPLINES.
2. ALL DUCT DIMENSIONS INDICATED ARE INSIDE CLEAR DIMENSIONS IN MM., EXCLUDING INTERNAL LINING & EXTERNAL INSULATION THICKNESS, UNLESS OTHERWISE INDICATED.
3. UNLESS OTHERWISE NOTED, THE FREE AREA OF ALL EXTERNAL LOUVERS SHALL BE A MINIMUM OF 50% OF GROSS AREA.
4. VOLUME CONTROL/ SPLITTER DAMPER SHALL BE PROVIDED FOR SUPPLY AND RETURN AIR DUCT AT EACH BRANCH, WHETHER SHOWN OR NOT SHOWN ON PLANS.
5. IN ADDITION TO THOSE SHOWN ON THE DRAWINGS THE CONTRACTOR SHALL SUPPLY AND INSTALL FIRE DAMPERS FOR AIR DUCTS PASSING THROUGH ALL FIRE RATED WALLS / SLABS IN ORDER TO FULFILL THE REQUIREMENTS OF LOCAL AUTHORITY. ALSO REFER TO FIRE LIFE SAFETY PLANS.
6. ALL AIR GRILLES / LOUVERS SHALL BE MADE OF ALUMINUM UNLESS OTHERWISE SPECIFIED. THE COLOR & SURFACE FINISHING OF THE GRILLES / LOUVERS SHALL BE SUBMITTED TO ARCHITECT FOR APPROVAL BEFORE MATERIAL ORDERING. UNLESS OTHERWISE SPECIFIED, COLOR FINISH SHALL BE IN BAKED ENAMEL PAINT.
7. ALL ANTI-VIBRATION MOUNTS FOR EQUIPMENT AND PIPE WORK SHALL BE OF SEISMIC SPRING TYPE UNLESS OTHERWISE SHOWN ON DRAWINGS.
8. FOR PIPES, SLEEVES AND DUCTS THROUGH FIRE BARRIER, THE GAP BETWEEN THE PIPES AND ITS SLEEVES, AND THE GAP BETWEEN THE DUCTS AND FIRE BARRIERS MUST BE FIRMLY SEALED WITH FIRESTOP MATERIALS HAVING A PERIOD OF FIRE RESISTANCE EQUAL TO THE FIRE BARRIERS. DETAILS OF DUCTS AND PIPES THROUGH WALL AND FLOOR SHALL COMPLY WITH U.L. STANDARD AND REQUIREMENTS.
9. ALL DUCT ELBOWS MUST BE FITTED WITH TURNING VANES TO SMACNA STANDARD.
10. SIZE OF GRILLES, LOUVERS OR DIFFUSERS SHOWN ARE NECK SIZE UNLESS OTHERWISE SPECIFIED.
11. ALL GRILLES AND DIFFUSERS SHALL BE INSTALLED WITH INTEGRAL OPPOSED BLADE VOLUME CONTROL DAMPERS OPERABLE FROM THE GRILLE/DIFFUSER FACE.
12. IN THE ABSENCE OF ANY OTHER REQUIREMENT NOT FOUND IN THE PSME CODE, THE MATERIALS, CONSTRUCTION AND INSTALLATION OF THE DUCTWORKS SHALL COMPLY WITH THE REQUIREMENT OF SMACNA OR ASHRAE STANDARDS.
13. ALL EQUIPMENT, DUCTWORKS AND OTHER ACCESSORIES INSTALLED OUTDOOR SHALL BE WEATHERPROOFED AND PROTECTED WITH ALUMINUM CLADDING.
14. COORDINATE AND REFER TO ARCHITECTURAL CEILING PLANS AND FINAL FF & E LAYOUT FOR EXACT LOCATION OF ALL CEILING MOUNTED AIR DISTRIBUTION DEVICES. COORDINATE EXACT LOCATION OF SLOTS, GRILLES, REGISTERS, AND DIFFUSERS WITH ARCHITECTURAL REFLECTED CEILING PLANS. IF A PARTICULAR ITEM IS NOT SHOWN ON THE ARCHITECTURAL REFLECTED CEILING PLAN, PREPARE A DRAWING AND PRESENT IT TO THE ARCHITECT FOR HIS REVIEW AND/OR APPROVAL.
15. MAINTAIN DUCTWORK LEVEL AND AS HIGH AS POSSIBLE UNLESS OTHERWISE NOTED. TRANSITION RECTANGULAR DUCTWORK ON THE TOP AND THE SIDES. ALL DUCT TRANSITIONS FROM SQUARE TO ROUND SHALL BE SMOOTH SQUARE TO ROUND TRANSITIONS. SPIN-IN FITTINGS AT THE END OF CAPPED DUCTS ARE NOT ACCEPTABLE.
16. ALL OPEN ENDED DUCTS SHALL BE BELLMOUTHED, SCREENED AND REINFORCED WITH 37.5mm x 37.5mm x 3.5mm GALVANIZED STEEL ANGLES BOLTED, SCREWED OR RIVETED 150mm ON CENTER (MAXIMUM) ALL AROUND THE EXTERIOR PERIMETER OF THE DUCT.
17. MOUNT THERMOSTATS, WHERE INDICATED ON PLANS AT 1500mm AFF UNLESS OTHERWISE NOTED. SEE THE ARCHITECTURAL AND INTERIOR DRAWINGS AS WELL AS THE MECHANICAL DRAWINGS FOR THE COORDINATED LOCATIONS. WHERE THERE IS A CONFLICT OF LOCATIONS AMONG THE DRAWINGS, NOTIFY THE ARCHITECT IMMEDIATELY FOR RESOLUTION.
18. ALL DIFFUSERS INSTALLED IN LAY-IN CEILINGS SHALL BE 4-WAY BLOW UNLESS OTHERWISE NOTED. ADJUST ALL DIFFUSERS IN CORRIDORS OR WITHIN 900mm OF A WALL TO PROVIDE 2-WAY OR 3-WAY BLOW AWAY FROM OR PARALLEL TO WALLS.
19. ALL WIRING IN THE CEILING PLENUM SHALL BE PLENUM-RATED CABLE PER NFPA-70 OR BE INSTALLED IN METAL CONDUIT.
20. ALL CEILING MOUNTED AIR DISTRIBUTION DEVICES LOCATED IN INACCESSIBLE CEILINGS SHALL HAVE FACE OPERABLE DAMPERS TO ALLOW AIR BALANCING OF THE SYSTEM AFTER THE CEILING IS IN PLACE.
21. INSULATE ALL SUPPLY AND RETURN AIR DUCTWORK.
22. ALL TERMINAL UNITS, FCU'S, VALVES, FANS AND DAMPERS ABOVE CEILING SHALL BE ACCESSIBLE. COORDINATE ALL ACCESS PANELS IN CEILINGS OR WALLS WITH ARCHITECTURAL REFLECTED CEILING PLANS AND INTERIOR DRAWINGS FOR PROPER LOCATION. NO ACCESS PANELS ARE ALLOWED IN PUBLIC SPACES WITHOUT PRIOR WRITTEN APPROVAL OF THE ARCHITECT.
23. THE FRESH AIR DUCT (BRANCH DUCT) SERVING EACH FAN COIL UNIT SHALL BE PROVIDED WITH VOLUME DAMPER WHETHER SHOWN OR NOT SHOWN ON DRAWINGS.
24. AFTER SUBMITTAL APPROVALS AND PRIOR TO ORDERING OF ANY EQUIPMENT OR ACCESSORIES, OR BEFORE FABRICATION AND/OR ASSEMBLY OF PIPING, DUCTS AND ANY DEVICES/COMPONENTS, THE CONTRACTOR SHALL ENSURE THAT EVERYTHING HAS BEEN VERIFIED AT SITE AND COORDINATED WITH ALL THE OTHER DISCIPLINES AS TO CONSTRUCTIBILITY AND MAINTAINABILITY OF THE EQUIPMENT AND UTILITIES. IF FOR ANY REASON, CONFLICT ARISE DUE TO CONTRACTOR'S FAILURE TO FOLLOW THE ABOVE OR HIS LACK OF DUE DILIGENCE, ALL WORKS AS NECESSITATED SHALL BE PERFORMED BY THE CONTRACTOR WITHOUT ADDITIONAL COST CHANGE ORDER.
25. IN GENERAL REFER TO MECHANICAL PLANS FOR QUANTITY OF AC & VENTILATION GRILLES AND DIFFUSERS FOR REFERENCE PURPOSES REFER TO ARCHITECTURAL REFLECTED CEILING PLAN FOR LOCATION OF UTILITIES.
26. DUCT CUTS WITH CANVASS OR ANY RESILIENT MATERIAL SUCH AS RUBBER, MUST BE PROVIDED ESPECIALLY IN AREAS WHERE WALLS OR CEILING ARE ISOLATED FROM THE REST OF MAIN BUILDING STRUCTURE.
27. ALL SUSPENDED AND FLOOR MOUNTED PIPES AND EQUIPMENTS SHALL BE PROVIDED WITH PROPER ISOLATORS AS RECOMMENDED BY ASHRAE (TABLE 42 & CHAPTER 47 2003 ASHRAE HANDBOOK).
28. ALL DUCT WORKS IN AREAS WITH SUSPENDED CEILING SHALL RUN IN THE CEILING VOID UNLESS OTHERWISE NOTED.
29. MATERIAL SPECIFICATIONS ARE AS FOLLOWS: (PLEASE REFER TO TECHNICAL SPECIFICATIONS)
    a. DUCT INSULATION
       i. INTERNAL (ALL SUPPLY AND RETURN AC DUCTS; 3.0 METERS UPSTREAM & DOWNSTREAM OF FANS)
          – 25mm THICK FIBERGLASS INSULATION, 48 kg/M³ DENSITY, MATTE FACE WITH ANTI-MICROBIAL TREATMENT.
       ii. EXTERNAL (ALL SUPPLY / RETURN AC DUCTS; EXHAUST DUCTS)
          – POLY OLEFIN FOAM (THERMOBREAK OR XCELLON 19/ 25mm THICK)
    b. GALVANIZED SHEET SCHEDULE – HOT DIPPED GALVANIZED STEEL SHEET CONFORMING TO SMACNA, ("APO GALFAN" BRAND). DUCT SCHEDULE SHOWN BELOW IS REPRESENTATIVE ONLY.

LARGER DUCT DIMENSION (mm)	U.S. Ga#
UP TO 300	26
325 TO 750	22
775 TO 1350	22
1375 TO 2100	20
ABOVE 2100	18

    c. FIRE DAMPER – U.L. LISTED FOR 2-HOUR FIRE RATING, CURTAIN TYPE.
    d. DUCT SEALANT – FIRE RESISTIVE, WATER BASED CONFORMING TO U.L. 181B – "FOSTER" DUCT FAST OR EQUAL.

DRAWING INDEX

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M-005	GROUND FLOOR A/C & VENTILATION LAYOUT
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M-007	ROOF DECK A/C & VENTILATION LAYOUT
M-008	MISCELLANEOUS DETAILS
M-009	MISCELLANEOUS DETAILS

LEGEND & SYMBOLS

SYMBOLS	DESCRIPTION	SYMBOLS	DESCRIPTION
	AIR COOLED CONDENSING UNIT		SUPPLY AIR GRILLE
	FAN COIL UNIT (WALL MOUNTED)	T	THERMOSTAT/WALL MOUNTED
	IN-LINE AXIAL FRESH AIR FAN		KILOWATT
	FAN COIL UNIT (FLOOR STANDING)		EQUIPMENT DESIGNATION
	CEILING CASSETTE EXHAUST AIR FAN		REFRIGERANT PIPES
	WALL MOUNTED EXHAUST AIR FAN		PIPE DOWN

ABBREVIATION

ABBREV	DESCRIPTION	ABBREV	DESCRIPTION
BD/BDD	BACK DRAFT DAMPER	FCU	FAN COIL UNIT
CDP	CONDENSATE DRAIN PIPE	HP	HORSE POWER
CU	CONDENSING UNITS	KW	KILOWATT
CDS	CONDENSATE DRAIN STACK	l/s / LPS	LITERS PER SECOND
EA	EXHAUST AIR	Pa	PASCAL
EF	EXHAUST FAN	RP	REFRIGERANT PIPE
ESP	EXTERNAL STATIC PRESSURE	T/A	TO ABOVE
F/A	FROM ABOVE	T/B	TO BELOW
F/B	FROM BELOW	TEF	TOILET EXHAUST FAN
FAD	FRESH AIR DUCT	W	WATTS
VD	VOLUME DAMPER	FD	FIRE DAMPER
SAG	SUPPLY AIR GRILLE		

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TIN NO. : 105-691-252
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DATE : JANUARY 21, 2019
PLACE : MAKATI CITY

OWNER: SOCIAL SECURITY SYSTEM, 6/F , SSS BUILDING EAST AVENUE, QUEZON CITY
APPROVED BY: MR. JOSE P. BAUTISTA, SVP NCR OPERATIONS GROUP

PROJECT TITLE/LOCATION: PROPOSED THREE -STOREY SSS BUILDING, APACIBLE CORNER F. AGONCILLO STREET, ERMITA, MALATE, MANILA

SHEET CONTENTS: SITE DEVELOPMENT PLAN, VICINITY MAP, GENERAL NOTES, DRAWING INDEX, ABBREVIATION, LEGEND & SYMBOLS

CADD	DATE	NO.	REVISIONS	CHK	DATE
MCB	AUG 2019				
DESIGNED	DATE				
JMA	AUG 2019				
APPROVED	DATE				
RMM	AUG 2019	0			

PAPER SIZE: 20X30
SHEET NO.: M-001
SCALE: AS SHOWN
PROJECT NO.: SO-G-15-010

AIR CONDITIONING EQUIPMENT SCHEDULE (VRV)

AIR COOLED CONDENSING UNIT										FAN COIL UNIT								
MARK	QTY	LOCATION	CAPACITY KW (TR)	COMPRESSOR TYPE	REFRIGERANT	REFRIGERANT PIPE RGL	REFRIGERANT PIPE RLL	ELECTRICAL DATA KW INPUT	ELECTRICAL DATA V/PH/HZ	REMARKS	MARK	QTY	LOCATION	AREA SERVED	CAPACITY KW (TR)	TYPE	ELECTRICAL DATA KW INPUT	ELECTRICAL DATA V/PH/HZ	REMARKS
ACCU A	1	ROOF DECK	137 (39)	HERMETICALLY SEALED SWING TYPE	R-410A	41.3	19.10	41.5	380/3/60	AIR COOLED CONDENSING UNIT C/W STANDARD ACCESSORIES	FCU 1A	1	GROUND FLOOR	PANTRY	3.7 (1)	WALL MOUNTED	0.03	230/1/60	FAN COIL UNIT COMPLETE WITH STANDARD ACCESSORIES.
											FCU 2A	1	GROUND FLOOR	WAITING AREA	13.5 (4)	FLOOR STANDING	0.48	230/1/60	FAN COIL UNIT COMPLETE WITH STANDARD ACCESSORIES.
											FCU 3A	1	GROUND FLOOR	WAITING AREA	13.5 (4)	FLOOR STANDING	0.48	230/1/60	FAN COIL UNIT COMPLETE WITH STANDARD ACCESSORIES.
											FCU 4A	1	GROUND FLOOR	WAITING AREA	13.5 (4)	FLOOR STANDING	0.48	230/1/60	FAN COIL UNIT COMPLETE WITH STANDARD ACCESSORIES.
											FCU 5A	1	GROUND FLOOR	E-CENTER	3.7 (1)	WALL MOUNTED	0.03	230/1/60	FAN COIL UNIT COMPLETE WITH STANDARD ACCESSORIES.
											FCU 6A	1	GROUND FLOOR	INFO KIOSK	3.7 (1)	WALL MOUNTED	0.03	230/1/60	FAN COIL UNIT COMPLETE WITH STANDARD ACCESSORIES.
											FCU 7A	1	GROUND FLOOR	LOBBY	13.5 (4)	FLOOR STANDING	0.48	230/1/60	FAN COIL UNIT COMPLETE WITH STANDARD ACCESSORIES.
											FCU 8A	1	GROUND FLOOR	P.E. WAITING AREA	7.1 (2)	WALL MOUNTED	0.05	230/1/60	FAN COIL UNIT COMPLETE WITH STANDARD ACCESSORIES.
											FCU 9A	1	SECOND FLOOR	OVP OFFICE	7.1 (2)	WALL MOUNTED	0.05	230/1/60	FAN COIL UNIT COMPLETE WITH STANDARD ACCESSORIES.
											FCU 10A	1	SECOND FLOOR	OVP OFFICE	7.1 (2)	WALL MOUNTED	0.05	230/1/60	FAN COIL UNIT COMPLETE WITH STANDARD ACCESSORIES.
											FCU 11A	1	SECOND FLOOR	OVP OFFICE	7.1 (2)	WALL MOUNTED	0.05	230/1/60	FAN COIL UNIT COMPLETE WITH STANDARD ACCESSORIES.
											FCU 12A	1	SECOND FLOOR	CONFERENCE ROOM 1	7.1 (2)	WALL MOUNTED	0.05	230/1/60	FAN COIL UNIT COMPLETE WITH STANDARD ACCESSORIES.
											FCU 13A	1	SECOND FLOOR	PANTRY	3.7 (1)	WALL MOUNTED	0.03	230/1/60	FAN COIL UNIT COMPLETE WITH STANDARD ACCESSORIES.
											FCU 14A	1	SECOND FLOOR	CONFERENCE ROOM 2	3.7 (1)	WALL MOUNTED	0.03	230/1/60	FAN COIL UNIT COMPLETE WITH STANDARD ACCESSORIES.
											FCU 15A	1	SECOND FLOOR	ASSISTANT BRANCH HEAD	13.5 (4)	FLOOR STANDING	0.48	230/1/60	FAN COIL UNIT COMPLETE WITH STANDARD ACCESSORIES.
											FCU 16A	1	SECOND FLOOR	WAITING AREA	13.5 (4)	FLOOR STANDING	0.48	230/1/60	FAN COIL UNIT COMPLETE WITH STANDARD ACCESSORIES.

1 / M-002 EQUIPMENT SCHEDULE
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PLACE : MAKATI CITY

OWNER
SOCIAL SECURITY SYSTEM
6/F , SSS BUILDING EAST AVENUE, QUEZON CITY
APPROVED BY:
MR. JOSE P. BAUTISTA
SVP NCR OPERATIONS GROUP

PROJECT TITLE/LOCATION
PROPOSED THREE -STOREY SSS BUILDING
APACIBLE CORNER F. AGONCILLO STREET, ERMITA, MALATE, MANILA

SHEET CONTENTS
EQUIPMENT SCHEDULE

CADD	MCB	DATE	AUG 2019	PAPER SIZE	20X30
DESIGNED	JMA	DATE	AUG 2019	SCALE	AS SHOWN
APPROVED	RMM	DATE	AUG 2019	SHEET NO.	M-002
				PROJECT NO.	SO-G-15-010

NO.	REVISIONS	CHK	DATE
0			

AIR CONDITIONING EQUIPMENT SCHEDULE (VRV)

AIR COOLED CONDENSING UNIT											FAN COIL UNIT								
MARK	QTY	LOCATION	CAPACITY KW (TR)	COMPRESSOR TYPE	REFRIGERANT	REFRIGERANT PIPE RGL	REFRIGERANT PIPE RLL	ELECTRICAL DATA KW INPUT	ELECTRICAL DATA V/PH/HZ	REMARKS	MARK	QTY	LOCATION	AREA SERVED	CAPACITY KW (TR)	TYPE	ELECTRICAL DATA KW INPUT	ELECTRICAL DATA V/PH/HZ	REMARKS
ACCU B	1	ROOF DECK	147 (42)	HERMETICALLY SEALED SWING TYPE	R-410A	41.3	19.10	46.2	380/3/60	AIR COOLED CONDENSING UNIT C/W STANDARD ACCESSORIES	FCU 1B	1	GROUND FLOOR	MSS BACKROOM	13.5 (4)	FLOOR STANDING	0.48	230/1/60	FAN COIL UNIT COMPLETE WITH STANDARD ACCESSORIES.
											FCU 2B	1	GROUND FLOOR	MSS BACKROOM	13.5 (4)	FLOOR STANDING	0.48	230/1/60	FAN COIL UNIT COMPLETE WITH STANDARD ACCESSORIES.
											FCU 3B	1	GROUND FLOOR	WAITING AREA	13.5 (4)	FLOOR STANDING	0.48	230/1/60	FAN COIL UNIT COMPLETE WITH STANDARD ACCESSORIES.
											FCU 4B	1	GROUND FLOOR	WAITING AREA	13.5 (4)	FLOOR STANDING	0.48	230/1/60	FAN COIL UNIT COMPLETE WITH STANDARD ACCESSORIES.
											FCU 5B	1	GROUND FLOOR	WAITING AREA	13.5 (4)	FLOOR STANDING	0.48	230/1/60	FAN COIL UNIT COMPLETE WITH STANDARD ACCESSORIES.
											FCU 6B	1	GROUND FLOOR	BANK SERVICE PROVIDER	3.7 (1)	WALL MOUNTED	0.03	230/1/60	FAN COIL UNIT COMPLETE WITH STANDARD ACCESSORIES.
											FCU 7B	1	GROUND FLOOR	P.E. CENTER	7.1 (2)	WALL MOUNTED	0.05	230/1/60	FAN COIL UNIT COMPLETE WITH STANDARD ACCESSORIES.
											FCU 8B	1	GROUND FLOOR	PHYSICAL EXAMINATION ROOM	3.7 (1)	WALL MOUNTED	0.03	230/1/60	FAN COIL UNIT COMPLETE WITH STANDARD ACCESSORIES.
											FCU 9B	1	SECOND FLOOR	OVP OFFICE	7.1 (2)	WALL MOUNTED	0.05	230/1/60	FAN COIL UNIT COMPLETE WITH STANDARD ACCESSORIES.
											FCU 10B	1	SECOND FLOOR	OVP OFFICE	7.1 (2)	WALL MOUNTED	0.05	230/1/60	FAN COIL UNIT COMPLETE WITH STANDARD ACCESSORIES.
											FCU 11B	1	SECOND FLOOR	OVP OFFICE EXPANSION	7.1 (2)	WALL MOUNTED	0.05	230/1/60	FAN COIL UNIT COMPLETE WITH STANDARD ACCESSORIES.
											FCU 12B	1	SECOND FLOOR	ADMINISTRATIVE OFFICE	13.5 (4)	FLOOR STANDING	0.48	230/1/60	FAN COIL UNIT COMPLETE WITH STANDARD ACCESSORIES.
											FCU 13B	1	SECOND FLOOR	AMS SECTION	13.5 (4)	FLOOR STANDING	0.48	230/1/60	FAN COIL UNIT COMPLETE WITH STANDARD ACCESSORIES.
											FCU 14B	1	SECOND FLOOR	AMS SECTION	13.5 (4)	FLOOR STANDING	0.48	230/1/60	FAN COIL UNIT COMPLETE WITH STANDARD ACCESSORIES.

AIR CONDITIONING EQUIPMENT SCHEDULE (SPLIT TYPE)

AIR COOLED CONDENSING UNIT										FAN COIL UNIT								
MARK	QTY	LOCATION	CAPACITY KW (TR)	COMPRESSOR TYPE	REFRIGERANT	REFRIGERANT PIPE RGL	REFRIGERANT PIPE RLL	ELECTRICAL DATA KW INPUT	ELECTRICAL DATA V/PH/HZ	REMARKS	MARK	QTY	LOCATION	AREA SERVED	CAPACITY KW (TR)	TYPE	ELECTRICAL DATA KW INPUT	ELECTRICAL DATA V/PH/HZ	REMARKS
ACCU 1	1	ROOF DECK	7 (2)	HERMETICALLY SEALED SWING TYPE	R-410A	15.68	6.35	2.2	230/1/60	AIR COOLED CONDENSING UNIT C/W STANDARD ACCESSORIES	FCU 1	1	GROUND FLOOR	TELLERING SECTION	7 (2)	WALL MOUNTED	-	-	FAN COIL UNIT COMPLETE WITH STANDARD ACCESSORIES.
ACCU 2	1	ROOF DECK	3.52 (1)	HERMETICALLY SEALED SWING TYPE	R-410A	12.7	6.35	1.3	230/1/60	AIR COOLED CONDENSING UNIT C/W STANDARD ACCESSORIES	FCU 2	1	SECOND FLOOR	OFFICE OF THE DIVISION HEAD OAVP	3.52 (1)	WALL MOUNTED	-	-	FAN COIL UNIT COMPLETE WITH STANDARD ACCESSORIES.
ACCU 3	1	ROOF DECK	3.52 (1)	HERMETICALLY SEALED SWING TYPE	R-410A	12.7	6.35	1.3	230/1/60	AIR COOLED CONDENSING UNIT C/W STANDARD ACCESSORIES	FCU 3	1	SECOND FLOOR	OFFICE OF THE BRANCH HEAD	3.52 (1)	WALL MOUNTED	-	-	FAN COIL UNIT COMPLETE WITH STANDARD ACCESSORIES.
ACCU 4	1	ROOF DECK	3.52 (1)	HERMETICALLY SEALED SWING TYPE	R-410A	12.7	6.35	1.3	230/1/60	AIR COOLED CONDENSING UNIT C/W STANDARD ACCESSORIES	FCU 4	1	SECOND FLOOR	LEGAL CLUSTER HEAD	3.52 (1)	WALL MOUNTED	-	-	FAN COIL UNIT COMPLETE WITH STANDARD ACCESSORIES.
ACCU 5	1	ROOF DECK	5.28 (1.5)	HERMETICALLY SEALED SWING TYPE	R-410A	12.7	6.35	1.7	230/1/60	AIR COOLED CONDENSING UNIT C/W STANDARD ACCESSORIES	FCU 5	1	SECOND FLOOR	LEGAL CLUSTER SECTION	5.28 (1.5)	WALL MOUNTED	-	-	FAN COIL UNIT COMPLETE WITH STANDARD ACCESSORIES.
ACCU 6	1	ROOF DECK	5.28 (1.5)	HERMETICALLY SEALED SWING TYPE	R-410A	12.7	6.35	1.7	230/1/60	AIR COOLED CONDENSING UNIT C/W STANDARD ACCESSORIES	FCU 6	1	SECOND FLOOR	LEGAL CLUSTER SECTION	5.28 (1.5)	WALL MOUNTED	-	-	FAN COIL UNIT COMPLETE WITH STANDARD ACCESSORIES.
ACCU 7	1	ROOF DECK	3.52 (1)	HERMETICALLY SEALED SWING TYPE	R-410A	12.7	6.35	1.3	230/1/60	AIR COOLED CONDENSING UNIT C/W STANDARD ACCESSORIES	FCU 7	1	SECOND FLOOR	SERVER ROOM	3.52 (1)	WALL MOUNTED	-	-	FAN COIL UNIT COMPLETE WITH STANDARD ACCESSORIES.
ACCU 8	1	ROOF DECK	3.52 (1)	HERMETICALLY SEALED SWING TYPE	R-410A	12.7	6.35	1.3	230/1/60	AIR COOLED CONDENSING UNIT C/W STANDARD ACCESSORIES	FCU 8	1	SECOND FLOOR	SERVER ROOM	3.52 (1)	WALL MOUNTED	-	-	FAN COIL UNIT COMPLETE WITH STANDARD ACCESSORIES.

1 / M-003 EQUIPMENT SCHEDULE
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TIN NO. : 105-691-252
PTR NO. : 7371938
DATE : JANUARY 21, 2019
PLACE : MAKATI CITY

OWNER: SOCIAL SECURITY SYSTEM, 6/F , SSS BUILDING EAST AVENUE, QUEZON CITY
APPROVED BY: MR. JOSE P. BAUTISTA, SVP NCR OPERATIONS GROUP

PROJECT TITLE/LOCATION: PROPOSED THREE -STOREY SSS BUILDING, APACIBLE CORNER F. AGONCILLO STREET, ERMITA, MALATE, MANILA

SHEET CONTENTS: EQUIPMENT SCHEDULE

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DESIGNED	JMA	AUG 2019			
APPROVED	RNM	AUG 2019	0		

NO.	REVISIONS	CHK	DATE

PAPER SIZE	SHEET NO.
20X30	M-003
SCALE	PROJECT NO.
AS SHOWN	SO-G-15-010

VENTILATING FANS

UNIT NO.	QTY	LOCATION	AREA SERVED	TYPE	DRIVE	CAPACITY (CMH)	TOTAL STATIC PRESSURE (Pa)	MOTOR DATA				REMARKS
								W	V	PH	HZ	
EF/1.1	1	GROUND FLOOR	GENSET ROOM	WALL MOUNTED	DIRECT	650	-	30	230	1	60	WALL MOUNTED FAN COMPLETE WITH STANDARD ACCESSORIES
EF/1.2	1	GROUND FLOOR	ELECTRICAL ROOM	WALL MOUNTED	DIRECT	200	-	30	230	1	60	WALL MOUNTED FAN COMPLETE WITH STANDARD ACCESSORIES
EF/1.3	2	GROUND FLOOR & ROOF DECK	PUMP ROOM	WALL MOUNTED	DIRECT	250	-	30	230	1	60	WALL MOUNTED FAN COMPLETE WITH STANDARD ACCESSORIES
EF/1.4	1	GROUND FLOOR	RECORDS ROOM	CEILING CASSETE	DIRECT	400	100	115	230	1	60	CEILING CASSETTE FAN COMPLETE WITH STANDARD ACCESSORIES
EF/1.5	1	GROUND FLOOR	SUPPLY ROOM	CEILING CASSETE	DIRECT	200	70	40	230	1	60	CEILING CASSETTE FAN COMPLETE WITH STANDARD ACCESSORIES
EF/1.6	1	GROUND FLOOR	UTILITY ROOM	CEILING CASSETE	DIRECT	150	70	40	230	1	60	CEILING CASSETTE FAN COMPLETE WITH STANDARD ACCESSORIES
TEF/1.1	1	GROUND FLOOR	EMPLOYEE MALE & FEMALE TOILET	CABINET IN-LINE FAN	DIRECT	450	100	95	230	1	60	CABINETIN LINE FAN COMPLETE WITH STANDARD ACCESSORIES
TEF/1.2	1	GROUND FLOOR	PUBLIC MALE & FEMALE TOILET	CABINET IN-LINE FAN	DIRECT	700	100	195	230	1	60	CABINETIN LINE FAN COMPLETE WITH STANDARD ACCESSORIES
WF/1	1	GROUND FLOOR	BREAST FEEDING ROOM	WALL MOUNTED	DIRECT	100	-	20	230	1	60	WALL MOUNTED FAN COMPLETE WITH STANDARD ACCESSORIES
FAF/1.1	1	GROUND FLOOR	WAITING AREA , OFFICES	CABINET IN-LINE FAN	DIRECT	1700	150	790	230	1	60	CABINETIN LINE FAN COMPLETE WITH STANDARD ACCESSORIES
FAF/1.2	1	GROUND FLOOR	WAITING AREA	CABINET IN-LINE FAN	DIRECT	1700	150	790	230	1	60	CABINETIN LINE FAN COMPLETE WITH STANDARD ACCESSORIES
TEF/2.1	1	SECOND FLOOR	DIVISION HEAD TOILET	CEILING CASSETE	DIRECT	85	25	30	230	1	60	CEILING CASSETTE FAN COMPLETE WITH STANDARD ACCESSORIES
TEF/2.2	1	SECOND FLOOR	PUBLIC MALE & FEMALE TOILET	CABINET IN-LINE FAN	DIRECT	600	100	195	230	1	60	CABINETIN LINE FAN COMPLETE WITH STANDARD ACCESSORIES
EF/2.1 & 2.2	2	SECOND FLOOR	RECORDS ROOM	CEILING CASSETE	DIRECT	250	100	195	230	1	60	CEILING CASSETTE FAN COMPLETE WITH STANDARD ACCESSORIES
EF/2.3	1	SECOND FLOOR	SUPPLY ROOM	CEILING CASSETE	DIRECT	150	70	40	230	1	60	CEILING CASSETTE FAN COMPLETE WITH STANDARD ACCESSORIES
EF/2.4	1	SECOND FLOOR	UTILITY ROOM	CEILING CASSETE	DIRECT	85	25	30	230	1	60	CEILING CASSETTE FAN COMPLETE WITH STANDARD ACCESSORIES
FAF/2.1	1	SECOND FLOOR	OVP,LEGAL CLUSTER, ASMIN	CABINET IN-LINE FAN	DIRECT	1200	150	550	230	1	60	CABINETIN LINE FAN COMPLETE WITH STANDARD ACCESSORIES
FAF/2.2	1	SECOND FLOOR	AMS SECTION	CABINET IN-LINE FAN	DIRECT	600	100	195	230	1	60	CABINETIN LINE FAN COMPLETE WITH STANDARD ACCESSORIES
EF/3.1	1	THIRD FLOOR	RECORDS ROOM	CABINET IN-LINE FAN	DIRECT	1100	150	400	230	1	60	CABINETIN LINE FAN COMPLETE WITH STANDARD ACCESSORIES
EF/3.2	1	THIRD FLOOR	RECORDS ROOM	CABINET IN-LINE FAN	DIRECT	1100	150	400	230	1	60	CABINETIN LINE FAN COMPLETE WITH STANDARD ACCESSORIES

AIR CURTAIN

ITEM	UNIT NO.	QTY	LOCATION	TYPE	CAPACITY (CMH)	MOTOR DATA				DIMENSION	WEIGHT (KG)	REMARKS
						W	V	PH	HZ			
1	AC/1	2	MAIN ENTRANCE / EXIT	AMBIENT / NO HEAT	1240 / 2600	650	230	1	60	1550 x 450 x 300	50	HORIZONTAL MOUNTING AIR CURTAIN COMPLETE WITH STANDARD ACCESSORIES.

AUTO FAN

UNIT NO.	QTY.	FLOOR LEVEL	LOCATION	TYPE	RPM		MOTOR DATA			
					LOW	HIGH	W	V	PH	HZ
OF/3.1 TO 3.5	5	THIRD FLOOR	RECORDS ROOM	OSCILLATION FAN	568-694	1089-1331	18.3-22.4 LOW 46.8-57.2 HIGH	220	1	60

1 M-004 EQUIPMENT SCHEDULE

SCALE NTS

a.c.ong CONSULTING INC. Engineering + Management ISO 9001 Certified

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CERTIFIED BY

ROLANDO M. MANAOAT
PROFESSIONAL MECHANICAL ENGINEER

REG. NO.: 4659
TIN NO. : 105-691-252
PTR NO. : 7371938
DATE : JANUARY 21, 2019
PLACE : MAKATI CITY

OWNER

SOCIAL SECURITY SYSTEM
6/F , SSS BUILDING EAST AVENUE, QUEZON CITY

APPROVED BY: MR. JOSE P. BAUTISTA
SVP NCR OPERATIONS GROUP

PROJECT TITLE/LOCATION

PROPOSED THREE -STOREY SSS BUILDING

APACIBLE CORNER F. AGONCILLO STREET, ERMITA, MALATE, MANILA

SHEET CONTENTS

EQUIPMENT SCHEDULE

CADD	DATE	NO.	REVISIONS	CHK	DATE	PAPER SIZE: 20X30
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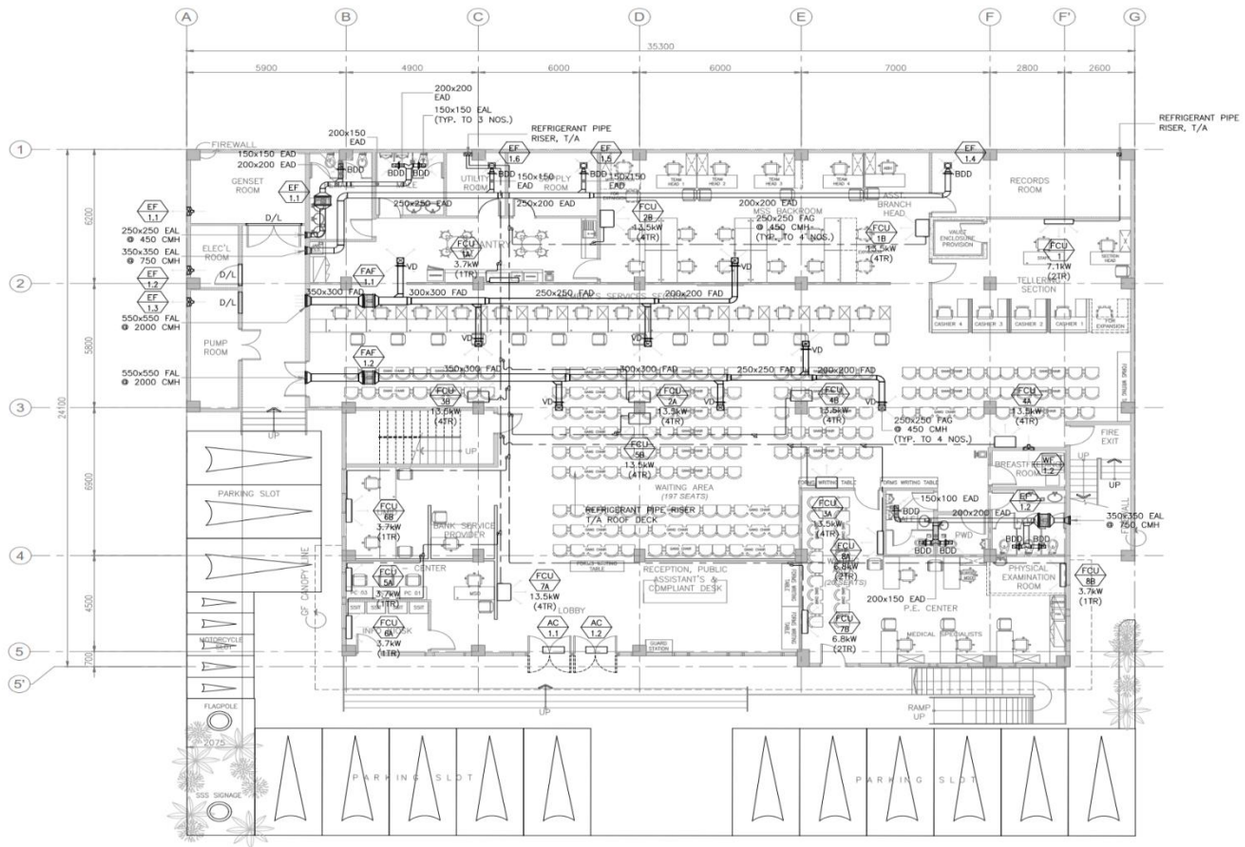
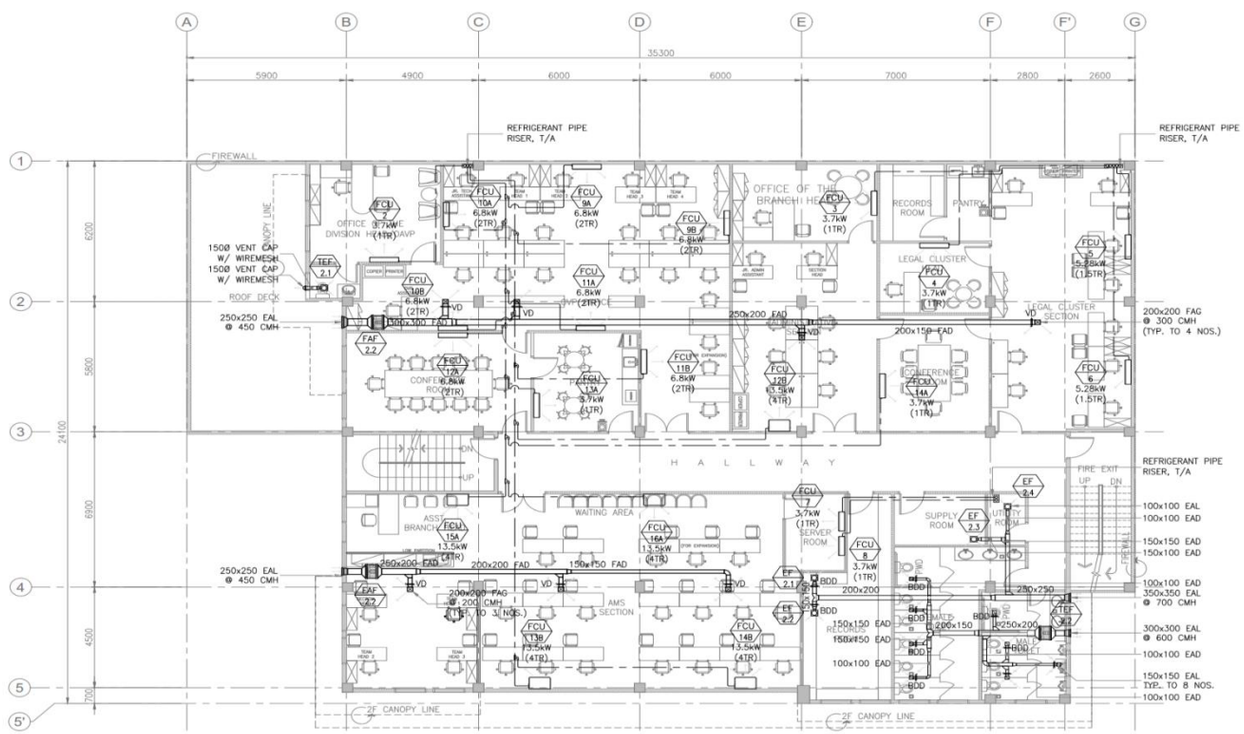
DESIGNED	DATE					SCALE: AS SHOWN
JMA	AUG 2019					PROJECT NO.: SO-G-15-010
APPROVED	DATE					
RMM	AUG 2019	0				



I M-005 GROUND FLOOR A/C & VENTILATION LAYOUT

SCALE 1:100M

a.c.ong CONSULTING INC. Engineering + Management ISO 9001 Certified	CERTIFIED BY: ROLANDO M. MANAOAT, PROFESSIONAL MECHANICAL ENGINEER	REG. NO.: 4659 TIN NO. : 105-691-252 PTR NO. : 7371938 DATE : JANUARY 21, 2019 PLACE : MAKATI CITY	OWNER: SOCIAL SECURITY SYSTEM, 6/F , SSS BUILDING EAST AVENUE, QUEZON CITY APPROVED BY: MR. JOSE P. BAUTISTA, SVP NCR OPERATIONS GROUP	PROJECT TITLE/LOCATION: PROPOSED THREE -STOREY SSS BUILDING, APACIBLE CORNER F. AGONCILLO STREET, ERMITA, MALATE, MANILA	SHEET CONTENTS: GROUND FLOOR A/C & VENTILATION LAYOUT	CADD: MCB AUG 2019 DESIGNED: JMA AUG 2019 APPROVED: RMM AUG 2019	NO. 0	REVISIONS	CHK	DATE	PAPER SIZE: 20X30 SCALE: AS SHOWN	SHEET NO.: M-005 PROJECT NO.: SO-G-15-010

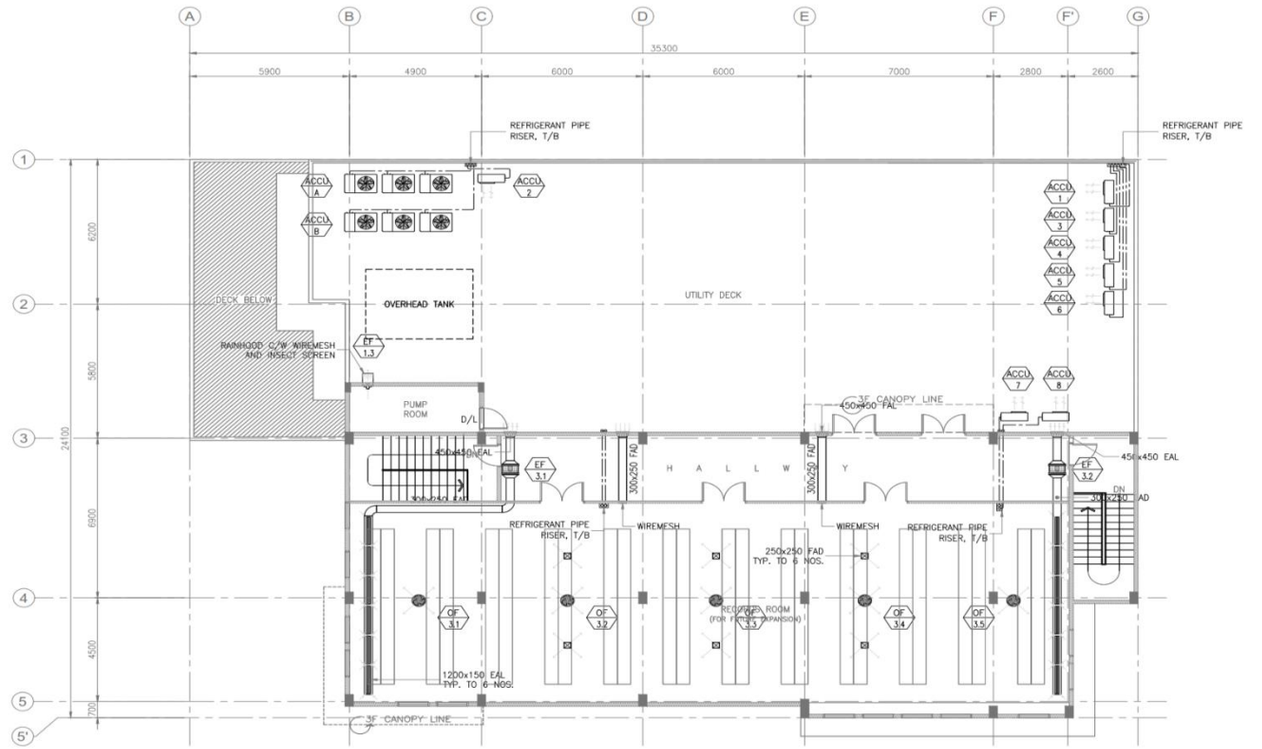


SECOND FLOOR A/C & VENTILATION LAYOUT

I / M-006

SCALE 1:100M

a.c.ong CONSULTING INC. Engineering + Management ISO 9001 Certified	CERTIFIED BY: ROLANDO M. MANAOAT, PROFESSIONAL MECHANICAL ENGINEER	REG. NO.: 4659 TIN NO. : 105-691-252 PTR NO. : 7371938 DATE : JANUARY 21, 2019 PLACE : MAKATI CITY	OWNER: SOCIAL SECURITY SYSTEM, 6/F , SSS BUILDING EAST AVENUE, QUEZON CITY APPROVED BY: MR. JOSE P. BAUTISTA, SVP NCR OPERATIONS GROUP	PROJECT TITLE/LOCATION: PROPOSED THREE -STOREY SSS BUILDING, APACIBLE CORNER F. AGONCILLO STREET, ERMITA, MALATE, MANILA	SHEET CONTENTS: SECOND FLOOR A/C & VENTILATION LAYOUT	CADD: MCB AUG 2019 DESIGNED: JMA AUG 2019 APPROVED: RMM AUG 2019	NO. 0	REVISIONS	CHK	DATE	PAPER SIZE: 20X30 SCALE: AS SHOWN	SHEET NO.: M-006 PROJECT NO.: SO-G-15-010



1 / M-006 THIRD FLOOR A/C & VENTILATION LAYOUT

SCALE 1:100M

a.c.ong CONSULTING INC. Engineering + Management ISO 9001 Certified	CERTIFIED BY		OWNER	PROJECT TITLE/LOCATION	SHEET CONTENTS	CADD	DATE	NO.	REVISIONS	CHK	DATE	PAPER SIZE	SHEET NO.
	ROLANDO M. MANAOAT	REG. NO.: 4659	SOCIAL SECURITY SYSTEM	PROPOSED THREE -STOREY SSS BUILDING	THIRD FLOOR A/C & VENTILATION LAYOUT	MCB	AUG 2019					20X30	M-007
	PROFESSIONAL MECHANICAL ENGINEER	PTR NO. : 7371938	6/F , SSS BUILDING EAST AVENUE, QUEZON CITY			DESIGNED	DATE					SCALE	PROJECT NO.
		DATE : JANUARY 21, 2019	APPROVED BY: MR. JOSE P. BAUTISTA, SVP NCR OPERATIONS GROUP	APACIBLE CORNER F. AGONCILLO STREET, ERMITA, MALATE, MANILA		JMA	AUG 2019					AS SHOWN	SO-G-15-010
		PLACE : MAKATI CITY				APPROVED	DATE						
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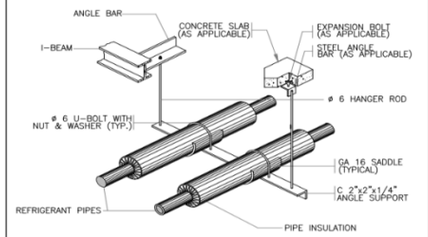

1 M-008 REFRIGERANT PIPE HANGER
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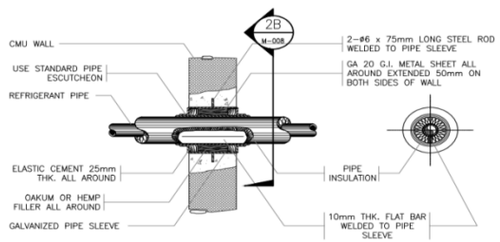
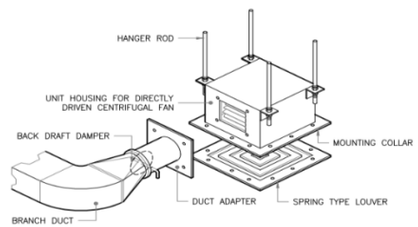
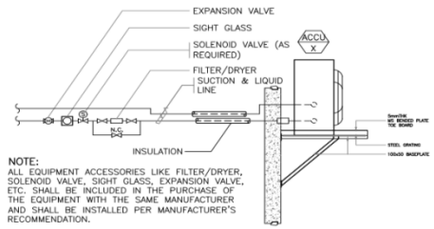


2A M-008 ELEVATION SCALE NTS
2B M-008 SECTION SCALE NTS

2 M-008 TYP. ACCU MOUNTING DETAIL
SCALE NTS



3 M-008 CEILING EXHAUST FAN DETAIL
SCALE NTS



4 M-008 TYP. ACCU MOUNTING DETAIL
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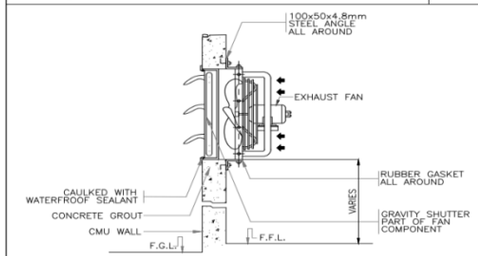
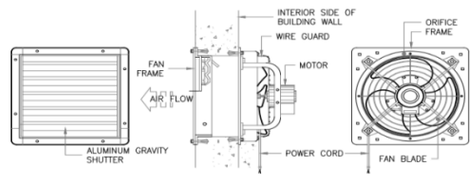
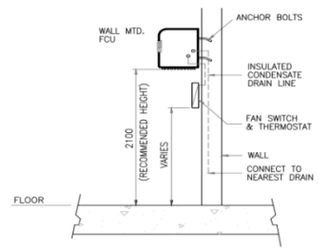


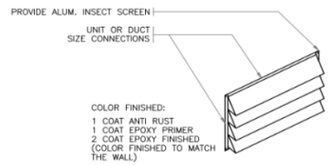
5 M-008 WALL MOUNTED EXHAUST FAN WEATHER PROOF HOOD
SCALE NTS



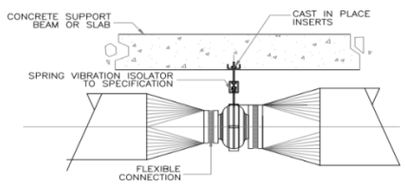
6 M-008 PROPELLER EXHAUST FAN DETAIL
SCALE NTS



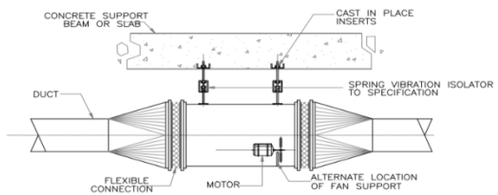
7 M-008 DETAIL (WALL MOUNTED) FCU INSTALLATION
SCALE NTS



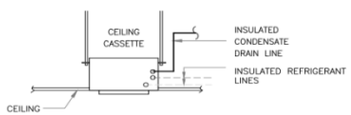
8 M-008 EXHAUST/ FRESH AIR GRILLE
SCALE NTS



9 M-008 IN - LINE CENTRIFUGAL FAN
SCALE NTS



10 M-008 IN - LINE CABINET FAN
SCALE NTS



11 M-008 DETAIL (CEILING CASSETTE) FCU INSTALLATION
SCALE NTS

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ISO 9001 Certified
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PLACE : MAKATI CITY

OWNER
SOCIAL SECURITY SYSTEM
6/F , SSS BUILDING EAST AVENUE, QUEZON CITY
APPROVED BY:
MR. JOSE P. BAUTISTA
SVP NCR OPERATIONS GROUP

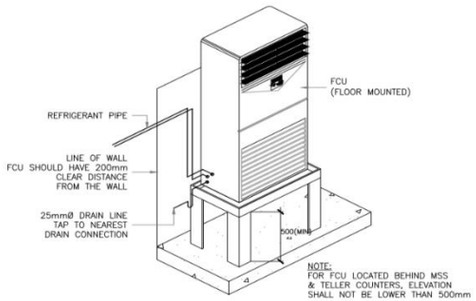
PROJECT TITLE/LOCATION
PROPOSED THREE -STOREY SSS BUILDING
APACIBLE CORNER F. AGONCILLO STREET, ERMITA, MALATE, MANILA

SHEET CONTENTS
MISCELLANEOUS DETAILS

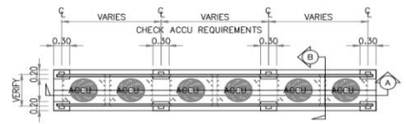
CADD	MCB	AUG 2019			
DESIGNED		DATE			
JMA		AUG 2019			
APPROVED		DATE			
RMM		AUG 2019	0		

NO.	REVISIONS	CHK	DATE

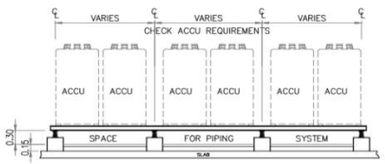
PAPER SIZE	SHEET NO.
20X30	M-008
SCALE	PROJECT NO.
AS SHOWN	SO-G-15-010



1 M-009 FCU (FLOOR STANDING) INSTALLATION DETAIL
SCALE NTS



2A M-009 ACCU PAD PLAN
SCALE NTS



2B M-009 ELEVATION
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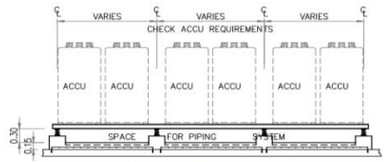

2C M-009 SECTION - A
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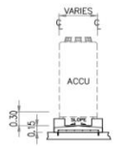

2D M-009 SECTION - B
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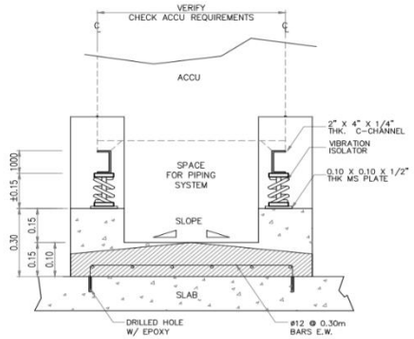

2E M-009 BLOW-UP DETAIL
SCALE NTS

2 M-009 ACCU PAD DETAIL
SCALE NTS

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SOCIAL SECURITY SYSTEM

6/F SSS Building, East Avenue, Quezon City

Proposed One-storey SSS Building

Bangay Buttong, Laoag City

Technical Specifications - Mechanical

August 2019

Rolando M. Manaoat, PME
Mechanical Engineer

PRC No. : 4659
PTR No. : 7371938
Issued in : Makati City
Date : January 21, 2019

2/F LTA Building
118 Perea Street
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Document Status					
Rev No.	Author	Reviewer	Approved for Issue		
			Name	Signature	Date
0	JMA	RMM	A. C. Ong		AUG 2019

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Contents

SUBMITTALS

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1.1.4 Product Data

1.1.5 Shop Drawings

1.1.6 Samples

1.1.7 Design data

1.1.8 Test reports

1.1.9 Certificates

1.1.10 Manufacturer's instructions

1.1.11 Manufacturer's field reports

1.1.12 Erection drawings

1.1.13 Construction photographs

1.2 RELATED SECTIONS

A. Contract Closeout: Contract closeout submittals.

1.3 REFERENCES

A. AGC (Associated General Contractors of America) publication "The Use of CPM in Construction - A Manual for General Contractors and the Construction Industry".

1.4 SUBMITTAL PROCEDURES

A. Transmit each submittal with Architect/Engineer accepted form.

B. Sequentially number the transmittal form. Revise submittals with original number and a sequential alphabetic suffix.

C. Identify Project, Contractor, Subcontractor or supplier; pertinent drawing and detail number, and specification section number, as appropriate.

D. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of Products required, field dimensions, adjacent construction Work,

and coordination of information is in accordance with the requirements of the Work and Contract Documents.

E. Schedule submittals to expedite the Project, and deliver to Architect/Engineer at business address. Coordinate submission of related items.

F. For each submittal for review, allow 15 days excluding delivery time to and from the Contractor.

G. Identify variations from Contract Documents and Product or system limitations which may be detrimental to successful performance of the completed Work.

H. Provide space for Contractor and Architect/Engineer review stamps.

I. When revised for resubmission, identify all changes made since previous submission.

J. Distribute copies of reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with requirements.

K. Submittals not requested will not be recognized or processed.

1.5 CONSTRUCTION PROGRESS SCHEDULES

A. Submit initial schedule in duplicate within 15 days after date established in Notice to Proceed.

B. Revise and resubmit as required.

C. Submit revised schedules with each Application for Payment, identifying changes since previous version.

D. Submit network analysis diagram using the critical path method, as outlined in AGC - The Use of CPM in Construction.

E. Show complete sequence of construction by activity, identifying Work of separate stages and other logically grouped activities. Indicate the early and late start, early and late finish, float dates, and duration.

F. Indicate estimated percentage of completion for each item of Work at each submission.

G. Indicate submittal dates required for shop drawings, product data, samples, and product delivery dates, including those furnished by Owner and required by Allowances.

1.6 PROPOSED PRODUCTS LIST

A. Within 15 days after date of Notice to Proceed, submit list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.

B. For products specified only by reference standards, give manufacturer, trade name, model or catalog designation, and reference standards.

1.7 PRODUCT DATA

A. Product Data for Review:

1. Submitted to Architect/Engineer for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents.

2. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article above and for record documents purposes described in CONTRACT CLOSEOUT.

B. Product Data for Information:

1. Submitted for the Architect/Engineer's knowledge as contract administrator or for the Owner.

C. Product Data for Project Close-out:

1. Submitted for the Owner's benefit during and after project completion.

D. Submit the number of copies which the Contractor requires, plus three (3) copies which will be retained by the Architect/Engineer.

E. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.

F. Indicate Product utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

G. After review distribute in accordance with the Submittal Procedures article above and provide copies for record documents described in CONTRACT CLOSEOUT.

1.8 SHOP DRAWINGS

A. Shop Drawings For Review:

1. Submitted to Architect/Engineer for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents.

2. After review, produce copies and distribute in accordance with SUBMITTAL PROCEDURES article above and for record documents purposes described in CONTRACT CLOSEOUT.

B. Shop Drawings For Information:

1. Submitted for the Architect/Engineer's knowledge as contract administrator or for the Owner.

1.10 DESIGN DATA

A. Submit for the Architect/Engineer's knowledge as contract administrator or for the Owner.

B. Submit for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.

1.11 TEST REPORTS

A. Submit for the Architect/Engineer's knowledge as contract administrator or for the Owner.

B. Submit test reports for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.

1.12 CERTIFICATES

A. When specified in individual specification sections, submit certification by the manufacturer, installation/application Subcontractor, or the Contractor to Architect/Engineer, in quantities specified for Product Data.

B. Indicate material or Product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.

C. Certificates may be recent or previous test results on material or Product, but must be acceptable to Architect/Engineer.

1.13 MANUFACTURER'S INSTRUCTIONS

A. When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, to Architect/Engineer for delivery to Owner in quantities specified for Product Data.

B. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

1.14 MANUFACTURER'S FIELD REPORTS

A. Submit reports for the Architect/Engineer's benefit as contract administrator or for the Owner.

B. Submit report in duplicate within 30 days of observation to Architect/Engineer for information.

C. Submit for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.

1.15 ERECTION DRAWINGS

A. Submit drawings for the Architect/Engineer's for review and approval and benefit as contract administrator or for the Owner.

B. Submit for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.

C. Data indicating inappropriate or unacceptable Work may be subject to action by the Architect/Engineer or Owner.

1.16 CONSTRUCTION PHOTOGRAPHS

A. Photographs taken during the construction and progress reports submit by the contractor.

CONTRACT CLOSEOUT

PART 1 - GENERAL

1.1 SECTION INCLUDES

1.1.1 Closeout procedures.

1.1.2 Final cleaning.

1.1.3 Adjusting.

1.1.4 Project record documents.

1.1.5 Operation and maintenance data.

1.1.6 Spare parts and maintenance Products.

1.1.7 Warranties and bonds.

1.1.8 Maintenance service.

1.2 RELATED SECTIONS

A. Construction Facilities and Temporary Controls: Progress cleaning.

B. Starting of Systems: System start-up, testing, adjusting, and balancing.

1.3 CLOSEOUT PROCEDURES

A. Submit written certification that Contract Documents have been reviewed, Work has been inspected, and that Work is complete in accordance with Contract Documents and ready for Architect/Engineer's review.

B. Provide submittals to Architect/Engineer that are required by governing or other authorities.

C. Submit final Application for Payment identifying total adjusted Contract Sum, previous payments, and sum remaining due.

1.4 FINAL CLEANING

A. Execute final cleaning prior to final project assessment.

B. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.

C. Replace filters of operating equipment.

D. Clean debris from roofs, gutters, downspouts, and drainage systems.

E. Clean site; sweep paved areas, rake clean landscaped surfaces.

F. Remove waste and surplus materials, rubbish, and construction facilities from the site.

1.5 ADJUSTING

A. Adjust operating Products and equipment to ensure smooth and unhindered operation.

1.6 PROJECT RECORD DOCUMENTS

A. Maintain on site one set, but not limited of the following record documents; record actual revisions to the Work:

1. Drawings
2. Specifications
3. Addenda
4. Change Orders and other modifications to the Contract
5. Reviewed Shop Drawings, Product Data, and Samples
6. Manufacturer's instruction for assembly, installation, and adjusting

B. Ensure entries are complete and accurate, enabling future reference by Owner.

C. Store record documents separate from documents used for construction.

D. Record information concurrent with construction progress.

E. Specifications: Legibly mark and record at each Product section description of actual Products installed, including the following:

1. Manufacturer's name and product model and number
2. Product substitutions or alternates utilized.
3. Changes made by Addenda and modifications.

F. Record Drawings and Shop Drawings : Legibly mark each item to record actual construction including:

1. Measured depths of foundations in relation to finish first floor datum.
2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
4. Field changes of dimension and detail.
5. Details not on original Contract drawings.

G. Submit documents to Architect/Engineer with claim for final Application for Payment.

1.7 OPERATION AND MAINTENANCE DATA

A. Submit data bound in 8-1/2 x 11 inch (A4) text pages, three D side ring binders with durable plastic covers.

B. Prepare binder cover with printed title "OPERATION AND MAINTENANCE INSTRUCTIONS", title of project , and subject matter of binder when multiple binders are required.

C. Internally subdivide the binder contents with permanent page dividers, logically organized as described below; with tab titling clearly printed under reinforced laminated plastic tabs.

D. Contents: Prepare a Table of Contents for each volume, with each Product or system description identified, typed on 20 pound white paper, in three parts as follows:

1. Part 1: Directory, listing names, addresses, and telephone numbers of Architect/Engineer, Contractor, Subcontractors, and major equipment suppliers.

2. Part 2: Operation and maintenance instructions, arranged by process flow and subdivided by specification section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Identify the following:

   A. Significant design criteria.
   B. List of equipment.
   C. Parts list for each component.
   D. Operating instructions.
   E. Maintenance instructions for equipment and systems.
   F. Maintenance instructions for finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.

3. Part 3: Project documents and certificates, including the following:

   A. Shop drawings and product data.
   B. Air balance reports.
   C. Certificates.
   D. Originals of warranties
   E. Submit
   F. Submit one (1) draft copy of completed volumes 30 days prior to final inspection. This copy will be reviewed and returned after final inspection, with Architect/Engineer comments. Revise content of all document sets as required prior to final submission.
   E. Submit three sets of revised final volumes, within 15 days after final inspection.

1.8 SPARE PARTS AND MAINTENANCE PRODUCTS

A. Provide spare parts, maintenance, and extra Products in quantities specified in individual specification sections.

B. Deliver to Project site and place in location as directed; obtain receipt prior to final payment.

1.9 WARRANTIES AND BONDS

A. Provide notarized copies.

B. Execute and assemble transferable warranty documents from Subcontractors, suppliers, and manufacturers.

C. Provide Table of Contents and assemble in three D side ring binder with durable plastic cover.

D. Submit prior to final Application for Payment.

E. For items of Work delayed beyond date of Substantial Completion, provide updated submittal within days after acceptance, listing date of acceptance as start of warranty period.

1.10 MAINTENANCE SERVICE

A. Furnish service and maintenance of components indicated in specification sections for two year from date of Substantial Completion.

B. Examine system components at a frequency consistent with reliable operation. Clean, adjust, and lubricate as required.

C. Include systematic examination, adjustment, and lubrication of components. Repair or replace parts whenever required. Use parts produced by the manufacturer of the original component.

D. Maintenance service shall not be assigned or transferred to any agent or Subcontractor without prior written consent of the Owner.

TESTING, ADJUSTING, AND BALANCING

PART 1 - GENERAL

1.1 SECTION INCLUDES BUT NOT LIMITED INTO FOLLOWING

A. Testing, adjustment, and balancing of air systems.
B. Measurement of final operating condition of HVAC systems.
C. Sound measurement of equipment operating conditions.
D. Vibration measurement of equipment operating conditions.

1.2 REFERENCES

A. ASHRAE 111 - Practices for Measurement, Testing, Adjusting, and Balancing of Building Heating, Ventilation, Air-conditioning, and Refrigeration Systems.

B. SMACNA - HVAC Systems Testing, Adjusting, and Balancing.
C. NEBB - National Environmental Balancing Bureau
D. NFPA - National Fire Protection Agency
E. PSME CODE - Philippine Society of Mechanical Engineering Code
F. National Building Codes

1.3 SUBMITTALS

A. Submit under provisions of Submittal Procedure.
B. Submit name detail of adjusting and balancing agency for approval within 30 days after award of Contract.
C. Prior to commencing work, submit report forms or outlines indicating adjusting, balancing, and equipment data required.
D. Submit draft copies of report for review prior to final acceptance of Project. Provide final copies for Architect/Engineer and for inclusion in operating and maintenance manuals.
E. Provide reports in soft cover, letter size, 3-ring binder manuals, complete with index page and indexing tabs, with cover identification at front and side. Include set of reduced drawings with air outlets and equipment identified to correspond with data sheets, and indicating thermostat locations.
F. Include detailed procedures, agenda, sample report forms prior to commencing system balance.
G. Test Reports: Indicate data on forms prepared following mentioned in section 1.2, Submit data in S.I. Metric units.

1.4 PROJECT RECORD DOCUMENTS

A. Submit under provisions of Contract Closeout.

1.5 QUALITY ASSURANCE

A. Perform total system balance in accordance with section 1.2 - References.
B. Maintain two copies of each document on site.

1.6 QUALIFICATIONS

A. Agency: Company specializing in the testing, adjusting, and balancing of systems specified in this Section with minimum three years documented experience.

B. Perform Work under supervision of registered Professional Engineer experienced in performance of this Work and licensed at the place where the Project is located.

1.7 PRE-BALANCING CONFERENCE

A. Convene one week prior to commencing work of this section.

1.8 DUCT LEAKEAGE TEST

Submit test procedure will done by the contractor for approval according into following into above code & reference stated on section 1.2

PART 2 - EXECUTION

2.1 EXAMINATION

A. Verify that systems are complete and operable before commencing work. Ensure but not limited into the following conditions and requested by client/engineers:

1. Systems are started and operating in a safe and normal condition.
2. Temperature control systems are installed complete and operable.
3. Proper & sufficient thermal overload protection is in place for electrical equipment. (independent breaker is recommended for multiple indoor unit
4. Duct systems are clean of debris.
5. Fans are rotating correctly.
6. Air coil fins are cleaned and combed.
7. Air outlets are installed and connected.
8. Duct system leakage is minimized.

B. Submit field reports. Report defects and deficiencies noted during performance of services which prevent system balance.

C. Beginning of work means acceptance of existing conditions.

2.2 PREPARATION

A. Provide instruments required for testing, adjusting, and balancing operations. Make instruments available to Architect/Engineer to facilitate spot checks during testing.

B. Provide additional balancing devices as required.

2.3 INSTALLATION TOLERANCES

A. Air Outlets and Inlets: Adjust total to within plus 10 percent and minus 5 percent of design to space. Adjust outlets and inlets in space to within plus or minus 10 percent of design.

2.4 ADJUSTING

A. Ensure recorded data represents actual measured or observed conditions.

B. Permanently mark settings of valves, dampers, and other adjustment devices allowing settings to be restored. Set and lock memory stops.

C. After adjustment, take measurements to verify balance has not been disrupted or that such disruption has been rectified.

D. Leave systems in proper working order, replacing belt guards, closing access doors, closing doors to electrical switch boxes, and restoring thermostats to specified settings.

E. At final inspection, recheck random selections of data recorded in report. Recheck points or areas as selected and witnessed by the Owner.

F. Check and adjust systems approximately six months after final acceptance and submit report.

2.5 AIR SYSTEM PROCEDURE

A. Adjust air distribution systems to provide required or design supply, return, and exhaust air quantities .

B. Make air quantity measurements in ducts by Pitot tube traverse of entire cross sectional area of duct.

C. Measure air quantities at air inlets and outlets.

D. Adjust distribution system to obtain uniform space temperatures free from objectionable drafts and noise.

E. Use volume control devices to regulate air quantities only to extend that adjustments do not create objectionable air motion or sound levels. Effect volume control by duct internal devices such as dampers and splitters.

F. Vary total system air quantities by adjustment of fan speeds. Provide drive changes required. Vary branch air quantities by damper regulation.

G. Provide system schematic with required and actual air quantities recorded at each outlet or inlet.

H. Measure static air pressure conditions on air supply units, including filter and coil pressure drops, and total pressure across the fan. Make allowances for 50 percent loading of filters.

I. Adjust outside air automatic dampers, outside air, return air, and exhaust dampers for design conditions.

J. Measure temperature conditions across outside air, return air, and exhaust dampers to check leakage.

K. Where modulating dampers are provided, take measurements and balance at extreme conditions.

L. Measure building static pressure and adjust supply, return, and exhaust air systems to provide required relationship between each to maintain approximately 0.05 inches (12.5 Pa) positive static pressure in clean rooms.

M. Check multi-zone units for motorized damper leakage. Adjust air quantities with mixing dampers set first for cooling, then heating, then modulating.

2.6 SCHEDULES

A. Equipment Requiring Testing, Adjusting, and Balancing

Fans
Air Inlets and Outlets
ACCU/FCU
Duct Branches

B. Report Forms

1. Title Page:
   a. Name of Testing, Adjusting, and Balancing Agency
   b. Address of Testing, Adjusting, and Balancing Agency
   c. Telephone number of Testing, Adjusting, and Balancing Agency
   d. Project name
   e. Project location
   f. Project Architect
   g. Project Engineer
   h. Project Contractor
   i. Project altitude
   j. Report date

2. Summary Comments:
   a. Design versus final performance
   b. Notable characteristics of system
   c. Description of systems operation sequence
   d. Summary of outdoor and exhaust flows to indicate amount of building pressurization
   e. Nomenclature used throughout report
   f. Test conditions

3. Instrument List:
   a. Instrument
   b. Manufacturer
   c. Model number

d. Serial number
e. Range
f. Calibration date

4. Electric Motors:
   a. Manufacturer
   b. Model/Frame
   c. HP/BHP
   d. Phase, voltage, amperage; nameplate, actual, no load
   e. RPM
   f. Service factor
   g. Starter size, rating, heater elements
   h. Sheave Make/Size/Bore

5. Air Moving Equipment
   a. Location
   b. Manufacturer
   c. Model number
   d. Serial number
   e. Arrangement/Class/Discharge
   f. Air flow, specified and actual
   g. Return air flow, specified and actual
   h. Outside air flow, specified and actual
   i. Total static pressure (total external), specified and actual
   j. Inlet pressure
   k. Discharge pressure
   l. Sheave Make/Size/Bore
   m. Number of Belts/Make/Size
   n. Fan RPM

6. Exhaust Fan Data:
   a. Location
   b. Manufacturer
   c. Model number
   d. Serial number
   e. Air flow, specified and actual
   f. Total static pressure (total external), specified and actual
   g. Inlet pressure
   h. Discharge pressure
   i. Sheave Make/Size/Bore
   j. Number of Belts/Make/Size
   k. Fan RPM

7. Duct Traverse:
   a. System zone/branch
   b. Duct size
   c. Area
   d. Design velocity
   e. Design air flow
   f. Test velocity
   g. Test air flow
   h. Duct static pressure
   i. Air temperature
   j. Air correction factor

11. Duct Leak Test:
    a. Description of ductwork under test
    b. Duct design operating pressure
    c. Duct design test static pressure
    d. Duct capacity, air flow
    e. Maximum allowable leakage duct capacity times leak factor
    f. Test apparatus
        1. Blower
        2. Calibrated
    g. Test static pressure
    i. Leakage

12. Flow Measuring Station:
    a. Identification/number
    b. Location
    c. Size
    d Manufacturer
    e. Model number
    f. Serial number
    g. Design Flow rate
    h. Design pressure drop
    i. Actual/final pressure drop
    j. Actual/final flow rate
    k. Station calibrated setting

13. Air Distribution Test Sheet:
    a. Air terminal number
    b. Room number/location
    c. Terminal type
    d. Terminal size
    e. Area factor
    f. Design velocity
    g. Design air flow
    h. Test (final) velocity
    i. Test (final) air flow
    j. Percent of design air flow

14. Sound Level Report:
    a. Location
    b. Octave bands - equipment off
    c. Octave bands - equipment on

15. Vibration Test:
    a. Location of points:
        1. Fan bearing, drive end
        2. Fan bearing, opposite end
        3. Motor bearing, center (if applicable)
        4. Motor bearing, drive end
        5. Motor bearing, opposite end
        6. Casing (bottom or top)
        7. Casing (side)
        8. Duct after flexible connection (discharge)
        9. Duct after flexible connection (suction)

b. Test readings:

1. Horizontal, velocity and displacement
2. Vertical, velocity and displacement
3. Axial, velocity and displacement

c. Normally acceptable readings, velocity and acceleration

d. Unusual conditions at time of test

e. Vibration source (if non-complying)

AIR CONDITIONING SYSTEMS

PART 1 - GENERAL

1.1 APPLICABLE PUBLICATIONS:

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

1.1.1 Air Conditioning and Refrigeration Institute (ARI) Publications:

210-81	Unitary Air Conditioning Equipment
260-75	Application, Installation and Servicing of Unitary Systems
360 -83	Commercial and Industrial Unitary Air-Conditioning Equipment

1.1.2 Air Moving and Conditioning Association (AMCA) Publications:

210-74	Laboratory Methods of Testing Fans for Rating
99-83	Standard Handbooks
210-74	Laboratory Methods of Testing Fans for Rating

1.1.3 American Society of Heating, Refrigerating, and Air- Conditioning Engineers (ASHRAE) Inc. Publications:

1983	Equipment, Handbook and Product Directory
1980	Systems, Handbook and Product Directory
15-78	Safety Code for Mechanical Refrigeration

1.1.4 American Society for Testing and Materials (ASTM) Publications:

A386-78	Zinc-Coating (Hot-Dip) on Assembled Steel Products
B117-85	Salt Spray (Fog) Testing
B209-83	Aluminum-Alloy Sheet and Plate
B280-83	Seamless Copper Tube for Air Conditioning and Refrigeration Field Service
F 872-84	Filter Units, Air Conditioning: Viscous-Impingement Type Cleanable

1.1.5 National Electrical Manufacturer's Association (NEMA) Publications:

MG-1-1978	Motors and Generators (Rev. 82)

ICS-1978 Industrial Controls, Devices, Controllers and Assembles (Rev. 83)

1.1.6 National Fire Protection Association (NFPA) Publications:

70-81 National Electrical Code

90A-81 Air Conditioning and Ventilating Systems

91-04 Exhaust System for Air Conveying of Gases, etc.

1.1.7 Underwriters Laboratories (UL) Publications:

109-78 Tube Fittings for Flammable and Combustible Fluid Refrigeration Services and Marine Use

873-79 Temperature Indicating and Regulating Equipment

1.2 GENERAL REQUIREMENTS: "Mechanical General Requirements", with the following additions and modifications, applies.

1.3 DESCRIPTION OF WORK: The work includes the following:

1.4 SUBMITTALS: The contractor shall submit all other items for approval.

1.4.1 Manufacturer's Data:

a. Split/Multi-split Inverter Type Units (Indoor and Outdoor Unit)
b. FCU (Wall and Ceiling Mounted Type)
c. Floor Standing
d. ACCU
e. Refrigeration piping & accessories

1.4.2 Certified Test Reports

a. VRF / Split / Multi-Split Type Units (Indoor and Outdoor Unit)
b. Fans / Blower data

1.4.3 Operation and Maintenance Manuals

a. VRF / Split / Multi-Split Type Units (Indoor and Outdoor Unit)

1.4.4 Posted Operating Instructions:

a. VRF / Split / Multi-Split Type Units (Indoor and Outdoor Unit)

1.4.5 Manufacturer's Recommended Procedures:

a. Installation, including evacuation and charging procedures
b. Start-up and initial operation

1.4.6 Report of Start-Up and Initial Readings

1.5 CORROSION PREVENTION: Unless specified otherwise, equipment fabricated from ferrous metals that do not have a zinc coating conforming to ASTM A386 or a duplex coating of zinc and paint shall be treated for prevention of rust with a factory coating or paint system that will withstand 125 hours in a salt-spray fog test except that equipment located outdoors shall be tested for 500 hours. The salt spray fog test shall be in accordance with ASTM B 117 using a 20 percent sodium chloride solution. Immediately after completion of the test, the coating shall show no signs of blistering, wrinkling cracking, no loss of adhesion, and the specimen shall show no signs of rust creepage beyond 3 mm on either side of the scratch mark. The film thickness of the factory coating or paint system applied on the equipment shall be not less than film thickness used on the test specimen.

1.6 SAFETY STANDARDS:

1.6.1 Design Manufacture and Installation of Mechanical Refrigeration Equipment: ASHRAE 15-78.

1.6.2 Machine Guards: Fully guard drives mechanisms, or other moving parts in accordance with ANSI B15.1. Provide guards fabricated of steel and expanded metal, rigidly mounted, and readily removed without disassembly.

PART 2 - PRODUCTS

2.1 General: The air conditioning system shall be designed, constructed, and rating tested in accordance with ARI Standard 430. Units shall be ARI certified.

2.2 Performance Rating: Cooling capacity of unit shall meet the total heat requirements indicated. Submittal shall include catalog selection data, which accounts for entering air conditions at evaporator, and condenser air conditions.

2.3 Air Conditioner; Split / Multi-Split Type: The unit shall be a multi-split system full inverter controlled compressor capable of changing the speed linearly to follow variations in cooling load. The indoor units shall be constructed for indoor installation and the outdoor unit shall be completely weather- proofed for outdoor installation. Both indoor and outdoor units shall be properly assembled, internally piped and wired, thoroughly tested, and charged with R32 refrigerant at the factory or any modern type refrigerant.

Cooling capacity - The total capacity of the multi-system full inverter controlled compressor (kW) shall be as shown on the equipment schedule.

2.3.1 Indoor Units:

Units shall have capacities at the operating conditions specified. They shall include an evaporator coil, expansion valve, centrifugal type air circulation blower, permanent type air filter, condensate drip pan and insulated decorative cabinet with discharge plenum, supply and return air grilles.

a. Refrigeration Cycle – The refrigeration cycle shall be equipped with heat exchanger, an electronic expansion valve, solenoid valves and flare connections.

b. Indoor Fan and Fan Motor – The indoor fan shall be the multi-blade centrifugal type, statically and dynamically balanced and direct driven by an electric motor. The motor bearing shall be permanently lubricated. The fan shall deliver air flow indicated on the schedule, nominal air flow for the model selected. They shall be provided with a combination fan switch and thermostat. Three operating positions can be selected according to the required conditions. Fan motor shall be equipped with overload protection.

c. Indoor Heat Exchanger – The heat exchanger shall be multi-pass, cross-finned tube type, equipped with highly-efficient aluminum fins, mechanically bonded to seamless, oxygen free copper tubes. The fins shall be spaced at no more than 12 fins per 25.4 mm. The face area shall not be less than the manufacturer's recommendation. The coil shall be cleaned, dehydrated and tested for leakage at the factory.

2.3.2 Outdoor Unit:

Unit shall be air cooled, split type multi system air conditioner consisting of one, two or three outdoor unit and multiple indoor units, each having capability to cool independently for the requirements of the rooms, connectible to multiple indoor units that can be joined to one refrigerant circuit and controlled individuality.

a. Full Inverter controlled compressor shall be capable of changing the speed linearly to follow variations in cooling and heating load. Outdoor unit shall be suitable for mix-match connection of the following type of indoor units.
   - Floor Standing Type
   - Wall Mounted Type
   - Ceiling Mounted

b. Capacity

   Unit shall have a total capacity as shown on the equipment schedule of the plans.

c. Refrigerant circuit

   - The refrigerant circuit shall include an accumulator, plural electronic expansion valves, one or two oil separators, a receiver and liquid and gas shut off valves. Filter drier and crankcase heaters shall be furnished.

   - The outdoor unit shall either scrolled / swing type conventional compressors and multiple inverter type compressors. The indoor unit shall be equipped with an electronic control valve to control refrigerant flow individually.

   - Refrigerant shall be R410a, R32 or any available modern refrigerant.

d. Safety Devices

   The following safety devices shall be part of the outdoor unit; high pressure switch, fused crankcase heater, fusible plug, thermal protectors for compressor and fan motor, over current protection for inverter, short recycling protection timer.

e. Oil Recovery System

Unit shall be equipped with an oil recovery system to ensure stable operation with long refrigerant piping

f. Controls

- Outdoor unit shall have a minimum of 21 capacity steps to meet load fluctuation and indoor unit individual control in case of inverter series
- Computerized PID control shall be used to maintain a correct room temperature.
- Unit shall be equipped with a self diagnosis circuit for easy maintenance and service
- The indoor unit shall be operated individually and each having a remote controller with an ON/OFF switch, a fan speed selector, a timer, a thermostat setting button and LCD which indicates temperature setting, operation mode, malfunction code and filter cleaning timing etc.
- The remote controller shall memorize the latest malfunction code for easy maintenance.
- Up to 20 indoor units can be controlled by one remote controller in case of group control operation

2.3.3 Related Accessories

a. The following accessories shall be provided:

- Piping branches and headers with insulation for quick work and smooth refrigerant flow
- Remote control devices for operation and monitoring of indoor unit from remote
- Multi-function centralized controller

b. The monitoring function shall be capable of indicating operation and trouble signals of the indoor and outdoor unit to the remote

2.3.4 Outdoor unit shall be provided with anti-corrosion treatment. Cabinet shall be constructed of galvanized steel sheet, baked with synthetic paint. The service panel shall be easily removable for service access to the electrical components and the compressor.

2.3.5 Fans: Statically and dynamically balanced, with air capacities horsepower, fan types, fan arrangement, and pressure ratings as indicated. Fan bearing life shall be minimum 200,000 hours at operating conditions. Provide guard (bird) screens for outdoor inlets and outlets. Equip with automatic back-draft damper where indicated. Housing and fan wheel shall be aluminum or steel.

a. Floor Standing Type - shall be design for quiet operation and shall match any interior design with a wide air flow wing installed turning to both sides of the air outlet to allow the air distribution in every four corners of the panel. The unit shall be provided with shutter to conceal the air outlet with the louvers when the operation is stopped. The louvers shall cover the air outlet horizontally providing a neat appearance. There shall be provision for fresh air duct connection. Install drain to meet local sanitation codes. Unit shall be provided with condensate pump installed as standard from the factory.

b. Wall Mounted Type Indoor Unit - shall be design for quiet operation, slim compact and highly performance diagonal flow cone type fan to minimize the noise. A long life filter (mildew-proof) shall be fitted as a standard with no maintenance for 2,500 hours of operation for ordinary offices.

c. Ceiling Suspended Type Indoor Unit - shall be design for quiet operation with auto-louver to automatically controls upward and downward motion of air flow and grille that serves as a shutter when stopped. A long life filter (mildew-proof) shall be fitted as a standard with no maintenance for 2,500 hours of operation. The fan shall be of a silent type with integral vibration isolators.

2.4 CLEANING, PAINTING, AND IDENTIFICATION: Cleaning, painting, and identification of piping shall be as specified under Section entitled "Painting of Building (Field Painting)".

2.5 IDENTIFICATION TAGS AND PLATES: Provide equipment, gages, thermometers, valves, and controllers with tags numbered and stamped for their use. Plates and tags shall be of brass or suitable nonferrous material, securely mounted or attached. Minimum letter and numeral size shall be 3 mm.

PART 3 - EXECUTION

3.1 INSTALLATION: Application and installation practices for unitary air-conditioning systems shall conform to the requirements of ARI 260.

3.1.1 General: Install equipment and components in a manner to insure proper and sequential operation of the equipment and its control. Installation of the system should strictly comply with the manufacturer's recommended installation practice. Manufacturer's representative should check and verify the installation to ensure it is in accordance with their recommendations. Preliminary refrigerant pipe sizes are depicted in the plan and requires to make necessary final pipe sizing that conform to their recommendation. Installation of equipment not covered herein or in the manufacturer's representative. Provide proper foundations for mounting of equipment, accessories, appurtenances, piping and controls including, but not limited to, supported vibration isolators, stands, guides, anchors, clamps and brackets. Foundations for equipment shall conform to equipment manufacturer's recommendation, unless otherwise shown on the drawings. Set anchor bolts and sleeves accurately using properly constructed templates. Anchor bolts shall be of adequate length and provided with welded-on plates on the head end embedded in the concrete. Level equipment base, using jacks or steel wedges, and neatly grouted-in with a non-shrinking type of mortar grout. Locate equipment so that working space is available for all necessary servicing such as shaft removal, disassembling compressor cylinders and pistons, replacing or adjusting drives, motors, or shaft seals, access to water valves and head of shell and tube equipment, tube cleaning or replacement, access to automatic controls, refrigerant charging, lubricator, oil draining and working clearance under overhead lines. Provide electric isolation between dissimilar metals for the purpose of minimizing galvanic corrosion.

3.1.2 Air Conditioning System: Install system as indicated, in accordance with the requirements of ASHRAE 15-78, and as recommended in the manufacturer's installation and operational instructions. All electrical control devices shall be enclosed in the indoor and outdoor units. The refrigeration cycle shall be equipped with solenoid valves and flare connections to changeover the cycle in mediating between outdoor unit and indoor unit.

3.1.3 Electrical Work: Electric motor driven equipment specified herein shall be provided complete with motors, motor starters, and controls. Electrical equipment and wiring shall be provided with complete "Interior Wiring Systems". Motor starters shall be provided complete with properly sized thermal overload protection and other appurtenances necessary for the motor control specified. Provide manual or automatic control and protective devices required for the operation, herein specified and any control wiring required for controls and devices but not indicated.

3.1.4 Refrigerant Piping: Piping and fitting installation shall conform to the requirements of ASME B31.1. Pipe shall be cut accurately to measurements established at the jobsite, and worked into place without springing or forcing, completely clearing all windows, doors, and other openings. Cutting or other weakening of the building structure to facilitate piping installation will not be permitted without written approval. Pipe or tubing shall be cut square, shall have burrs removed by reaming, and shall permit free expansion and contraction without causing damage to the building structure, pipe, joints, or hangers. Changes in direction shall be made with fittings, except that bending of pipe 100 mm (4 inches) and smaller will be permitted, provided a pipe bender is used and wide weep bends are formed. Mitering or notching pipe or other similar construction to form elbows or tees will not be permitted. The centerline radius of bends shall not be less than 6 diameters of the pipe. Bent pipe showing kinks wrinkles, flattening, or other malformations will not be accepted. Piping shall be installed 4 mm per m (1/2 inch per 10 feet) of pipe in the direction of flow to ensure adequate oil drainage. Open ends of refrigerant lines or equipment shall be properly capped or plugged during installation to keep moisture, dirt, or other foreign material out of the system. Equipment piping shall be in accordance with the equipment manufacturer's recommendations and the contract drawings. Equipment and piping arrangements shall fit into space allotted and allow adequate acceptable clearances for installation, replacement, entry, servicing, and maintenance.

3.1.5 FANS: Installation shall conform to NFPA 91, AMCA and SMACNA Round Industrial Duct Construction Standards, and SMACNA Rectangular Industrial Duct Construction Standards. Provide mounting and supports for equipment and accessories, including structural supports, hangers, vibration isolators, stands, clamps and brackets, access doors, and dampers. Install accessories in accordance with manufacturer's instructions.

3.1.5.1 Installation of Supports:

3.1.5.1.1 Selection: Selection of equipment support system shall take into account the best practice recommendations and requirements of SMACNA Round Industrial Duct Construction Standards, SMACNA Rectangular Industrial Duct Construction Standards, and NFPA 91; location and precedence of work under other sections; interferences of

various piping and electrical work; facility equipment; building configuration; structural and safety factor requirements; vibrations and imposed loads under normal and abnormal service conditions. Indicated support sizes, configurations, and spacing are the minimal type of supporting component required for normal loads. Where installed loads are excessive for the normal support spacing, provide heavier duty components or reduce the element spacing. After system start-up, replace or correct support elements, which vibrate and cause noise or possible fatigue failure.

3.2 FIELD TESTS AND INSPECTIONS

3.2.1 Tests: All tests shall be performed and the Contractor shall furnish materials and equipment required for test. Tests after installation and prior to acceptance shall be performed in the presence of the Engineer and subject to his approval. Equipment and material certified as having been successfully tested by the manufacturer in accordance with referenced specifications and standards will not require retesting before installation. Equipment and materials not tested at the place of manufacturer will be tested before or after installation, as applicable, where necessary to determine compliance with referenced specifications and standards.

3.2.1.1 Leak Testing: Upon completion of installation of the air conditioning equipment, test all factories as well as field refrigerant piping with an electronic-type leak detector to acquire leak tight refrigerant systems. If leaks are detected at the time of installation or during the guarantee period, remove the entire refrigerant charge from the system, correct the leaks and retest the system.

3.2.1.2 Evacuation, Dehydration, and Charging: After system is found to be without leaks, evacuate the system using a reliable gage and a vacuum pump capable of pulling a vacuum of at least 1 mm Hg absolute. Evacuate system in strict accordance with the triple-evacuation and blotter method or in strict accordance with equipment manufacturer's printed instructions. System leak testing, evacuation, dehydration, and charging with refrigerant shall comply with the requirements contained in ARI Standard 260.

3.2.1.3 Start-Up and Operation Tests: Follow the manufacturer's start-up and initial operation procedures and place the system under all modes of operation to ensure that it is functioning correctly. Adjust safety and automatic control instruments as necessary to ensure proper operation and sequence. Initial operation period shall be not less than 8 hours. The air conditioner manufacturer/vendor shall perform the start-up and should verify and confirm the complete installation. Manufacturer should issue acceptance of the installed system that the system is fully functional and operational according to the need of the project.

3.2.1.4 Performance Tests: Upon completion of evacuation, charging, start-up, final leak testing, and proper adjustment of controls, the system shall be performance tested to demonstrate that it complies with the performance and capacity requirements of the specifications and plans. Test the system for not less than 8 hours, during which time hourly readings shall be recorder. At the end of the test period, the readings shall be averaged and the average shall be considered to be the system performance.

REFRIGERANT PIPING AND SPECIALTIES

PART 1 : GENERAL

1.1 SECTION INCLUDES

A. Piping.

B. Refrigerant.

C. Moisture and liquid indicators.

D. Valves.

E. Strainers.

F. Check valves.

G. Pressure relief valves.

H. Filter-driers.

I. Solenoid valves.

J. Expansion valves.

K. Receivers.

L. Flexible connections.

1.2 REFERENCES

A. ARI 495 - Refrigerant Liquid Receivers.

B. ARI 710 - Liquid Line Dryers.

C. ARI 730 - Flow-Capacity Rating and Application of Suction-Line Filters and Filter-Driers

D. ARI 750 - Thermostatic Refrigerant Expansion Valves.

E. ARI 760 - Solenoid Valves for Use With Volatile Refrigerants.

F. ASHRAE 15 - Safety Code for Mechanical Refrigeration.

G. ASHRAE 34 - Number Designation of Refrigerants.

H. ASME B16.22 - Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.

I. ASME B16.26 - Cast Copper Alloy Fittings For Flared Copper Tubes.

J. ASME B31.5 - Refrigeration Piping.

K. ASTM B280 - Seamless Copper Tube for Air Conditioning and Refrigeration Field Service.

L. MSS SP58 - Pipe Hangers and Supports - Materials, Design and Manufacturer.

M. MSS SP69 - Pipe Hangers and Supports - Selection and Application.

N. MSS SP89 - Pipe Hangers and Supports - Fabrication and Installation Practices.

1.3 SYSTEM DESCRIPTION

A. Where more than one piping system material is specified ensure system components are compatible and joined to ensure the integrity of the system is not jeopardized. Provide necessary joining fittings. Ensure flanges, union, and couplings for servicing are consistently provided.

B. Provide pipe hangers and supports in accordance with ASTM B31.5 MSS SP69 unless indicated otherwise.

C. Liquid Indicators:

D. Valves

E. Refrigerant Charging Packed Angle Valve: Use in liquid line between receiver shut-off valve and expansion valve.

F. Strainers:

G. Pressure Relief Valves: Use on ASME receivers and pipe to outdoors.

H. Permanent Filter Driers:

1. Use in low temperature systems.
2. Use in systems utilizing hermetic compressors.

I. Replaceable Cartridge Filter Driers:

1. Use vertically in liquid line adjacent to receivers.
2. Use filter driers for each solenoid valve.

J. Solenoid Valves:

K. Receivers:

1. Use on systems 10 tons ,36 kW and larger, sized to accommodate pump down charge.
2. Use on systems with long piping runs.

L. Flexible Connectors: Utilize at or near compressors where piping configuration does not absorb vibration.

1.4 PROJECT RECORD DOCUMENTS

Record exact locations of equipment and refrigeration accessories on record drawings.

1.5 QUALIFICATIONS

A. Installer: Company specializing in performing the work of this section with minimum three (3) years documented experience.

B. Design piping system under direct supervision of a Professional Engineer experienced in design of this work and licensed at the place where the Project is located.

1.6 REGULATORY REQUIREMENTS

A. Conform to ASME B31.9 for installation of piping system.

B. Products Requiring Electrical Connection: Listed and classified by UL, as suitable for the purpose indicated.

PART 2 - PRODUCTS

2.1 PIPING

A. Copper Tubing: ASTM B280, Type ACR hard drawn or annealed.

1. Fittings: ASME B16.22 wrought copper.
2. Joints: Braze, AWS A5.8 BCuP silver/phosphorus/copper alloy with melting range 640 to 805 degrees C.

B. Copper Tubing to 22 mm OD: ASTM B88, Type K, annealed.

1. Fittings: ASME B16.26 cast copper.
2. Joints: Flared.

D. Pipe Supports and Anchors:

1. Conform to ASME B31.5 .
2. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.
3. Hanger Rods: Mild steel threaded both ends, threaded one end, or continuous threaded.

PART 3 - EXECUTION

3.1 PREPARATION

A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.
B. Remove scale and dirt on inside and outside before assembly.
C. Prepare piping connections to equipment with flanges or unions.

3.2 INSTALLATION

A. Install refrigeration specialties in accordance with manufacturer's instructions.
B. Route piping in orderly manner, with plumbing parallel to building structure, and maintain gradient.
C. Install piping to conserve building space and not interfere with use of space.
D. Group piping whenever practical at common elevations and locations. Slope piping one percent in direction of oil return.
E. Inserts:

1. Provide inserts for placement in concrete formwork.
2. Provide inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.
3. Where concrete slabs form finished ceiling, locate inserts flush with slab surface.

F. Where pipe support members are welded to structural building frame, brush clean, and apply one coat of zinc rich primer to welding.

G. Prepare unfinished pipe, fittings, supports, and accessories ready for finish painting. Refer to Section Painting.

H. Insulate piping.

O. Follow ASHRAE 15 procedures for charging and purging of systems and for disposal of refrigerant.

P. Fully charge completed system with refrigerant after testing.

Q. Provide electrical connection to solenoid valves.

3.3 FIELD QUALITY CONTROL

A. Test refrigeration system in accordance with ASME B31.5.

3.4 SCHEDULES

A. Pipe Hanger Spacing

Pipe Size, mm	Maximum Hanger Spacing, m	Hanger Rod, mm
12 to 32	2	9
38 to 50	3	9
62 to 75	3	13
100 t0 150	3	15
200 to 300	4.25	22

THERMAL INSULATION FOR MECHANICAL SYSTEMS

PART 1 - GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only. At the discretion of the Government, the manufacturer of any material supplied will be required to furnish test reports pertaining to any of the tests necessary to assure compliance with the standard or standards referenced in this specification.

ASHRAE 90.1 - IP	(2007; Supplement 2008; Errata 2009; Errata 2009) Energy Standard for Buildings Except Low-Rise Residential Buildings, I-P Edition
ASHRAE 90.2	(2007) Energy Efficient Design of Low-Rise Residential Buildings
ASTM A 167	(1999; R 2004) Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip
ASTM B 209	(2007) Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate
ASTM C 1136	(2008) Standard Specification for Flexible, Low Permeance Vapor Retarders for Thermal Insulation
ASTM C 1290	(2006e1) Standard Specification for Flexible Fibrous Glass Blanket Insulation Used to Externally Insulate HVAC Ducts
ASTM C 534/C 534M	(2008) Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form
MSS SP-69	(2003; R 2004) Standard for Pipe Hangers and Supports - Selection and Application
MICA Insulation Stds	(1999) National Commercial & Industrial Insulation Standards
NFPA 96	(2007) Ventilation Control and Fire Protection of Commercial Cooking Operations

1.2 SYSTEM DESCRIPTION

1.2.1 General

Provide field-applied insulation and accessories on mechanical systems as specified herein; factory-applied insulation is specified under the piping, duct or equipment to be insulated. Insulation of heat distribution systems and chilled water systems outside of buildings shall be as specified in Section UNDERGROUND ELECTRICAL DISTRIBUTION SYSTEM. Field applied insulation materials required for use on Government-furnished items as listed in the SPECIAL CONTRACT REQUIREMENTS shall be furnished and installed by the Contractor.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval/information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section SUBMITTAL PROCEDURES:

Submit the three SD types, SD-02 Shop Drawings, SD-03 Product Data, and SD-08 Manufacturer's Instructions at the same time for each system.

SD-02 Shop Drawings

Pipe Insulation Systems and Associated Accessories
Duct Insulation Systems and Associated Accessories
Equipment Insulation Systems and Associated Accessories

A booklet containing completed MICA Insulation Stds plates detailing each insulating system for each pipe, duct, or equipment insulating system, after approval of materials and prior to applying insulation.

a. The MICA plates shall detail the materials to be installed and the specific insulation application. Submit all MICA plates required showing the entire insulating system, including plates required to show insulation penetrations, vessel bottom and top heads, legs, and skirt insulation as applicable. The MICA plates shall present all variations of insulation systems including locations, materials, vapor proofing, jackets and insulation accessories.

b. If the Contractor elects to submit detailed drawings instead of edited MICA Plates, the detail drawings shall be technically equivalent to the edited MICA Plate submittal.

SD-03 Product Data

Pipe Insulation Systems
Duct Insulation Systems
Equipment Insulation Systems

A complete list of materials, including manufacturer's descriptive technical literature, performance data, catalog cuts, and installation instructions. The product number, k-value, thickness and furnished accessories including adhesives, sealants and jackets for each mechanical system requiring insulation shall be included. The product data must be copywrited, have an identifying or publication number, and shall have been published prior to the issuance date of this solicitation. Materials furnished under this section of the specification shall be submitted together in a booklet and in conjunction with the MICA plates booklet (SD-02). Annotate the product data to indicate which MICA plate is applicable.

SD-08 Samples

Thermal Insulation

After approval of materials, actual sections of installed systems, properly insulated in accordance with the specification requirements, shall be displayed. Such actual sections must remain accessible to inspection throughout the job and will be reviewed from time to time for controlling the quality of the work throughout the construction site. Each material used shall be identified, by indicating on an attached sheet the specification requirement for the material and the material by each manufacturer intended to meet the requirement. The Contracting Officer will inspect display sample sections at the jobsite. Approved display sample sections shall remain on display at the jobsite during the construction period. Upon completion of construction, the display sample sections will be closed and sealed.

Pipe Insulation Display Sections: Display sample sections shall include as a minimum an elbow or tee, a valve, dielectric waterways and flanges, a hanger with protection shield and insulation insert, or dowel as required, at support point, method of fastening and sealing insulation at longitudinal lap, circumferential lap, butt joints at fittings and on pipe runs, and terminating points for each type of pipe insulation used on the job, and for hot pipelines and cold pipelines, both interior and exterior, even when the same type of insulation is used for these services.

Duct Insulation Display Sections: Display sample sections for rigid and flexible duct insulation used on the job. A temporary covering shall be used to enclose and protect display sections for duct insulation exposed to weather.

SD-08 Manufacturer's Instructions

Pipe Insulation Systems
Duct Insulation Systems
Equipment Insulation Systems

Submit a booklet containing manufacturer's published installation instructions for the insulation systems in coordination with the submitted MICA Insulation Stds plates booklet. Annotate their installation instructions to indicate which product data and which MICA plate are applicable. The instructions must be copywrited, have an identifying or publication number, and shall have been published prior to the issuance date of this solicitation.

1.4 DELIVERY, STORAGE, AND HANDLING

Materials shall be delivered in the manufacturer's unopened containers. Materials delivered and placed in storage shall be provided with protection from weather, humidity, dirt, dust and other contaminants. The Contracting Officer may reject insulation material and supplies that become dirty, dusty, wet, or contaminated by some other means. Packages or standard containers of insulation, jacket material, cements, adhesives, and coatings delivered for use, and samples required for approval shall have manufacturer's stamp or label attached giving the name of the manufacturer and brand, and a description of the material. Insulation packages and containers shall be asbestos free.

PART 2 - PRODUCTS

2.1 STANDARD PRODUCT

Provide materials which are the standard products of manufacturers regularly engaged in the manufacture of such products and that essentially duplicate items that have been in satisfactory use for at least 2 years prior to bid opening. Provide insulation systems in accordance with the approved MICA National Insulation Standards plates as supplemented by this specification. Provide field-applied insulation for heating, ventilating, and cooling (HVAC) air distribution systems and piping systems which are located within, on, under, and adjacent to buildings; and for plumbing systems.

2.2 MATERIALS

Provide insulation that meets or exceed the requirements of ASHRAE 90.1 – IP/ASHRAE 90.2. Insulation exterior shall be cleanable, grease resistant, non-flaking and non-peeling. Materials shall be compatible and shall not contribute to corrosion, soften, or otherwise attack surfaces to which applied in either wet or dry state. Materials to be used on stainless steel surfaces shall meet ASTM C 795 requirements. Materials shall be asbestos free and conform to the following:

2.2.1 Wire

Soft annealed ASTM A 580/A 580M Type 302, 304 or 316 stainless steel, 16 or 18 gauge.

2.2.2 Insulation Bands

Insulation bands shall be 1/2 inch wide; 26 gauge stainless steel.

2.2.3 Sealants

Sealants shall be chosen from the butyl polymer type, the styrene-butadiene rubber type, or the butyl type of sealants. Sealants shall have a maximum moisture vapor transmission of 0.02 perms, and a maximum flame spread index of 25 and a maximum smoke developed index of 50 when tested in accordance with ASTM E 84.

2.3 DUCT INSULATION SYSTEMS

2.3.1 Duct Insulation

Provide factory-applied [cellular glass polyisocyanurate or phenolic foam/elastomeric insulation. Provide factory applied elastomeric closed cell or phenolic foam insulation

according to manufacturer's recommendations for insulation with manufacturer's standard reinforced fire-retardant vapor barrier, with identification of installed thermal resistance (R) value and out-of-package R value.]

2.3.1.1 Rigid Insulation

Rigid mineral fiber in accordance with ASTM C 612, Class 2 (maximum surface temperature 400 degrees F), 3 pcf average, 1-1/2 inch thick, Type IA, IB, II, III, and IV. Alternately, minimum thickness may be calculated in accordance with ASHRAE 90.2/ASHRAE 90.1 – IP.

2.3.1.2 Blanket Insulation

Blanket flexible mineral fiber insulation conforming to ASTM C 553, Type 1, Class B-3, 3/4 pcf nominal, 2.0 inches thick or Type II up to 250 degrees F. Also ASTM C 1290 Type III may be used. Alternately, minimum thickness may be calculated in accordance with ASHRAE 90.2/ASHRAE 90.1 - IP.

2.3.2 Kitchen Exhaust Ductwork Insulation

Minimum insulation thickness of 2 inches, blocks or boards, either mineral fiber conforming to ASTM C 612, Class 5, 20 pcf average or calcium silicate conforming to ASTM C 533, Type II. Provide vapor barrier for outside air connection to kitchen exhaust hood.

2.3.3 Acoustical Duct Lining

For ductwork indicated or specified in Section AIR SUPPLY, DISTRIBUTION, VENTILATION, AND EXHAUST SYSTEM to be acoustically lined, provide external insulation in accordance with this specification section and in addition to the acoustical duct lining.

2.3.4 Duct Insulation Jackets

2.3.4.1 All-Purpose Jacket

Provide insulation with insulation manufacturer's standard reinforced fire-retardant jacket with or without integral vapor barrier as required by the service. In exposed locations, provide jacket with a white surface suitable for field painting.

2.3.4.2 Metal Jackets

a. Aluminum Jackets: ASTM B 209, Temper H14, minimum thickness of 27 gauge (0.016 inch), with factory-applied polyethylene and kraft paper moisture barrier on inside surface. Provide smooth surface jackets for jacket outside dimension 8 inches and larger. Provide corrugated surface jackets for jacket outside dimension 8 inches and larger. Provide stainless steel bands, minimum width of 1/2 inch.

b. Stainless Steel Jackets: ASTM A 167 or ASTM A 240/A 240M; Type 304, minimum thickness of 33 gauge (0.010 inch), smooth surface with factory-applied polyethylene and kraft paper moisture barrier on inside surface. Provide stainless steel bands, minimum width of 1/2 inch.

2.3.4.3 Vapor Barrier/Weatherproofing Jacket

Vapor barrier/weatherproofing jacket shall be laminated self-adhesive (minimum 2 mils adhesive, 3 mils embossed) less than 0.0000 permeability, greater than 3 ply, standard grade, silver, white, black and embossed or greater than 8 ply (minimum 2.9 mils adhesive), heavy duty white or natural).

2.3.5 Weatherproof Duct Insulation

Provide ASTM C 591 Type I, polyurethane or polyisocyanate board insulation, minimum density of 1.7 pcf ASTM C 552, cellular glass thermal insulation ASTM C 534/C 534M Grade 1, Type II, flexible cellular insulation], and weatherproofing as specified in manufacturer's instruction.

2.4 EQUIPMENT INSULATION SYSTEMS

Insulate equipment and accessories as specified in Tables 4 and 5. In outside locations, provide insulation 1/2 inch thicker than specified. Increase the specified insulation thickness for equipment where necessary to equal the thickness of angles or other structural members to make a smooth, exterior surface.

PART 3 - EXECUTION

3.1 APPLICATION - GENERAL

Insulation shall only be applied to unheated and uncooled piping and equipment. Flexible elastomeric cellular insulation shall not be compressed at joists, studs, columns, ducts, hangers, etc. The insulation shall not pull apart after a one hour period; any insulation found to pull apart after one hour, shall be replaced.

3.1.1 Installation

Except as otherwise specified, material shall be installed in accordance with the manufacturer's written instructions. Insulation materials shall not be applied until [tests] [tests and heat tracing] specified in other sections of this specification are completed. Material such as rust, scale, dirt and moisture shall be removed from surfaces to receive insulation. Insulation shall be kept clean and dry. Insulation shall not be removed from its shipping containers until the day it is ready to use and shall be returned to like containers or equally protected from dirt and moisture at the end of each workday. Insulation that becomes dirty shall be thoroughly cleaned prior to use. If insulation becomes wet or if cleaning does not restore the surfaces to like new condition, the insulation will be rejected, and shall be immediately removed from the jobsite. Joints shall be staggered on multi layer insulation. Mineral fiber thermal insulating cement shall be mixed with demineralized water when used on stainless steel surfaces. Insulation, jacketing and accessories shall be installed in accordance with MICA Insulation Stds plates except where modified herein or on the drawings.

3.2 DUCT INSULATION SYSTEMS INSTALLATION

Install duct insulation systems in accordance with the approved MICA Insulation Stds plates as supplemented by the manufacturer's published installation instructions.

Except for oven hood exhaust duct insulation, corner angles shall be installed on external corners of insulation on ductwork in exposed finished spaces before covering with jacket. [Duct insulation shall be omitted on exposed supply and return ducts in air conditioned spaces [where the difference between supply air temperature and room air temperature is less than 15 degrees F] unless otherwise shown.] Air conditioned spaces shall be defined as those spaces directly supplied with cooled conditioned air (or provided with a cooling device such as a fan-coil unit) and heated conditioned air (or provided with a heating device such as a unit heater, radiator or convector).

3.2.1 *Duct Insulation Thickness*

Duct insulation thickness shall be in accordance with Table 4.

Table 4 - Minimum Duct Insulation (inches)

Cold Air Ducts	2.0
Relief Duct	1.5
Fresh Air Intake Ducts	1.5
Warm Air Ducts	2.0
Fresh Air Intake Ducts	1.5

FANS & BLOWERS

PART 1 - GENERAL

1.1 Fans shall be of the type, size, arrangement and capacity as indicated in the schedule and/or as shown on the drawings.

1.2 Unless specify, fans performance rating data shall be tested accordance with AMCA Standard 210-85 (Air Movement and Control Association), ANSI/ASHRAE Standard 51-1985 Laboratory Methods of Testing Fans for Rating". Sound ratings shall conform to AMCA Standard 300-85. "Reverberant Room Method for Sound Testing of Fans".

1.3 A computer printout of fan performance rating corresponding to the AMCA licensed data, with corrected ratings for altitude and temperature, fan operating speed, bearing life, etc., shall be submitted for approval.

1.4 All fans shall be dynamically trim-balanced to ISO 1940 and AMCA 204/3-G2.5 quality grade after assembly. A computer printout with the vibration spectrum analysis shall be attached to the fans.

1.4 Fan motors shall comply in all respects with continuous rating in accordance with IEC34 or equivalent. Motor bearing shall be of ball or roller type, grease or lubricant sealed for life. Fan and drive shall earthed to prevent accumulation of static charge.

1.5 Kitchen exhaust fan shall be of :

A. Bifurcated Axial or
B. SISW Centrifugal direct or belt driven type
C. Inline Smokespill Cabinet Fan.
D. DIDW Centrifugal and Direct Drive
E. Axial Flow Fan

where belts or motor are in the air stream are not acceptable.

PART 2 : PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

It should be comply according to the Codes and References Section.

2.2 AXIAL FLOW FANS (DIRECT DRIVE)

A. Fans shall be licensed to bear the AMCA Air and Sound Certified Ratings Seal. The test standard used shall be ANSI/AMCA 210-85. ANSI/ASHRAE Standard 51-1985 "Laboratory Method of Testing Fans for Rating" and AMCA 300 "Reverberant Room Method for Sound Testing of fans".

B. Fans shall be oven-baked with polyester coating for minimum thickness of 60 microns or hot-dipped galvanized. To achieve the minimum and equal clearance between the blade tips and casing, tube casing shall maintain its roundness by means of using one piece of sheet metal with 90° edge flanging up.

C. Fan motor base support shall be properly secured (locked and sealed) to the fan housing and be of adjustable type to have precise control of motor shaft central position as well as running clearance between blade tips and casing. Motor (KW/HP) shall be able to be changed or upgraded at site without changing fan housing or ducting construction.

D. Fans supplied shall be complete with factory fabricated mounting bracket (ceiling or foot mounted) and suction/discharge matching flanges as accessories.

All hubs shall be cast Aluminum alloy (Grade LM2) unless for Smoke Extractor Fans where high temperature (250°C/2Hrs) air is expected then Aluminum alloy or steel fan impeller blades are required. Otherwise impeller blade material with Polypropylene (PP), Glass reinforced Polypropylene (PPG) and Glass-reinforced Polyamid (PAG), to provide self-balancing, anti-static, anti-sparkling characteristics is preferable.

E. Running clearance between blade tips and casing shall not exceed 1% of the impeller diameter and 2% for smoke spill high temperature fan where mechanical expansion coefficient is different from normal ambient temperature. Fan manufacturer shall provide the fan assembled with the same clearance between blade tips and casing of the tested prototype. Note that the air performance and pressure loss are greatly affected by the clearance.

F. Impellers shall be secured to the drive shaft by a key and keyway. Axial location shall be provided by a collar or shoulder on the drive shaft together with a retaining washer and screw fitted into a tapped hole at the end of the shaft and locked in position. Blades shall be secured in place to the angel setting by setscrews, locking nuts or setting pins.

Fan motor shall be totally enclosed and external terminal box of at least IP55 shall be provided.

Fans speed shall not exceed 1800 RPM.

All fans after assembly shall be dynamically trim balanced to ISO1940 and AMCA 204/3-G2.5 quality grade. A computer printout with vibration spectrum analysis shall be attached to the fans.

2.3 IN-LINE CENTRIFUGAL DUCT FAN

A. Fan shall be of SISW forward or backward curved centrifugal direct driven type.

B. Casing shall be of Galvanized steel with Oven-baked epoxy coating. Impeller material shall be either Galvanized Steel or Glass Reinforced Polypropylene.

C. Motor shall be external rotor type for power supply 220-240V/60Hz/Single Phase.

2.4 BIFURCATED FAN

A. Axial Bifurcated fan shall have the motor isolated from the air stream. The fans shall have a built in central chamber ventilated to the external ambient containing the direct drive motor.

B. The hub shall be specially cast in one piece to suit the required distance between impeller and motor shaft.

C. Fan casing shall be carefully controlled to ensure smooth flow of the air to avid turbulent airflow and noise.

2.5. BELT DRIVEN FANS

A. Fan impellers shall be driven by V-belts with the pulley keyed to the shaft and retained by taper-bushes.

B. Motor mounting plate shall be supported using four threaded rods for belt tensioning. Belt tunnel shall be sealed fro the air stream and belt guards with proper ventilation should be provided.

2.6 CENTRIFUGAL FANS

A. Fans forward or backward or Airfoil curved, SISW or DIDW, shall be licensed to bear the AMCA Air and Sound Certified Ratings Seal. The test standard used shall be ANSI/AMCA 210-85, NASI/ASHRAE Standard 51-1985 "Laboratory Method of Testing Fans for Rating" and AMCA 300 "Reverberant Room Method for Sound Testing of Fans".

B. All fans shall be dynamically trim-balanced to ISO 1940 and AMCA 204/3-G2.5 quality grade after assembly. A computer printout with vibration spectrum analysis shall be attached to the fans.

C. Fans shall be oven-baked with polyester coating for minimum thickness of 60 microns, unless the housing scroll and side frame is constructed from galvanized steel sheet (G.I.), Stainless Steel, Aluminum and etc.

D. Fan housing shall be of an appropriate thickness to prevent vibration and drumming. The fan scroll shall be attached to the side plate by means of continuous lock seam or intermittent spot welding. The wheel and inlet cone shall be aerodynamically designed and constructed to provide maximum performance and efficiency as published by the manufacturer.

E. Fans must be physically capable of operating safely at every point of rating at or below the "minimum performance" limit fir that class as defined in AMCA standard 99-2408-69 "Performance Class of Operating Limits of Centrifugal Fans".

F. Shaft size shall be carefully calculated and designed such that maximum operating speed (RPM) shall not exceed 75% of the first critical speed. For any application that is not a standard product form catalogue of the fan manufacturer detailed calculation of critical speed characteristics shall be submitted for approval

G. Shafts shall be made of carbon steel (C45) machined and polished to tolerance of standard ISO 286-2 – grade g6 Protective coat of anti-rusting shall be applied to all bare surfaces of the shaft at the factory.

H. Bearing shall be of self-alignment (concentric) type with adaptor sleeve bearing. Bearing of eccentric locking collar with grub screw type are not acceptable. Bearing shall be maintenance free with permanently lubricated sealed ball bearing type. Bearing life shall be at least 75,000 hours based on basic rating life L10 of ISO 281 standard. Calculation sheet of bearing life shall be submitted for approval.

I. Motor installed shall be of a minimum 130% of the fan power absorbed (Brake horsepower) and shall have sufficient torque available for starting and continuous operation.

J. Belts and pulleys shall be sized for minimum 150% of the installed motor horsepower. The belt speed shall not exceed 30m/s. The pulley shall be of Taper Lock SPZ, SPA, SPB or SPC type. Conventional type of pulley is not acceptable. Both fan and motor pulley shall be balanced to the quality grade G.2.5

K. Fan outlet velocity shall not exceed 10% of the main duct air velocity designed (0.1" per 100 ft or 1 Pascal per meter duct length) Pressure Loss is as referred to in SMACNA Standard unless otherwise specified.

L. A computer printout on fan performance rating corresponding to the AMCA licenced data with corrected rating for altitude and temperature fan operating speed bearing life etc. Shall be submitted for approval

2.7. CABINET

A. Fan contained within cabinet shall be licensed to bear the AMCA Air and Sound Certified rating Seal.

B. Fan shall be of DIDW forward or Backward curved with fan scroll belt drive or direct drive assembled within a cabinet.

C. Cabinet shall be constructed of Galvanized Steel material with 220 g/m2 coating.

D. Cabinet shall e of "Panel Construction" assembled together by means of fasteners for easy of dismantling for service and maintenance. Welded cabinets are not acceptable.

E. Cabinet design shall be capable of adding acoustic insulation (i.e. double skin arrangement) if requested for noise reduction.

2.8. DIRECT DRIVE TYPE

A. Fans shall be of DIDW Forward Curved centrifugal type with fan scroll within a Cabinet.

B. Fan speed shall not exceed 1800 RPM.

C. Motor shall be for power supply 220-240 V/60Hz/Single Phase

2.9. IN-LINE CENTRIFUGAL DUCT FAN

A. Fan shall be of SISW forward or backward curved centrifugal direct driven type.

B. Casing shall be of Galvanized steel with Oven-baked epoxy coating. Impeller material shall be either Galvanized Steel or Glass Reinforced Polypropylene.

C. Motor shall be external rotor type for power supply 220-240V/60Hz/Single Phase.

2.10. PROPELLER FAN

A. Fan shall be of the ring-mounted type and the blades constructed from heavy gauge metal. An aerodynamically designed bell mouth constructed from heavy gauge metal shall be provided. The fan speed shall not exceed 1800RPM at 60Hz Operation.

B. Propeller fans shall be direct driven type the motor either a single phase capacitor start-run or a three-phase squirrel cage induction type. The motor shall have inbuilt inherent protection against overloading. Motor with shaded pole or centrifugal switch type is not acceptable

C. Bearing shall be maintenance free permanently lubricated type. Fans shall be complete with wire guards. External grilles, fan chambers and volume control damper shall be provided where indicated in the specification drawings.

AIR INLETS AND OUTLETS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Diffusers.
B. Registers/grilles.
C. Door grilles.
D. Louvers.

1.2 RELATED SECTIONS

A. Section - Painting: Painting of ductwork visible behind outlets and inlets.

1.3 REFERENCES

A. ARI 650 - Air Outlets and Inlets.
B. ASHRAE 70 - Method of Testing for Rating the Air Flow Performance of Outlets and Inlets.
C. SMACNA - HVAC Duct Construction Standard - Metal and Flexible.
D. NFPA 90A - Installation of Air Conditioning and Ventilating Systems.

1.4 SUBMITTALS

A. Submit under provisions of Section Submittal Procedures.
B. Product Data: Provide data for equipment required for this project. Review outlets and inlets as to size, finish, and type of mounting prior to submission. Submit schedule of outlets and inlets showing type, size, location, application, and noise level.
C. Samples: Submit two of each required air outlet and inlet type.

1.5 PROJECT RECORD DOCUMENTS

A. Submit under provisions of Section Contract Closeout.
B. Record actual locations of air outlets and inlets.

1.6 QUALITY ASSURANCE

A. Test and rate air outlet and inlet performance in accordance with ADC Equipment Test Code 1062 and ASHRAE 70.
B. Test and rate louver performance in accordance with AMCA 500.

1.7 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum three (3) years documented experience.

1.8 MOCKUP

A. Provide mockup of typical interior ceiling module with supply and return air outlets under provisions if applicable.
B. Mockup may not remain as part of the Work.

PART 2 - PRODUCTS

2.1 RECTANGULAR CEILING DIFFUSERS

A. Type: Square and rectangular, adjustable pattern ,diffuser to discharge air in four way pattern with sectorizing baffles where indicated.
B. Frame: Snap-in type.
C. Fabrication: Aluminum with baked enamel off-white finish.
D. Accessories: Combination splitter damper and multi-louvered equalizing grid with damper adjustable from diffuser face.

2.2 CEILING SUPPLY REGISTERS/GRILLES

A. Type: Streamlined and individually adjustable curved blades to discharge air along face of grille.
B. Frame: 32 mm margin with concealed mounting and gasket.
C. Fabrication: Aluminum extrusions with factory off-white enamel finish.
D. Damper: Integral, gang-operated, opposed blade type with removable key operator, operable from face.

2.3 WALL EXHAUST AND RETURN REGISTERS/GRILLES

A. Type: Streamlined blades, 19 mm minimum depth, 19 mm maximum spacing, with spring or other device to set blades, horizontal face.
B. Frame: 32 mm margin with concealed mounting.
C. Fabrication: Steel and aluminum with 20 gage (0.90 mm) minimum frame, with factory baked enamel finish , color to be selected.
D. Damper: Integral, gang-operated, opposed blade type with removable key operator, operable from face.
E. Gymnasiums: Provide front pivoted or welded in place blades, securely fastened to be immobile.

2.4 DOOR GRILLES

A. Type: V-shaped louvers of 20 gage (0.90 mm) thick steel, 25 mm deep on 13 mm centers.
C. Frame: 20 gage (0.90 mm) steel with auxiliary frame to give finished appearance on both sides of door, with factory prime coat finish.

2.5 LOUVERS

A. Type: 100 mm deep with blades on 45 degree slope , heavy channel frame, birdscreen with 13 mm square mesh for exhaust and 19 mm for intake.
B. Fabrication: 12 gage (2.50 mm) thick extruded aluminum, welded assembly, with factory baked enamel finish color to be selected.
C. Mounting: Furnish with exterior , flat flange for installation.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Check location of outlets and inlets and make necessary adjustments in position to conform with architectural features, symmetry, and lighting arrangement.

C. Install diffusers to ductwork with air tight connection.

D. Provide balancing dampers on duct take-off to diffusers, and grilles and registers, despite whether dampers are specified as part of the diffuser, or grille and register assembly.

E. Paint ductwork visible behind air outlets and inlets matte black.

HEAT RECOVERY SYSTEM

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. ENERGY RECOVERY VENTILATOR.

1.2 REFERENCES

ASHRAE 15	(1994) Safety Code for Mechanical Refrigeration
ASHRAE 52.1	(1992) Gravimetric and Dust-Spot Procedures for Testing Air-Cleaning Devices Used in General Ventilation for Removing Particulate Matter
ASHRAE 68	(1986) Laboratory Method of Testing In-Duct Sound Power Measurement Procedures for Fans
ASHRAE 70	(1991) Method of Testing for Rating the Performance of Air Outlets and Inlets
ASHRAE 84	(1991) Method of Testing Air-to-Air Heat Exchangers
NFPA 70	(1999) National Electrical Code
NFPA 90A	(1996) Installation of Air Conditioning and Ventilating Systems
SMACNA HVAC Duct Const Stds	(1995; Addenda Nov 1997) HVAC Duct Construction Standards - Metal and Flexible
SMACNA Leakage Test Mnl	(1985) HVAC Air Duct Leakage Test Manual

1.3 SUBMITTALS

A. Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with SUBMITTAL PROCEDURES.

B. Spare parts data for each item of equipment provided, after approval of the detail drawings and not later than before the date of beneficial occupancy. The data shall include a complete list of spare parts and supplies with current unit prices and source of supply

C. Detail drawings consisting of a complete list of equipment and material, including manufacturer's descriptive and technical literature, performance charts and curves, catalog cuts, drawings, and installation instructions.

D. Drawings shall contain complete piping and wiring drawings, schematic diagrams, and any other details required to demonstrate that the system has been coordinated and will properly function as a unit.

E. Drawings shall show proposed layout and anchorage of equipment and appurtenances, and equipment relationship to other parts of the work including clearances required for maintenance and operation.

F. Each major item of equipment shall have the manufacturer's name, address, type or style, model or serial number, and catalog number on a plate secured to the item of equipment.

PART 2 - PRODUCTS

2.1. Casing should be Galvanized steel plate

2.2. Insulation Material - It should be Self-extinguishable polyurethane foam

2.3. Heat Exchange System and Material - It should be air to air cross flow total heat (Sensible Heat + Latent Heat) exchange, with Specially processed non-flammable paper material.

2.4. Air Filter - Should be Multi-directional fibrous fleeces.

2.5. Accesories - In large models in particular (1500 - 2000 m^3 / h models), if the supply air grille SAG is installed near the main unit, the noise of the main unit may be heard from the discharge grille via the duct, and this will result in a marjed increased in noise.

2.5.1. Use a sound-muffling box, flexible duct and sound-muffling air supply/discharge grilles.

2.5.2. Decentralized installation of discharge grilles.

2.5.3. Use ceiling materials with high sound insulating properties (high transmission loss).

CAPACITY (CMH)	95 - 150	155 - 350	295 - 650	670 - 1000	1260 - 2000
CONNECTION DUCT DIAMETER	100 Ø	150 Ø	200 Ø	250 Ø	350 Ø
UNIT AMBIENT CONDITION	-15°C-50°C DB, 80 % RH or less				

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Check location of outlets and inlets and make necessary adjustments in position to conform with architectural features, symmetry, and lighting arrangement.

C. Install diffusers to ductwork with air tight connection.

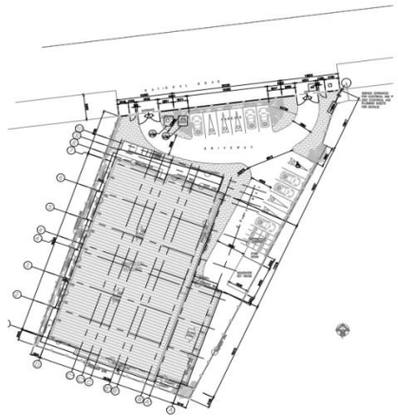
D. Provide balancing dampers on duct take-off to diffusers, and grilles and registers, despite whether dampers are specified as part of the diffuser, or grille and register assembly.

E. Obtain locally (ON when temperature is at or below -10°C) and (OFF when temperature is at or more than 5°C) for Thermostat.

F. Examine fully an installation place and specification for using electric heater based on the standard and regulation of each country.

G. Use a non-inflammable connecting duct to the electric heater. Be sure to allow 2 m or more between the electric heater and the (Energy Recovery Ventilator) ERV for safety.

H. For ERV (Energy Recovery Ventilator), use a different power supply from that of the electric heater and install a circuit breaker for each.



I
M-001 SITE DEVELOPMENT PLAN
SCALE NTS

GENERAL NOTES:

1. THESE DRAWINGS ARE SCHEMATIC IN NATURE AND ARE NOT INTENDED TO SHOW ALL POSSIBLE CONDITIONS. (DO NOT SCALE FOR EQUIPMENT, DEVICE OR MATERIAL LOCATION). IT IS INTENDED THAT A COMPLETE HVAC SYSTEM BE PROVIDED WITH ALL NECESSARY EQUIPMENT, APPURTENANCES, AND CONTROLS, COMPLETELY COORDINATED WITH ALL DISCIPLINES. DOCUMENTS STRICTLY CONFORM WITH ALL PARAMETERS GIVEN IN THESE DOCUMENTS. ANY ITEMS AND LABOR REQUIRED FOR A COMPLETE ACMV SYSTEM IN ACCORDANCE WITH ALL APPLICABLE CODES, STANDARDS, AND THESE CONTRACT DOCUMENTS SHALL BE FURNISHED WITHOUT INCURRING ANY ADDITIONAL COST TO THE CONTRACT. CAREFULLY REVIEW ALL CONTRACT DOCUMENTS AND THE DESIGN OF OTHER TRADES BEFORE PREPARING SHEET METAL AND PIPING SHOP DRAWINGS. EACH TRADE SHALL PREPARE ITS OWN FABRICATION AND INSTALLATION DRAWINGS FOR COORDINATION WITH ALL OTHER DISCIPLINES.
2. ALL DUCT DIMENSIONS INDICATED ARE INSIDE CLEAR DIMENSIONS IN MM., EXCLUDING INTERNAL LINING & EXTERNAL INSULATION THICKNESS, UNLESS OTHERWISE INDICATED.
3. UNLESS OTHERWISE NOTED, THE FREE AREA OF ALL EXTERNAL LOUVERS SHALL BE A MINIMUM OF 50% OF GROSS AREA.
4. VOLUME CONTROL/ SPLITTER DAMPER SHALL BE PROVIDED FOR SUPPLY AND RETURN AIR DUCT AT EACH BRANCH, WHETHER SHOWN OR NOT SHOWN ON PLANS.
5. IN ADDITION TO THOSE SHOWN ON THE DRAWINGS THE CONTRACTOR SHALL SUPPLY AND INSTALL FIRE DAMPERS FOR AIR DUCTS PASSING THROUGH ALL FIRE RATED WALLS / SLABS IN ORDER TO FULFILL THE REQUIREMENTS OF LOCAL AUTHORITY. ALSO REFER TO FIRE LIFE SAFETY PLANS.
6. ALL AIR GRILLES / LOUVERS SHALL BE MADE OF ALUMINUM UNLESS OTHERWISE SPECIFIED. THE COLOR & SURFACE FINISHING OF THE GRILLES / LOUVERS SHALL BE SUBMITTED TO ARCHITECT FOR APPROVAL BEFORE MATERIAL ORDERING. UNLESS OTHERWISE SPECIFIED, COLOR FINISH SHALL BE IN BAKED ENAMEL PAINT.
7. ALL ANTI-VIBRATION MOUNTS FOR EQUIPMENT AND PIPE WORK SHALL BE OF SEISMIC SPRING TYPE UNLESS OTHERWISE SHOWN ON DRAWINGS.
8. FOR PIPES, SLEEVES AND DUCTS THROUGH FIRE BARRIER, THE GAP BETWEEN THE PIPES AND ITS SLEEVES, AND THE GAP BETWEEN THE DUCTS AND FIRE BARRIERS MUST BE FIRMLY SEALED WITH FIRESTOP MATERIALS HAVING A PERIOD OF FIRE RESISTANCE EQUAL TO THE FIRE BARRIERS. DETAILS OF DUCTS AND PIPES THROUGH WALL AND FLOOR SHALL COMPLY WITH U.L. STANDARD AND REQUIREMENTS.
9. ALL DUCT ELBOWS MUST BE FITTED WITH TURNING VANES TO SMACNA STANDARD.
10. SIZE OF GRILLES, LOUVERS OR DIFFUSERS SHOWN ARE NECK SIZE UNLESS OTHERWISE SPECIFIED.
11. ALL GRILLES AND DIFFUSERS SHALL BE INSTALLED WITH INTEGRAL OPPOSED BLADE VOLUME CONTROL DAMPERS OPERABLE FROM THE GRILLE/DIFFUSER FACE.
12. IN THE ABSENCE OF ANY OTHER REQUIREMENT NOT FOUND IN THE PSME CODE, THE MATERIALS, CONSTRUCTION AND INSTALLATION OF THE DUCTWORKS SHALL COMPLY WITH THE REQUIREMENT OF SMACNA OR ASHRAE STANDARDS.
13. ALL EQUIPMENT, DUCTWORKS AND OTHER ACCESSORIES INSTALLED OUTDOOR SHALL BE WEATHERPROOFED AND PROTECTED WITH ALUMINUM CLADDING.
14. COORDINATE AND REFER TO ARCHITECTURAL CEILING PLANS AND FINAL FF & E LAYOUT FOR EXACT LOCATION OF ALL CEILING MOUNTED AIR DISTRIBUTION DEVICES. COORDINATE EXACT LOCATION OF SLOTS, GRILLES, REGISTERS, AND DIFFUSERS WITH ARCHITECTURAL REFLECTED CEILING PLANS. IF A PARTICULAR ITEM IS NOT SHOWN ON THE ARCHITECTURAL REFLECTED CEILING PLAN, PREPARE A DRAWING AND PRESENT IT TO THE ARCHITECT FOR HIS REVIEW AND/OR APPROVAL.
15. MAINTAIN DUCTWORK LEVEL AND AS HIGH AS POSSIBLE UNLESS OTHERWISE NOTED. TRANSITION RECTANGULAR DUCTWORK ON THE TOP AND THE SIDES. ALL DUCT TRANSITIONS FROM SQUARE TO ROUND SHALL BE SMOOTH SQUARE TO ROUND TRANSITIONS. SPIN-IN FITTINGS AT THE END OF CAPPED DUCTS ARE NOT ACCEPTABLE.
16. ALL OPEN ENDED DUCTS SHALL BE BELLMOUTHED, SCREENED AND REINFORCED WITH 37.5mm x 37.5mm x 3.5mm GALVANIZED STEEL ANGLES BOLTED, SCREWED OR RIVETED 150mm ON CENTER (MAXIMUM) ALL AROUND THE EXTERIOR PERIMETER OF THE DUCT.
17. MOUNT THERMOSTATS, WHERE INDICATED ON PLANS AT 1500mm AFF UNLESS OTHERWISE NOTED. SEE THE ARCHITECTURAL AND INTERIOR DRAWINGS AS WELL AS THE MECHANICAL DRAWINGS FOR THE COORDINATED LOCATIONS. WHERE THERE IS A CONFLICT OF LOCATIONS AMONG THE DRAWINGS, NOTIFY THE ARCHITECT IMMEDIATELY FOR RESOLUTION.
18. ALL DIFFUSERS INSTALLED IN LAY-IN CEILINGS SHALL BE 4-WAY BLOW UNLESS OTHERWISE NOTED. ADJUST ALL DIFFUSERS IN CORRIDORS OR WITHIN 900mm OF A WALL TO PROVIDE 2-WAY OR 3-WAY BLOW AWAY FROM OR PARALLEL TO WALLS.
19. ALL WIRING IN THE CEILING PLENUM SHALL BE PLENUM-RATED CABLE PER NFPA-70 OR BE INSTALLED IN METAL CONDUIT.
20. ALL CEILING MOUNTED AIR DISTRIBUTION DEVICES LOCATED IN INACCESSIBLE CEILINGS SHALL HAVE FACE OPERABLE DAMPERS TO ALLOW AIR BALANCING OF THE SYSTEM AFTER THE CEILING IS IN PLACE.
21. INSULATE ALL SUPPLY AND RETURN AIR DUCTWORK.
22. ALL TERMINAL UNITS, FCU'S, VALVES, FANS AND DAMPERS ABOVE CEILING SHALL BE ACCESSIBLE. COORDINATE ALL ACCESS PANELS IN CEILINGS OR WALLS WITH ARCHITECTURAL REFLECTED CEILING PLANS AND INTERIOR DRAWINGS FOR PROPER LOCATION. NO ACCESS PANELS ARE ALLOWED IN PUBLIC SPACES WITHOUT PRIOR WRITTEN APPROVAL OF THE ARCHITECT.
23. THE FRESH AIR DUCT (BRANCH DUCT) SERVING EACH FAN COIL UNIT SHALL BE PROVIDED WITH VOLUME DAMPER WHETHER SHOWN OR NOT SHOWN ON DRAWINGS.
24. AFTER SUBMITTAL APPROVALS AND PRIOR TO ORDERING OF ANY EQUIPMENT OR ACCESSORIES, OR BEFORE FABRICATION AND/OR ASSEMBLY OF PIPING, DUCTS AND ANY DEVICES/COMPONENTS, THE CONTRACTOR SHALL ENSURE THAT EVERYTHING HAS BEEN VERIFIED AT SITE AND COORDINATED WITH ALL THE OTHER DISCIPLINES AS TO CONSTRUCTIBILITY AND MAINTAINABILITY OF THE EQUIPMENT AND UTILITIES. IF FOR ANY REASON, CONFLICT ARISE DUE TO CONTRACTOR'S FAILURE TO FOLLOW THE ABOVE OR HIS LACK OF DUE DILIGENCE, ALL WORKS AS NECESSITATED SHALL BE PERFORMED BY THE CONTRACTOR WITHOUT ADDITIONAL COST CHANGE ORDER.
25. IN GENERAL REFER TO MECHANICAL PLANS FOR QUANTITY OF AC & VENTILATION GRILLES AND DIFFUSERS FOR REFERENCE PURPOSES REFER TO ARCHITECTURAL REFLECTED CEILING PLAN FOR LOCATION OF UTILITIES.
26. DUCT CUTS WITH CANVASS OR ANY RESILIENT MATERIAL SUCH AS RUBBER, MUST BE PROVIDED ESPECIALLY IN AREAS WHERE WALLS OR CEILING ARE ISOLATED FROM THE REST OF MAIN BUILDING STRUCTURE.
27. ALL SUSPENDED AND FLOOR MOUNTED PIPES AND EQUIPMENTS SHALL BE PROVIDED WITH PROPER ISOLATORS AS RECOMMENDED BY ASHRAE (TABLE 42 & CHAPTER 47 2003 ASHRAE HANDBOOK).
28. ALL DUCT WORKS IN AREAS WITH SUSPENDED CEILING SHALL RUN IN THE CEILING VOID UNLESS OTHERWISE NOTED.
29. MATERIAL SPECIFICATIONS ARE AS FOLLOWS: (PLEASE REFER TO TECHNICAL SPECIFICATIONS)
    a. DUCT INSULATION
        i. INTERNAL (ALL SUPPLY AND RETURN AC DUCTS; 3.0 METERS UPSTREAM & DOWNSTREAM OF FANS)
            - 25mm THICK FIBERGLASS INSULATION, 48 kg/M^3 DENSITY, MATTE FACE WITH ANTI-MICROBIAL TREATMENT.
        ii. EXTERNAL (ALL SUPPLY / RETURN AC DUCTS; EXHAUST DUCTS)
            - POLY OLEFIN FOAM (THERMOBREAK OR XCELLON 19/ 25mm THICK)

    b. GALVANIZED SHEET SCHEDULE – HOT DIPPED GALVANIZED STEEL SHEET CONFORMING TO SMACNA, ("APO GALFAN" BRAND). DUCT SCHEDULE SHOWN BELOW IS REPRESENTATIVE ONLY.

LARGER DUCT DIMENSION (mm)	U.S. Ga#
UP TO 300	26
325 TO 750	22
775 TO 1350	22
1375 TO 2100	20
ABOVE 2100	18

    c. FIRE DAMPER – U.L. LISTED FOR 2-HOUR FIRE RATING, CURTAIN TYPE.

    d. DUCT SEALANT – FIRE RESISTIVE, WATER BASED CONFORMING TO U.L. 181B – "FOSTER" DUCT FAST OR EQUAL.

DRAWING INDEX

M-001	SITE DEVELOPMENT PLAN,GENERAL NOTES, DRAWING INDEX, LEGEND & SYMBOLS, ABBREVIATIONS
M-002	EQUIPMENT SCHEDULE
M-003	EQUIPMENT SCHEDULE
M-004	A/C & VENTILATION LAYOUT
M-005	MISCELLANEOUS DETAILS

LEGEND & SYMBOLS

SYMBOLS	DESCRIPTION	SYMBOLS	DESCRIPTION
	AIR COOLED CONDENSING UNIT		SUPPLY AIR GRILLE
	FAN COIL UNIT (WALL MOUNTED)	T	THERMOSTAT/WALL MOUNTED
	FAN COIL UNIT (FLOOR STANDING)		EQUIPMENT DESIGNATION
	CEILING CASSETTE EXHAUST AIR FAN		OSCILLATING FAN (OF)
	IN-LINE AXIAL FRESH AIR FAN		REFRIGERANT PIPES
	WALL MOUNTED EXHAUST AIR FAN		DOOR LOUVER (D/L)

ABBREVIATION

ABBREV	DESCRIPTION	ABBREV	DESCRIPTION
FCU	FAN COIL UNIT	SAG	SUPPLY AIR GRILLE
CDP	CONDENSATE DRAIN PIPE	l/s / LPS	LITERS PER SECOND
EA	EXHAUST AIR	Pa	PASCAL
EF	EXHAUST FAN	RP	REFRIGERANT PIPE
ESP	EXTERNAL STATIC PRESSURE	TEF	TOILET EXHAUST FAN
FAD	FRESH AIR DUCT	W	WATTS
VD	VOLUME DAMPER	FD	FIRE DAMPER

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ROLANDO M. MANAOAT
PROFESSIONAL MECHANICAL ENGINEER
REG. NO.: 4569
TIN NO. : 105-691-252
PTR NO. : 7371938
DATE : JANUARY 21, 2019
PLACE : MAKATI CITY

OWNER
SOCIAL SECURITY SYSTEM
6/F , SSS BUILDING EAST AVENUE, QUEZON CITY
APPROVED BY: JOSIE G. MAGANA
SVP NCR OPERATIONS GROUP

PROJECT TITLE/LOCATION
PROPOSED ONE -STOREY SSS BUILDING
BRGY. BUTTONG , LAOAG CITY

SHEET CONTENTS
SITE DEVELOPMENT PLAN, GENERAL NOTES, DRAWING INDEX, LEGEND & SYMBOLS, ABBREVIATIONS

CADD	POB	AUG 2019					PAPER SIZE	20X30	SHEET NO. M-001
DESIGNED	DATE								
JMA	AUG 2019						SCALE	AS SHOWN	PROJECT NO. SO-G-15-010
APPROVED	DATE								
RMM	AUG 2019	0							

AIR COOLED CONDENSING UNIT

MARK	QUANTITY	LOCATION	FCU SERVED	CAPACITY	COMPRESSOR TYPE	REFRIGERANT	REFRIGERANT PIPE		ELECTRICAL DATA		REMARKS
				KW			RGL	RLL	KW INPUT	V/PH/HZ	
ACCU/ 1	1	OUTDOOR	FCU 1	6.8	HERMETICALLY SEALED SWING TYPE	R-410A	15.9	9.50	2.0	230/1/60	AIR COOLED CONDENSING UNIT C/W STANDARD ACCESSORIES
ACCU/ 2	1	OUTDOOR	FCU 2	6.8	HERMETICALLY SEALED SWING TYPE	R-410A	15.9	9.50	2.0	230/1/60	AIR COOLED CONDENSING UNIT C/W STANDARD ACCESSORIES
ACCU/ 3	1	OUTDOOR	FCU 3	6.8	HERMETICALLY SEALED SWING TYPE	R-410A	15.9	9.50	2.0	230/1/60	AIR COOLED CONDENSING UNIT C/W STANDARD ACCESSORIES
ACCU/ 4	1	OUTDOOR	FCU 4	3.7	HERMETICALLY SEALED SWING TYPE	R-410A	15.9	9.50	1.3	230/1/60	AIR COOLED CONDENSING UNIT C/W STANDARD ACCESSORIES
ACCU/ 5	1	OUTDOOR	FCU 5	6.8	HERMETICALLY SEALED SWING TYPE	R-410A	15.9	9.50	2.0	230/1/60	AIR COOLED CONDENSING UNIT C/W STANDARD ACCESSORIES
ACCU/ 6	1	OUTDOOR	FCU 6	6.8	HERMETICALLY SEALED SWING TYPE	R-410A	15.9	9.50	2.0	230/1/60	AIR COOLED CONDENSING UNIT C/W STANDARD ACCESSORIES
ACCU/ 7	1	OUTDOOR	FCU 7	14.0	HERMETICALLY SEALED SWING TYPE	R-410A	15.9	9.50	5.1	230/1/60	AIR COOLED CONDENSING UNIT C/W STANDARD ACCESSORIES
ACCU/ 8	1	OUTDOOR	FCU 8	6.8	HERMETICALLY SEALED SWING TYPE	R-410A	15.9	9.50	2.0	230/1/60	AIR COOLED CONDENSING UNIT C/W STANDARD ACCESSORIES
ACCU/ 9	1	OUTDOOR	FCU 9	14.0	HERMETICALLY SEALED SWING TYPE	R-410A	15.9	9.50	5.1	230/1/60	AIR COOLED CONDENSING UNIT C/W STANDARD ACCESSORIES
ACCU/ 10	1	OUTDOOR	FCU 10	6.8	HERMETICALLY SEALED SWING TYPE	R-410A	15.9	9.50	2.6	230/1/60	AIR COOLED CONDENSING UNIT C/W STANDARD ACCESSORIES
ACCU/ 11	1	OUTDOOR	FCU 11	6.8	HERMETICALLY SEALED SWING TYPE	R-410A	15.9	9.50	2.0	230/1/60	AIR COOLED CONDENSING UNIT C/W STANDARD ACCESSORIES
ACCU/ 12	1	OUTDOOR	FCU 12	6.8	HERMETICALLY SEALED SWING TYPE	R-410A	15.9	9.50	2.0	230/1/60	AIR COOLED CONDENSING UNIT C/W STANDARD ACCESSORIES
ACCU/ 13	1	OUTDOOR	FCU 13	6.8	HERMETICALLY SEALED SWING TYPE	R-410A	15.9	9.50	2.0	230/1/60	AIR COOLED CONDENSING UNIT C/W STANDARD ACCESSORIES
ACCU/ 14	1	OUTDOOR	FCU 14	14.0	HERMETICALLY SEALED SWING TYPE	R-410A	15.9	9.50	5.1	230/1/60	AIR COOLED CONDENSING UNIT C/W STANDARD ACCESSORIES
ACCU/ 15	1	OUTDOOR	FCU 15	14.0	HERMETICALLY SEALED SWING TYPE	R-410A	15.9	9.50	5.1	230/1/60	AIR COOLED CONDENSING UNIT C/W STANDARD ACCESSORIES
ACCU/ 16	1	OUTDOOR	FCU 16	3.7	HERMETICALLY SEALED SWING TYPE	R-410A	15.9	9.50	1.3	230/1/60	AIR COOLED CONDENSING UNIT C/W STANDARD ACCESSORIES
ACCU/ 17	1	OUTDOOR	FCU 17	14.0	HERMETICALLY SEALED SWING TYPE	R-410A	15.9	9.50	5.1	230/1/60	AIR COOLED CONDENSING UNIT C/W STANDARD ACCESSORIES
ACCU/ 18	1	OUTDOOR	FCU 18	14.0	HERMETICALLY SEALED SWING TYPE	R-410A	15.9	9.50	5.1	230/1/60	AIR COOLED CONDENSING UNIT C/W STANDARD ACCESSORIES
ACCU/ 19	1	OUTDOOR	FCU 19	14.0	HERMETICALLY SEALED SWING TYPE	R-410A	15.9	9.50	5.1	230/1/60	AIR COOLED CONDENSING UNIT C/W STANDARD ACCESSORIES

FAN COIL UNIT

MARK	QUANTITY	LOCATION	AREA SERVED	CAPACITY	TYPE	ELECTRICAL DATA	REMARKS
				KW		V/PH/HZ	
FCU 1	1	GROUND FLOOR	OFFICE OF THE BRANCH HEAD	6.8	WALL MOUNTED	230/1/60	SPLIT-TYPE INVERTER FAN COIL UNIT. COMPLETE WITH STANDARD ACCESSORIES AND DRAIN PUMP.
FCU 2	1	GROUND FLOOR	CONNFERENCE HALL	6.8	WALL MOUNTED	230/1/60	SPLIT-TYPE INVERTER FAN COIL UNIT. COMPLETE WITH STANDARD ACCESSORIES AND DRAIN PUMP.
FCU 3	1	GROUND FLOOR	PANTRY	6.8	WALL MOUNTED	230/1/60	SPLIT-TYPE INVERTER FAN COIL UNIT. COMPLETE WITH STANDARD ACCESSORIES AND DRAIN PUMP.
FCU 4	1	GROUND FLOOR	DATA &COMMUNICATION ROOM	3.7	WALL MOUNTED	230/1/60	SPLIT-TYPE INVERTER FAN COIL UNIT. COMPLETE WITH STANDARD ACCESSORIES AND DRAIN PUMP.
FCU 5	1	GROUND FLOOR	TELLERING SECTION	6.8	WALL MOUNTED	230/1/60	SPLIT-TYPE INVERTER FAN COIL UNIT. COMPLETE WITH STANDARD ACCESSORIES AND DRAIN PUMP.
FCU 6	1	GROUND FLOOR	TELLERING SECTION	6.8	WALL MOUNTED	230/1/60	SPLIT-TYPE INVERTER FAN COIL UNIT. COMPLETE WITH STANDARD ACCESSORIES AND DRAIN PUMP.
FCU 7	1	GROUND FLOOR	MSS BACKROOM	14.0	FLOORSTANDING	230/1/60	SPLIT-TYPE INVERTER FAN COIL UNIT. COMPLETE WITH STANDARD ACCESSORIES .
FCU 8	1	GROUND FLOOR	MSS BACKROOM	6.8	WALL MOUNTED	230/1/60	SPLIT-TYPE INVERTER FAN COIL UNIT. COMPLETE WITH STANDARD ACCESSORIES AND DRAIN PUMP.
FCU 9	1	GROUND FLOOR	MSS BACKROOM	14.0	FLOORSTANDING	230/1/60	SPLIT-TYPE INVERTER FAN COIL UNIT. COMPLETE WITH STANDARD ACCESSORIES .
FCU 10	1	GROUND FLOOR	MSS BACKROOM	6.8	FLOORSTANDING	230/1/60	SPLIT-TYPE INVERTER FAN COIL UNIT. COMPLETE WITH STANDARD ACCESSORIES .
FCU 11	1	GROUND FLOOR	P.E. CENTER	6.8	WALL MOUNTED	230/1/60	SPLIT-TYPE INVERTER FAN COIL UNIT. COMPLETE WITH STANDARD ACCESSORIES AND DRAIN PUMP.
FCU 12	1	GROUND FLOOR	P.E. CENTER	6.8	WALL MOUNTED	230/1/60	SPLIT-TYPE INVERTER FAN COIL UNIT. COMPLETE WITH STANDARD ACCESSORIES AND DRAIN PUMP.
FCU 13	1	GROUND FLOOR	ADMINISTRATIVE SECTION	6.8	WALL MOUNTED	230/1/60	SPLIT-TYPE INVERTER FAN COIL UNIT. COMPLETE WITH STANDARD ACCESSORIES AND DRAIN PUMP.
FCU 14	1	GROUND FLOOR	WAITING AREA	14.0	FLOORSTANDING	230/1/60	SPLIT-TYPE INVERTER FAN COIL UNIT. COMPLETE WITH STANDARD ACCESSORIES .
FCU 15	1	GROUND FLOOR	WAITING AREA	14.0	FLOORSTANDING	230/1/60	SPLIT-TYPE INVERTER FAN COIL UNIT. COMPLETE WITH STANDARD ACCESSORIES .
FCU 16	1	GROUND FLOOR	E-CENTER	3.7	WALL MOUNTED	230/1/60	SPLIT-TYPE INVERTER FAN COIL UNIT. COMPLETE WITH STANDARD ACCESSORIES AND DRAIN PUMP.
FCU 17	1	GROUND FLOOR	WAITING AREA	14.0	FLOORSTANDING	230/1/60	SPLIT-TYPE INVERTER FAN COIL UNIT. COMPLETE WITH STANDARD ACCESSORIES .
FCU 18	1	GROUND FLOOR	WAITING AREA	14.0	FLOORSTANDING	230/1/60	SPLIT-TYPE INVERTER FAN COIL UNIT. COMPLETE WITH STANDARD ACCESSORIES .
FCU 19	1	GROUND FLOOR	WAITING AREA	14.0	FLOORSTANDING	230/1/60	SPLIT-TYPE INVERTER FAN COIL UNIT. COMPLETE WITH STANDARD ACCESSORIES .

AIR COOLED CONDENSING UNIT(MULTI-SPLIT TYPE)

MARK	QUANTITY	LOCATION	FCU SERVED	CAPACITY	COMPRESSOR TYPE	REFRIGERANT	REFRIGERANT PIPE		ELECTRICAL DATA		REMARKS
				KW			RGL	RLL	KW INPUT	V/PH/HZ	
ACCU/ A	1	GROUND FLOOR	FCU/ 1A	14.2	HERMETICALLY SEALED SWING TYPE	R-410A	15.9	9.5	3.9	230/1/60	MULTI- SPLIT TYPE AIR COOLED CONDENSING UNIT C/W STANDARD ACCESSORIES
			FCU/ 2A								
			FCU/ 3A								
ACCU/ B	1	GROUND FLOOR	FCU/ 1B	22	HERMETICALLY SEALED SWING TYPE	R-410A	19.1	9.5	5.94	380/3/60	MULTI- SPLIT TYPE AIR COOLED CONDENSING UNIT C/W STANDARD ACCESSORIES
			FCU/ 2B								
			FCU/ 3B								
			FCU/ 4B								

FAN COIL UNIT(MULTI-SPLIT TYPE)

MARK	QUANTITY	LOCATION	AREA SERVED	CAPACITY	TYPE	ELECTRICAL DATA		REMARKS
				KW		KW INPUT	V/PH/HZ	
FCU/ 1A	1	GROUND FLOOR	ADMINISTRATIVE SECTION	6.8	WALL MOUNTED	0.05	230/1/60	FAN COIL UNIT. COMPLETE WITH STANDARD ACCESSORIES
FCU/ 2A	1	GROUND FLOOR	ACCOUNTS AND MANAGEMENT SECTION	3.7	WALL MOUNTED	0.03	230/1/60	FAN COIL UNIT. COMPLETE WITH STANDARD ACCESSORIES
FCU/ 3A	1	GROUND FLOOR	ACCOUNTS AND MANAGEMENT SECTION	3.7	WALL MOUNTED	0.03	230/1/60	FAN COIL UNIT. COMPLETE WITH STANDARD ACCESSORIES
FCU/ 1B	1	GROUND FLOOR	BANK SERVICE PROVIDER	3.7	WALL MOUNTED	0.03	230/1/60	FAN COIL UNIT. COMPLETE WITH STANDARD ACCESSORIES
FCU/ 2B	1	GROUND FLOOR	UMID	6.8	WALL MOUNTED	0.05	230/1/60	FAN COIL UNIT. COMPLETE WITH STANDARD ACCESSORIES
FCU/ 3B	1	GROUND FLOOR	INFO KIOSK	3.7	WALL MOUNTED	0.03	230/1/60	FAN COIL UNIT. COMPLETE WITH STANDARD ACCESSORIES
FCU/ 4B	1	GROUND FLOOR	LOBBY	6.8	WALL MOUNTED	0.05	230/1/60	FAN COIL UNIT. COMPLETE WITH STANDARD ACCESSORIES

1 M-002 EQUIPMENT SCHEDULE

SCALE NTS

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CERTIFIED BY: ROLANDO M. MANAOAT, PROFESSIONAL MECHANICAL ENGINEER
REG. NO.: 4569
TIN NO. : 105-691-252
PTR NO. : 7371938
DATE : JANUARY 21, 2019
PLACE : MAKATI CITY

OWNER: SOCIAL SECURITY SYSTEM, 6/F , SSS BUILDING EAST AVENUE, QUEZON CITY
APPROVED BY: JOSIE G. MAGANA, SVP NCR OPERATIONS GROUP

PROJECT TITLE/LOCATION: PROPOSED ONE -STOREY SSS BUILDING, BRGY. BUTTONG , LAOAG CITY

SHEET CONTENTS: EQUIPMENT SCHEDULE

CADD	DATE	NO.	REVISIONS	CHK	DATE
POB	AUG 2019				
DESIGNED	DATE				
JMA	AUG 2019				
APPROVED	DATE				
RMM	AUG 2019	0			

PAPER SIZE	SHEET NO.
20X30	M-002
SCALE	PROJECT NO.
AS SHOWN	SO-G-15-010

FRESH AIR FANS

ITEM	UNIT NO.	QTY	LOCATION	AREA SERVED	TYPE	DRIVE	CAPACITY (CMH)	TOTAL STATIC PRESSURE (Pa)	MOTOR DATA				WEIGHT (KG)	REMARKS
									W	V	PH	HZ		
1	FA/1 TO FA/2	2	GROUND FLOOR	WAITING AREA	CENTRIFUGAL INLINE	DIRECT	1000	150	240	230	1	60	8	DIRECT CENTRIFUGAL INLINE FAN COMPLETE WITH STANDARD ACCESSORIES.

EXHAUST FANS

ITEM	UNIT NO.	QTY	AREA SERVED	TYPE	CAPACITY (CMH)	TOTAL STATIC PRESSURE (Pa)	MOTOR DATA				WEIGHT (KG)	REMARKS
							W	V	PH	HZ		
1	TEF/1 TO TEF/6	6	TOILET (MALE /FEMALE)	CEILING CASSETTE	180	50	40	230	1	60	1	CEILING CASSETTE EXHAUST FAN COMPLETE WITH STANDARD ACCESSORIES. INTERLOCK W/ LIGHT SWITCH
2	EF/1	1	PUMP ROOM	CEILING CASSETTE	300	150	70	230	1	60	6	CEILING CASSETTE EXHAUST FAN COMPLETE WITH STANDARD ACCESSORIES. INTERLOCK W/ LIGHT SWITCH
3	EF/2	1	ELECTRICAL ROOM	CEILING CASSETTE	400	150	50	230	1	60	6	CEILING CASSETTE EXHAUST FAN COMPLETE WITH STANDARD ACCESSORIES. INTERLOCK W/ LIGHT SWITCH
4	EF/3	1	PANTRY	CEILING CASSETTE	400	150	50	230	1	60	6	CEILING CASSETTE EXHAUST FAN COMPLETE WITH STANDARD ACCESSORIES. INTERLOCK W/ LIGHT SWITCH
5	EF/4	1	RECORDS ROOM	WALL MOUNTED	1,000	-	50	230	1	60	6	WALL MOUNTED EXHAUST FAN COMPLETE WITH STANDARD ACCESSORIES.INTERLOCK WITH LIGHT SWITCH
6	EF/5	1	SUPPLY ROOM	WALL MOUNTED	200	-	25	230	1	60	2.5	WALL MOUNTED EXHAUST FAN COMPLETE WITH STANDARD ACCESSORIES.INTERLOCK WITH LIGHT SWITCH
7	TF/1	1	BREASTFEEDING ROOM	WALL MOUNTED	250	-	30	230	1	60	1	WALL MOUNTED EXHAUST FAN COMPLETE WITH STANDARD ACCESSORIES.

AIR CURTAIN

ITEM	UNIT NO.	QTY	LOCATION	TYPE	CAPACITY (CMH)	MOTOR DATA				DIMENSION	WEIGHT (KG)	REMARKS
						W	V	PH	HZ			
1	AC/1	2	MAIN ENTRANCE / EXIT	AMBIENT / NO HEAT	1240 / 2600	650	230	1	60	1550 x 450 x 300	50	HORIZONTAL MOUNTING AIR CURTAIN COMPLETE WITH STANDARD ACCESSORIES.
2	AC/2											

1 M-003 EQUIPMENT SCHEDULE
SCALE NTS

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CERTIFIED BY
ROLANDO M. MANAOAT
PROFESSIONAL MECHANICAL ENGINEER
REG. NO.: 4569
TIN NO. : 105-691-252
PTR NO.: 7371938
DATE : JANUARY 21, 2019
PLACE : MAKATI CITY

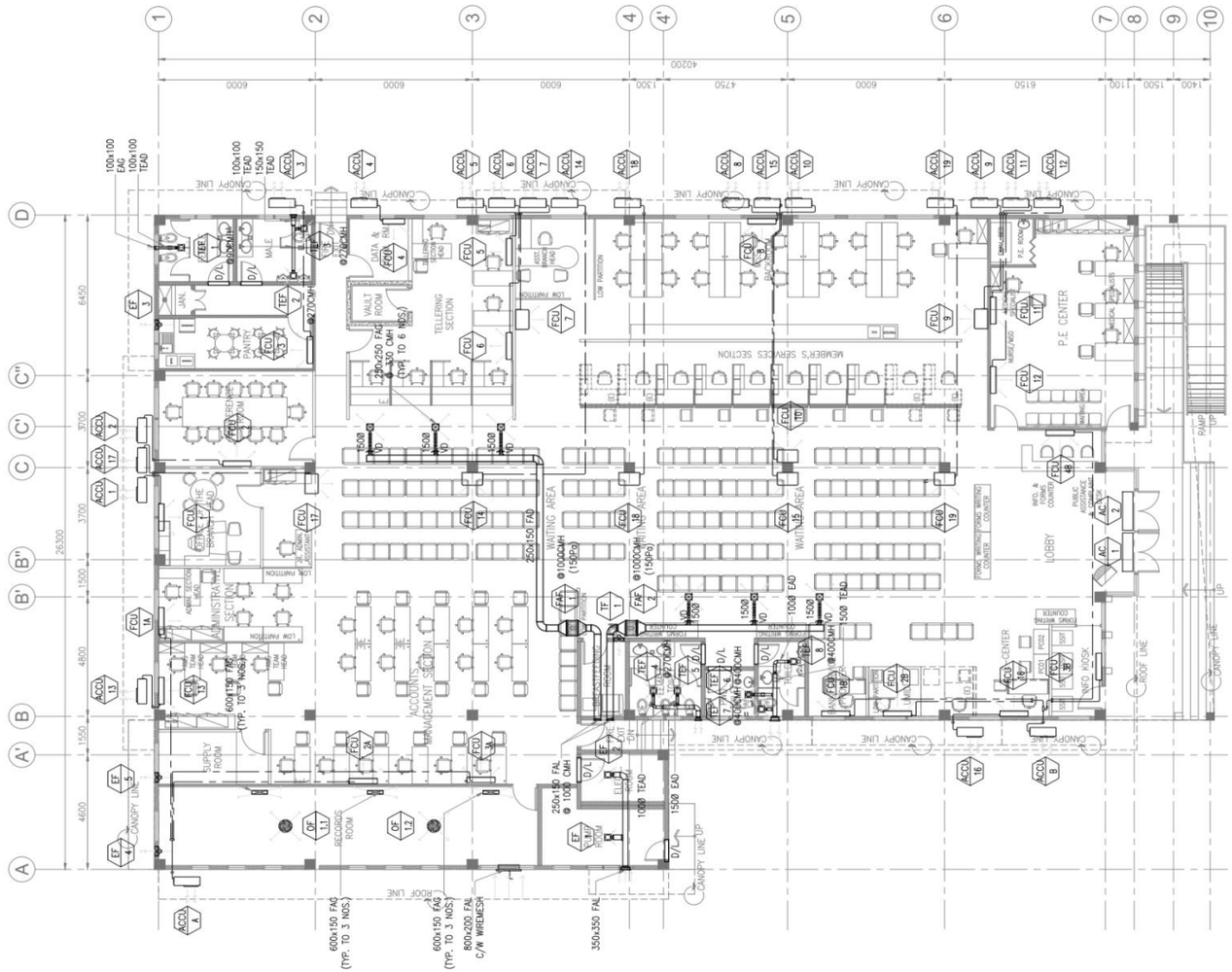
OWNER
SOCIAL SECURITY SYSTEM
6/F , SSS BUILDING EAST AVENUE, QUEZON CITY
APPROVED BY: JOSIE G. MAGANA
SVP NCR OPERATIONS GROUP

PROJECT TITLE/LOCATION
PROPOSED ONE -STOREY SSS BUILDING
BRGY. BUTTONG , LAOAG CITY

SHEET CONTENTS
EQUIPMENT SCHEDULE

CADD	DATE	NO.	REVISIONS	CHK	DATE
POB	AUG 2019				
DESIGNED	DATE				
JMA	AUG 2019				
APPROVED	DATE				
RMM	AUG 2019	0			

PAPER SIZE	SHEET NO.
20X30	M-003
SCALE	PROJECT NO.
AS SHOWN	SO-G-15-010



a.c.ong CONSULTING INC. Engineering + Management ISO 9001 Certified 2F LTA Building 116 Perea Street, Legaspi Village, 1229 Makati City, Philippines Tel. Nos.: +63 2 8935827 Fax No.: +63 2 8935829 Email: acoconsulting@aco.com.ph Website: www.aco.com.ph	CERTIFIED BY ROLANDO M. MANAOAT PROFESSIONAL MECHANICAL ENGINEER	REG. NO.: 4569 TIN NO. : 105-691-252 PTR NO. : 7371938 DATE : JANUARY 21, 2019 PLACE : MAKATI CITY	OWNER SOCIAL SECURITY SYSTEM 6/F , SSS BUILDING EAST AVENUE, QUEZON CITY APPROVED BY: JOSIE G. MAGANA SVP NCR OPERATIONS GROUP	PROJECT TITLE/LOCATION PROPOSED ONE -STOREY SSS BUILDING BRGY. BUTTONG , LAOAG CITY	SHEET CONTENTS A/C & VENTILATION LAYOUT	CADD	DATE	NO.	REVISIONS	CHK	DATE	PAPER SIZE 20X30 SCALE AS SHOWN	SHEET NO. M-004 PROJECT NO. SO-G-15-010
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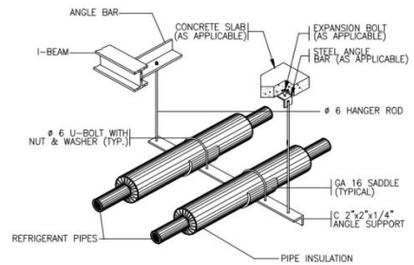

1 M-005 REFRIGERANT PIPE HANGER
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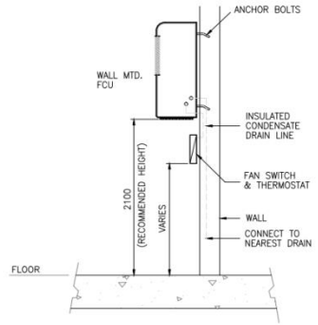

2 M-005 DETAIL (WALL MOUNTED) FCU INSTALLATION
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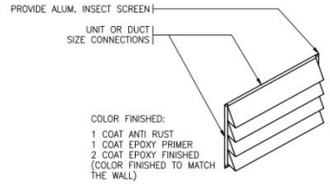
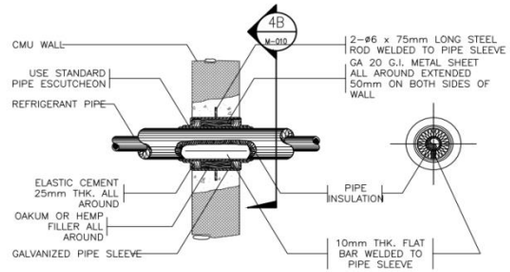
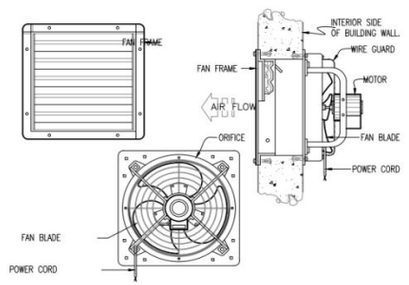


3 M-005 EXHAUST / FRESH AIR GRILLE
SCALE NTS

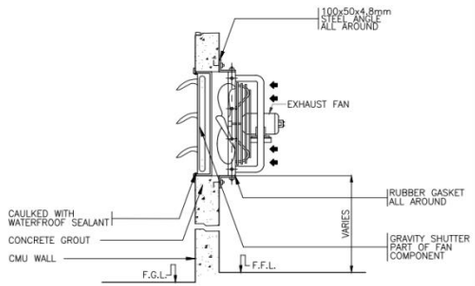


4A M-005 ELEVATION SCALE NTS
4B M-005 SECTION SCALE NTS

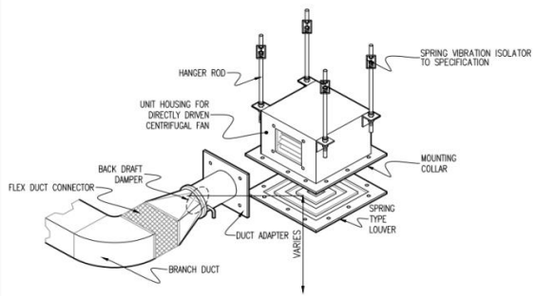
4 M-005 TYP. ACCU MOUNTING DETAIL
SCALE NTS



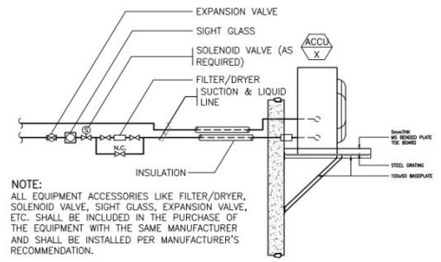
5 M-005 PROPELLER EXHAUST FAN INSTALLATION DETAIL
SCALE NTS



6 M-005 WALL MOUNTED EXHAUST FAN WEATHER PROOF HOOD
SCALE NTS

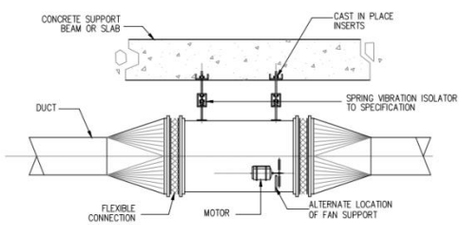


7 M-005 CEILING EXHAUST FAN DETAIL
SCALE NTS

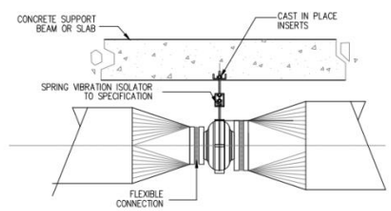


NOTE:
ALL EQUIPMENT ACCESSORIES LIKE FILTER/DRYER, SOLENOID VALVE, SIGHT GLASS, EXPANSION VALVE, ETC. SHALL BE INCLUDED IN THE PURCHASE OF THE EQUIPMENT WITH THE SAME MANUFACTURER AND SHALL BE INSTALLED PER MANUFACTURER'S RECOMMENDATION.

8 M-005 TYP. ACCU MOUNTING DETAIL
SCALE NTS



9 M-005 IN - LINE CABINET FAN
SCALE NTS



10 M-005 IN - LINE CENTRIFUGAL FAN
SCALE NTS

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OWNER
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APPROVED BY:
JOSIE G. MAGANA
SVP NCR OPERATIONS GROUP

PROJECT TITLE/LOCATION
PROPOSED ONE -STOREY SSS BUILDING
BRGY. BUTTONG , LAOAG CITY

SHEET CONTENTS
MISCELLANEOUS DETAILS

	DATE	NO.	REVISIONS	CHK	DATE
CADD POB	AUG 2019				
DESIGNED JMA	AUG 2019				
APPROVED RMM	AUG 2019	0			

PAPER SIZE 20X30
SHEET NO. M-005
SCALE AS SHOWN
PROJECT NO. SO-G-15-010


Republic of the Philippines
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Government Procurement Policy Board