



NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LIMITED

REPLACEMENT, SUPPLY, INSTALLATION, TESTING &
COMMISSIONING OF FIFTEEN (15) Nos. AIR HANDLING UNITS AT
NESPAK HOUSE, LAHORE



BIDDING DOCUMENT

July 2025



National Engineering Services Pakistan (Pvt) Limited
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Email: coord@nespak.com.pk, info@nespak.com.pk
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Clearance Code		Doc No.		Rev No.	00
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INVITATION FOR BIDS

INVITATION FOR BIDS

Date: _____

Bid Reference No. : _____

1. National Engineering Services Pakistan (Pvt.) Limited. (NESPAK) (the Employer”) has arranged funds from its own resources towards the cost of Replacement, Supply, Installation, Testing & Commissioning of Fifteen (15) Nos. Air Handling Units at NESPAK House, Lahore and it is intended that part of the proceeds of this funding will be applied to eligible payments under the Contract for the said HVAC works. Bidding is open to all eligible Bidders.
2. The Employer invites electronic bids through EPADS on single stage two envelope bidding procedure basis from eligible bidders licensed by *Pakistan Engineering Council in category C-5 or higher (in specialization code ME-01)*.
3. e-Bidding Documents as per regulations, containing detailed terms and conditions, specifications and requirements etc., are available for the registered bidders on EPADS at (www.eprocure.gov.pk).
4. Bids must be submitted by using EPADS on or before **1500 hours, on July _____, 2025**. Manual bids, shall not be accepted. Electronic Bids (Technical Bids) will be opened at **1530 hours on the same day on** www.eprocure.gov.pk, in the presence of bidders’ representatives who choose to attend at the below mentioned address. This invitation is also available on websites of **National Engineering services Pakistan (Pvt.) Limited**. (www.nespak.com.pk) and **PPRA** (www.ppra.org.pk).
5. Bidders wishing to offer discounts, shall be allowed to do so, provided those discounts are included in the Bids.

**Manager General Services
Human Resource Division,
NESPAK House 1-C, Block-N,
Model Town Extension, Lahore-54700.
Tel: 042-99231944 / 99090000, Ext: 545
Fax: 042-99231950**

Email: _____

INSTRUCTIONS TO BIDDERS (IB)

INSTRUCTIONS TO BIDDERS

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INSTRUCTIONS TO BIDDERS

A. GENERAL

- IB.1 Scope of Bid** 1.1 The Employer as defined in the **Bidding Data** hereinafter called “the Employer” wishes to receive bids for the construction and completion of works as described in these Bidding Documents, and summarized in the **Bidding Data** hereinafter referred to as the “Works”.
- 1.2 The successful Bidder will be expected to complete the Works within the time specified in the **Bidding Data**.
- IB.2 Source of Funds** 2.1 The Employer has applied for/received a funding from the source(s) in various currencies towards the cost of the project specified in the **Bidding Data** and it is intended that part of the proceeds of this funding will be applied to eligible payments under the Contract for which these Bidding Documents are issued.
- IB.3 Eligible Bidders** 3.1 This Invitation for Bids is open to all Bidders meeting the following requirements at the time of submission of Bids and thereafter:
- (a) Duly eligible for this bidding process;
 - (b) Duly licensed by the Pakistan Engineering Council (PEC) in the category relevant to the value of the Works in the relevant field of specialization.

However, a Foreign Constructor can submit provisional licence with its Bid but the Foreign Constructor will be required to submit standard licence after award of Contract and before start of work.

Foreign Constructor shall not be eligible to participate in bidding individually. Foreign Constructor shall enter into joint venture with Pakistani Constructor registered with the Pakistan Engineering Council in equivalent/compatible category and submit the joint venture agreement to the Employer before participating in bidding in accordance with PEC Construction and Operation of Engineering Works Bye-laws, 1987;
 - (c) Pakistani Constructor must be on Active Taxpayer List of the Federal Board of Revenue and provincial revenue authority/ board where applicable; and
 - (d) All partners constituting the Bidder including proposed subcontractors do not appear in the list of debarred/blacklisted firms and individuals on the websites of PEC and Federal & Provincial Procurement Regulatory Authorities and have not been declared debarred/blacklisted by foreign country, international organizations or other foreign institutions.

- IB.4 Eligible Materials, Equipment and Services**
- 4.1 All materials, equipment and services to be supplied under this Contract shall have their origin in eligible countries described under paragraph 4.4 hereunder.
- 4.2 For purpose of this Clause, “origin” means the place where the Goods are mined, grown or produced or from where the ancillary services are supplied. Goods are produced when, through manufacturing, processing or substantial and major assembling of components, a commercially recognized product results that is substantially different in basic characteristics or in purpose or utility from its components.
- 4.3 The origin of Goods and Services is distinct from the nationality of the Bidder.
- 4.4 Eligible countries to participate in this bidding process are those which have been notified by Ministry of Interior, Government of Pakistan as Business Friendly Countries (BVL); information can be accessed through following link:
<http://www.dgip.gov.pk/Files/Visa%20Categories.aspx#L>

- IB.5 One Bid per Bidder**
- 5.1 Each Bidder shall submit only one Bid either by himself, or as a partner in a joint venture. A Bidder who submits or participates in more than one Bid (other than alternatives pursuant to Clause IB.17) will be disqualified.

- IB.6 Site Visit**
- 6.1 The Bidders are advised to visit and examine the Site of Works and its surroundings and obtain for themselves on their own responsibility all information that may be necessary for preparing the Bid and entering into a contract for construction of the Works. All cost in this respect shall be at the Bidder’s own expense.
- 6.2 The Bidders and any of their personnel or agents will be granted permission by the Employer to enter upon his premises and lands for the purpose of such inspection, but only upon the express condition that the Bidders, their personnel and agents, will release and indemnify the Employer, his personnel and agents from and against all liability in respect thereof and will be responsible for death or personal injury, loss of or damage to property and any other loss, damage, costs and expenses incurred as a result of such inspection.

B. BIDDING DOCUMENTS

- IB.7 Contents of Bidding Documents**
- 7.1 The Bidding Documents, in addition to Invitation for Bids, are those stated below and should be read in conjunction with any Addenda issued in accordance with Clause IB.9:

1. Instructions to Bidders;
2. Bidding Data;
3. Evaluation Criteria and Qualification Updating Forms;
4. General Conditions (GC);
5. Particular Conditions (PC):
 - Part A - Contract Data;
 - Part B - Special Provisions;
6. Specifications (SP):
 - Part A - Specific Provisions;
 - Part B - Technical Provisions;
7. Letter of Bid;
8. Schedules to Bid;
9. Standard Forms:
 - (i) Form of Bid Security;
 - (ii) Letter of Acceptance;
 - (iii) Form of Contract Agreement;
 - (iv) Form of Performance Security;
 - (v) DAAB Agreement;
 - (vi) Form of Mobilization Advance Guarantee;
10. Drawings.

7.2 The Bidders are expected to examine carefully the contents of all the above documents. Failure to comply with the requirements of Bid submission will be at the Bidder's own risk. Pursuant to Clause IB.26, bids which are not substantially responsive to the requirements of the Bidding Documents will be rejected.

IB.8 Clarification of Bidding Documents, Pre-Bid Meeting

- 8.1 Any prospective Bidder requiring any clarification(s) in respect of the Bidding Documents may notify the Employer in writing at the Employer's address indicated in the Invitation for Bids. The Employer will respond to any request for clarification which he receives earlier than the period specified in the **Bidding Data**, prior to the deadline for submission of bids.
- 8.2 Copies of the Employer's response will be forwarded to all purchasers of the Bidding Documents, including a description of the enquiry but without identifying its source.
- 8.3 The Employer may, on his own or at the request of any prospective Bidder(s), hold a pre-bid meeting to clarify issues and to answer any questions on matters related to the Bidding Documents. The date, time and venue of pre-bid meeting, if convened, are as stipulated in the **Bidding Data**. All prospective Bidders or their authorized representatives shall be invited to attend such a pre-bid meeting.
- 8.4 The Bidders are requested to submit questions, if any, in writing so as to reach the Employer not later than seven (7) days before the proposed pre-bid meeting.

- 8.5 Minutes of the pre-bid meeting, including the text of the questions raised and the replies given, will be transmitted without delay to all purchasers of the Bidding Documents. Any modification of the Bidding Documents listed in Sub-Clause IB.7.1 hereof which may become necessary as a result of the pre-bid meeting shall be made by the Employer exclusively through the issue of an Addendum pursuant to Clause IB.9 and not through the minutes of the pre-bid meeting.
- 8.6 Absence at the pre-bid meeting will not be a cause for disqualification of a Bidder.

IB.9 Amendment of Bidding Documents

- 9.1 At any time prior to the deadline for submission of bids, the Employer may, for any reason, whether at his own initiative or in response to a clarification requested by a prospective Bidder, modify the Bidding Documents by issuing addendum.
- 9.2 Any addendum thus issued shall be part of the Bidding Documents listed in Sub-Clause IB.7.1 hereof and shall be communicated in writing to all purchasers of the Bidding Documents. Prospective Bidders shall acknowledge receipt of each addendum in writing to the Employer.
- 9.3 Such addendum shall be issued not later than number of days prior to the deadline for submission of bids, specified in the **Bidding Data**. To afford prospective Bidders reasonable time in which to take an addendum into account in preparing their bids, the Employer may extend the deadline for submission of bids in accordance with Clause IB.20.

C. PREPARATION OF BIDS

IB.10 Cost of Bidding

- 10.1 The Bidders shall bear all costs associated with the preparation and submission of their respective bids and the Employer will in no case be responsible or liable for those costs, regardless of the conduct or outcome of the bidding process.

IB.11 Language of Bid

- 11.1 The Bid and all correspondence and documents related to the Bid exchanged by a Bidder and the Employer shall be in the Bid language stipulated in the **Bidding Data** and Particular Conditions of Contract. Supporting documents and printed literature furnished by the Bidders may be in any other language provided the same are accompanied by duly certified translation of the relevant parts in the Bid language, in which case, for purposes of evaluation of the bid, the translation in Bid language shall prevail.

IB.12 Documents Comprising the Bid

- 12.1 Each Bidder shall:
 - (a) submit duly filled in, signed and stamped Letter of Bid and completed Schedules to Bid as required, including priced Bill of Quantities, in accordance with Clause IB.18 hereof;

- (b) submit Bid Security in accordance with Clause IB.16 hereof;
- (c) submit alternative proposal, if permissible in accordance with Clause IB.17;
- (d) submit a written power of attorney authorizing the signatory of the Bid to act for and on behalf of the Bidder. The name and position held by each person signing the authorization must be typed or printed below the signature;
- (e) submit the Qualification Updating Forms duly filled in, signed and stamped along with requisite attachments, to establish that the Bidder continues to meet the Eligibility and Qualification Criteria set out in the Pre-Qualification Documents and as provided in the Section "Evaluation Criteria and Qualification Updating Forms";
- (f) furnish a technical proposal taking into account the various Schedules to Bid, specially the following:
 - Schedule-C to Bid, Proposed Construction Schedule;
 - Schedule-D to Bid, Method of Performing the Work;
 - Schedule-E to Bid, List of Major Equipment;
 - Schedule-F to Bid, Organization Chart for Supervisory Staff;and other pertinent information, such as mobilization programme, etc.

12.2 Bids submitted by a joint venture of two (2) or more firms specified in **Bidding Data**, shall comply with the following requirements:

- (a) the bid, and in case of a successful bid, the Form of Contract Agreement shall be signed by all members so as to be legally binding on all partners;
- (b) one of the joint venture partners shall be nominated as being in-charge; and this authorization shall be evidenced by submitting a power of attorney signed by legally authorized signatories of all the joint venture partners;
- (c) the partner-in-charge shall always be duly authorized to deal with the Employer regarding all matters related with and/or incidental to the execution of Works as per the terms and Conditions of Contract and in this regard to incur any and all liabilities, receive instructions, give binding undertakings and receive payments on behalf of the joint venture;
- (d) all partners of the joint venture shall at all times and under all circumstances be liable jointly and severally for the execution of the Contract in accordance with the

Contract terms and a statement to this effect shall be included in the authorization mentioned under Sub-Para(b) above as well as in the Letter of Bid and in the Form of Contract Agreement (in case of a successful bid); and

- (e) a copy of the agreement entered into by the joint venture partners shall be submitted with the bid stating the conditions under which it will function, its period of duration, the persons authorized to represent and obligate it and which persons will be directly responsible for due performance of the Contract and can give valid receipts on behalf of the joint venture, the proportionate participation and corresponding duties & responsibilities of the several firms forming the joint venture, and any other information necessary to permit a full appraisal of its functioning. No amendments/modifications whatsoever in the joint venture agreement shall be agreed to between the joint venture partners without prior written consent of the Employer.

12.3 Bidders shall also submit proposals of work methods and schedule, in sufficient detail to demonstrate the adequacy of the Bidders' proposals to meet the technical specifications and the completion time referred to in Sub-Clause IB.1.2 hereof.

IB.13 Bid Prices

13.1 The price and discount if any quoted by the Bidders in the Letter of Bid and in the Bill of Quantity shall conform to the requirement specified below:

13.2 The Bidder shall quote any discounts and the methodology for their application.

13.3 If bids are being invited for individual lots (contracts) or for any combination of lots, the Bidders can offer discounts for the individual lots (contracts) as well as for award of more than one Contract and shall specify in their bid.

13.4 Unless stated otherwise in the Bidding Documents, the Contract shall be for the whole of the Works as described in Sub-Clause IB.1.1 hereof, based on the unit rates and/or prices.

13.5 The Bidders shall fill in rates and prices for all items of the Works described in the Bill of Quantities. Items against which no rate or price is entered by a Bidder will not be paid for by the Employer when executed and shall be deemed covered by rates and prices for other items in the Bill of Quantities.

13.6 All duties, taxes and other levies payable by the Contractor under the Contract, or for any other cause, as on the date 28 days prior to the deadline for submission of bids shall be included in the rates and prices and the total Bid Price submitted by a Bidder.

Additional/reduced duties, taxes and levies due to subsequent additions or changes in legislation shall be reimbursed/deducted as per Sub Clause 13.6 [*Adjustment for Changes in Laws*] of the Conditions of Contract.

13.7 The rates and prices quoted by the Bidders are subject to adjustment during the performance of the Contract in accordance with the provisions of Sub-Clause 13.7 [*Adjustments for Changes in Cost*] of the General Conditions of Contract. The Bidders shall furnish the prescribed information for the price adjustment formulae in Schedule-A to Bid, and shall submit with their bids such other requisite supporting information if required under the said Schedule.

IB.14 Currencies of Bid and Payment

14.1 The unit rates and the prices shall be quoted by the Bidder entirely PKR.

A Bidder expecting to incur expenditures in other currencies for inputs to the Works supplied from outside the Employer's country (referred to as the "Foreign Currency Requirements") shall indicate in Table III of Schedule-A to Bid the proportion of the Bid Price (excluding Provisional Sums) needed by him for the payment of such Foreign Currency Requirements; in such case the unit rates and the prices shall be quoted by the Bidder in Equivalent PKR.

14.2 The rates of exchange to be used by the Bidder for currency conversion shall be the TT Selling Rates published or authorized by the State Bank of Pakistan prevailing on the date twenty eight (28) days prior to the deadline for submission of bids. Such rates shall be notified by the Employer not later than fourteen (14) days prior to the deadline for submission of Bids.

For the purpose of payments, the exchange rates used in Bid preparation shall apply for the duration of the Contract.

IB.15 Bid Validity

15.1 Bids shall remain valid for the period stipulated in the **Bidding Data** after the date of Bid Opening specified in Clause IB.23.

15.2 In exceptional circumstances, prior to expiry of the original bid validity period, the Employer may request that the Bidders extend the period of validity for a specified additional period which normally may not be more than the original bid validity period. The request and the responses thereto shall be made in writing. A Bidder may refuse the request without forfeiting his Bid Security. A Bidder agreeing to the request will not be required or permitted to modify his bid, but will be required to extend the validity of his Bid Security for the period of the extension, and in compliance with Clause IB.16 in all respects.

IB.16 Bid Security

16.1 Each Bidder shall furnish, as part of his bid, a Bid Security in original form in the amount stipulated in the **Bidding Data** in PKR or an equivalent amount in a freely convertible currency.

- 16.2 The Bid Security shall be, at the option of the Bidder, in the form of Call Deposit Receipt (CDR)/ Pay Order or a Security issued in the prescribed form included in the Bidding Documents, by (a) a Scheduled Bank in Pakistan or (b) a foreign bank duly counter-guaranteed by a Scheduled Bank in Pakistan or (c) an Insurance Company listed in the **Bidding Data** and rated by PACRA/VIS of rating as provided in Table below in favour of the Employer valid for a period 14 days beyond the Bid Validity date. The Bid Security of Joint Venture shall be in the name of Joint Venture or Lead/either Firm of the JV or in ratio of shares of the individual JV partners, submitting the bid.

Bid Price (In Eq. million PKR)	Minimum Rating of Insurance Companies
Up to 1000	A (+)
1001 to no limit	AA
<i>[Note: Insurance Company includes Joint Ventures of Insurance Companies also]</i>	

- 16.3 Any Bid not accompanied by an acceptable Bid Security shall be rejected by the Employer as non-responsive.
- 16.4 The Bid Securities of the Bidders except the lowest three will be returned by the Employer within twenty eight (28) days from the opening of Bids, provided a Bidder requests for the return of its Bid Security, or upon the expiry of original validity of Bid Security or as extended, whichever is earlier.
- 16.5 The Bid Security of the lowest three Bidders including the successful Bidder will be returned when the successful Bidder has furnished the required Performance Security.
- 16.6 The Bid Security may be forfeited:
- (a) if the Bidder withdraws his bid except as provided in Sub Clause IB.22.1;
 - (b) if the Bidder does not accept the correction of his Bid Price pursuant to Sub Clause IB.28.2 hereof; or
 - (c) in the case of successful Bidder, fails to furnish the required Performance Security.
- 16.7 In case of annulment, all Bids submitted and specially, Bid securities, shall be returned to the Bidders within 14 days of annulment.

IB.17 Alternative Proposals by Bidder

- 17.1 Unless otherwise specified in the **Bidding Data**, alternative proposal(s) shall not be considered.
- 17.2 Should any Bidder consider that he can offer any advantages to the Employer by a modification to the designs, specifications or other conditions, he may, in addition to his Bid to be submitted in strict compliance with the Bidding Documents, submit any alternative proposal(s) containing

(a) relevant design calculations; (b) technical specifications; (c) proposed construction methodology; and (d) any other relevant details/conditions, provided always that the total sum entered on the Letter of Bid shall be that which represents complete compliance with the Bidding Documents.

17.3 Alternative proposal(s), if any, of the Bidder having submitted most advantageous Bid only may be considered by the Employer as the basis for the award of Contract to such Bidder.

IB.18 Format and Signing of Bid

18.1 Bidders are particularly directed that the amount entered on the Letter of Bid shall be for performing the Contract strictly in accordance with the Bidding Documents.

18.2 All Schedules to Bid are to be properly completed and signed.

18.3 No alteration is to be made in the Letter of Bid nor in the Schedules thereto except in filling up the blanks as directed. If any such alterations be made or if these instructions be not fully complied with, the Bid may be rejected.

18.4 Each Bidder shall prepare by filling in the forms completely and without alterations one (1) original and number of copies, specified in the **Bidding Data**, of the documents comprising the Bid as described in Clause IB.12 and clearly mark them "ORIGINAL" and "COPY" as appropriate. In the event of discrepancy between them, the original shall prevail.

The Bidder shall also provide complete searchable PDF versions as well as Word, Excel, etc., versions of the Bid if so required in the **Bidding Data**.

18.5 The original of the Bid shall be typed or written in indelible ink and shall be signed by a person or persons duly authorized to sign on behalf of the Bidder pursuant to Sub-Clause IB.12.1(d) hereof. All pages of the Bid shall be initialled and stamped by the person or persons signing the bid.

18.6 The Bid shall contain no alterations, omissions or additions, except to comply with instructions issued by the Employer, or as are necessary to correct errors made by the Bidder, in which case such corrections shall be initialled by the person or persons signing the Bid.

18.7 Bidders shall indicate in the space provided in the Letter of Bid their full and proper addresses at which notices may be legally served on them and to which all correspondence in connection with their bids and the Contract is to be sent.

18.8 Bidders should retain a copy of the Bidding Documents and the Bid as their file copy.

18.9 All documents executed outside Pakistan required to be submitted with the Bid must be certified by Pakistani Embassy in the respective country(ies).

D. SUBMISSION OF BIDS

IB.19 Sealing and Marking of Bids

- 19.1 Each Bidder shall submit his Bid as under:
- (a) ORIGINAL and each copy of the Bid shall be separately sealed and put in separate envelopes and marked as such.
 - (b) The envelopes containing the ORIGINAL and copies will be put in one sealed envelope and addressed / identified as given in Sub Clause IB.19.2 hereof.
- 19.2 The inner and outer envelopes shall:
- (a) be addressed to the Employer at the address provided in the **Bidding Data**;
 - (b) bear the specific identification of this bidding process as specified in the **Bidding Data**; and
 - (c) provide a warning not to open before the time and date for bid opening, as specified in the **Bidding Data**.
- 19.3 In addition to the identification required in Sub-Clause IB.19.2 hereof, the inner envelope shall indicate the name and address of the Bidder to enable the Bid to be returned unopened in case it is declared “late” pursuant to Clause IB.21.
- 19.4 If the outer envelope is not sealed and marked as above, the Employer will assume no responsibility for the misplacement or premature opening of the Bid.

IB.20 Deadline for Submission of Bids

- 20.1
- (a) Bids must be received by the Employer at the address specified no later than the time and date stipulated in the **Bidding Data**.
 - (b) Bids with charges payable will not be accepted, nor will arrangements be undertaken to collect the bids from any delivery point other than that specified above. Bidders shall bear all expenses incurred in the preparation and delivery of Bids. No claims will be entertained for refund of such expenses.
 - (c) Where delivery of a Bid is by mail and the Bidder wishes to receive an acknowledgment of receipt of such Bid, he shall make a request for such acknowledgment in a separate letter attached to but not included in the sealed Bid envelope.
 - (d) Upon request, acknowledgment of receipt of Bids will be provided to those making delivery in person or by messenger.
- 20.2 The Employer may, at his discretion, extend the deadline for submission of Bids by issuing an amendment in accordance with Clause IB.9, in which case all rights and obligations of the Employer and the Bidders previously subject to the original deadline will thereafter be subject to the deadline as extended.

- IB.21 Late Bids**
- 21.1 (a) Any Bid received by the Employer after the deadline for submission of bids prescribed in Clause IB.20 shall be declared late, rejected and returned unopened to such Bidder.
- (b) Delays in the mail, delays of person in transit, or delivery of a Bid to the wrong office shall not be accepted as an excuse for failure to deliver a Bid at the proper place and time. It shall be the Bidder's responsibility to determine the manner in which timely delivery of his Bid will be accomplished either in person, by messenger or by mail.

- IB.22 Modification, Substitution and Withdrawal of Bids**
- 22.1 Any Bidder may modify, substitute or withdraw his Bid after Bid submission provided that the modification, substitution or written notice of withdrawal is received by the Employer prior to the deadline for submission of bids.
- 22.2 The modification, substitution, or notice for withdrawal of any Bid shall be prepared, sealed, marked and delivered in accordance with the provisions of Clause IB.19 with the outer and inner envelopes additionally marked "MODIFICATION", "SUBSTITUTION" or "WITHDRAWAL" as appropriate.
- 22.3 No Bid may be modified by a Bidder after the deadline for submission of Bids except in accordance with Sub Clauses IB.22.1 and 28.2.
- 22.4 Withdrawal of a Bid during the interval between the deadline for submission of Bids and the expiration of the period of Bid validity specified in the Letter of Bid may result in forfeiture of the Bid security in pursuance to Clause IB.16.

E. BID OPENING AND EVALUATION

- IB.23 Bid Opening**
- 23.1 The Employer will open the Bids including withdrawals, substitution and modifications made pursuant to Clause IB.22, in the presence of Bidders' representatives who choose to attend, at the time, date and location stipulated in the **Bidding Data**. The Bidders' representatives who are present shall sign a register evidencing their attendance.
- 23.2 Envelopes marked "MODIFICATION", "SUBSTITUTION" or "WITHDRAWAL" shall be opened and read out first. Bids for which an acceptable notice of withdrawal has been submitted pursuant to Clause IB.22 shall not be opened. Only bids that are opened and read out at Bid opening shall be considered further.
- 23.3 The Bidder's name, total Bid Price and price of any alternative proposal(s), any discounts, Bid modifications, substitution and withdrawals, the presence or absence of Bid security, and such other details as the Employer may consider appropriate, will be announced by the Employer at the opening of Bids. Only discounts and alternative proposals

read out at Bid opening shall be considered for evaluation. The Letter of Bid and the Summary Bill of Quantities are to be initialled by representative(s) of the Employer attending Bid opening. The Employer shall neither discuss the merits of any Bid nor reject any Bid (except for late Bids, in accordance with Sub-Clause IB 21.1).

23.4 The Employer shall prepare minutes of the Bid opening, including the information disclosed to those present in accordance with the Sub-Clause IB.23.3.

IB.24 Process to be Confidential

24.1 Information relating to the examination, clarification, evaluation and comparison of Bids and recommendations for the award of Contract shall not be disclosed to Bidders or any other person not officially concerned with such process before the announcement of the result of Bid evaluation in the form of final evaluation report giving justification for acceptance or rejection of Bids which shall be done at least fifteen (15) days prior to award of Contract. The announcement to all Bidders will include table(s) comprising read out prices, discounted prices, price adjustments made, final evaluated prices and recommendations against all the Bids evaluated. Any effort by a Bidder to influence the Employer's processing of Bids or Contract award decisions may result in the rejection of such Bidder's Bid. Whereas any Bidder feeling aggrieved may lodge a written complaint not later than five (5) days after the announcement of the final evaluation report.

IB.25 Clarification of Bids

25.1 To assist in the examination, evaluation and comparison of Bids, the Employer may, at his discretion, ask any Bidder for clarification of his Bid, including breakdowns of unit rates and lump sum prices. Any clarification submitted by a Bidder that is not in response to a request by the Employer shall not be considered. The request for clarification and the response shall be in writing. No change in the price or substance of the Bid shall be sought, offered or permitted except as required to confirm the correction of arithmetic errors discovered by the Employer in the evaluation of the Bids in accordance with Clause IB.28.

25.2 The Employer may, at his discretion, ask any Bidder for confirmation/submission of missing information to clarify its Bid. However, the Employer does not have an obligation to request any additional information or clarification with respect to missing or deficient information in a Bid. The Employer may reject any Bid as non-responsive if found materially incomplete, obscure, irregular or omitting any material information required to be submitted in accordance with the Bidding Documents.

25.3 If a Bidder does not provide clarifications of its Bid by the date and time set reasonably (not less than seven (7) days) in the Employer's request for clarification, the Employer may proceed with the evaluation based on the information submitted in the Bid without waiting for the Bidder's response.

- IB.26 Examination of Bids and Determination of Responsiveness**
- 26.1 Prior to the comparison of Bids, the Employer will determine whether each Bid is substantially responsive to the requirements of the Bidding Documents.
- 26.2 The Employer’s determination of a Bid’s responsiveness is to be based on the contents of the Bid itself, as defined in Sub-Clause IB.12.
- 26.3 A substantially responsive Bid is one which meets the requirements of the Bidding Documents, without material deviation, reservation or omission. A material deviation, reservation or omission is one that,
- (a) if accepted, would:
 - (i) affect in any substantial way the scope, quality or performance of the Works; or
 - (ii) limit in any substantial way, inconsistent with the Bidding Documents, the Employer’s rights or the Bidder’s obligations under the proposed Contract; or
 - (b) if rectified, would unfairly affect the competitive position of other Bidders presenting substantially responsive Bids.
- 26.4 During the evaluation of Bids, the following definitions apply:
- (a) “Deviation” is a departure from the requirements specified in the Bidding Documents;
 - (b) “Reservation” is the setting of limiting conditions or withholding from complete acceptance of the requirements specified in the Bidding Documents; and
 - (c) “Omission” is the failure to submit part or all of the information or documentation required in the Bidding Documents.
- 26.5 The Employer shall examine the technical aspects of the Bid submitted in accordance with Sub-Clause IB.12.1(f), in particular, to confirm that all requirements stated in Specifications have been met without any material deviation, reservation or omission.
- 26.6 If a Bid is not substantially responsive to the requirements of the Bidding Documents, it will be rejected by the Employer, and may not subsequently be made responsive by correction or withdrawal of the non-conforming deviation, reservation or omission.
- IB.27 Nonmaterial Nonconformities**
- 27.1 Provided that a Bid is substantially responsive, the Employer may waive any nonconformities in the Bid.
- 27.2 Provided that a Bid is substantially responsive, the Employer may request that the Bidder submit the necessary information or documentation, within a reasonable period of time, to rectify nonmaterial nonconformities in the Bid related to documentation requirements. Requesting information or

documentation on such nonconformities shall not be related to any aspect of the price of the Bid. Failure of the Bidder to comply with the request may result in the rejection of its Bid.

27.3 Provided that a Bid is substantially responsive, the Employer shall rectify quantifiable nonmaterial nonconformities related to the Bid Price. To this effect, the Bid Price shall be adjusted, for comparison purposes only, to reflect the price of a missing or non-conforming item or component, by adding the average price of the item or component quoted by other lowest two evaluated substantially responsive Bidders. If the price of the item or component cannot be derived from the price of other substantially responsive Bids, the Employer shall use a suitable CSR, adjusted to the date 28 days earlier to the Bid submission date or its best assessment.

IB.28 Correction of Arithmetic Errors

28.1 Bids determined to be substantially responsive will be checked by the Employer for any arithmetic errors. Errors will be corrected by the Employer as follows:

- (a) where there is a discrepancy between the amounts in figures and in words, the amount in words will govern.
- (b) where there is a discrepancy between the unit rate and the line item total resulting from multiplying the unit rate by the quantity, the unit rate as quoted will govern, unless in the opinion of the Employer there is an obviously gross misplacement of the decimal point in the unit rate, in which case the line item total as quoted will govern and the unit rate will be corrected.
- (c) if there is an error in a total corresponding to the addition or subtraction of subtotals, the subtotals shall prevail and the total shall be corrected.

28.2 The amount stated in the Letter of Bid will be adjusted by the Employer in accordance with the above procedure for the correction of errors and with the concurrence of the Bidder, shall be considered as binding upon the Bidder. If the Bidder does not accept the corrected Bid Price, his Bid will be rejected, and the Bid security shall be forfeited in accordance with Sub Clause IB.16.6(b) hereof.

IB.29 Evaluation and Comparison of Bids

29.1 The Employer will evaluate and compare only the Bids determined to be substantially responsive in accordance with Clause IB.26. The Employer shall use the criteria and methodologies listed in this Clause. No other evaluation criteria or methodologies shall be permitted.

29.2 In evaluating and comparing the Bids, the Employer will determine for each Bid the evaluated Bid Price by adjusting the Bid Price as follows:

- (a) making any correction for arithmetic errors pursuant to Clause IB.28;

- (b) price adjustment due to discounts offered in accordance with Sub-Clause IB.23.3;
- (c) excluding Provisional Sums and the provision, if any, for contingencies in the Summary Bill of Quantities, but including competitively priced daywork;
- (d) making an appropriate price adjustment for any quantifiable nonmaterial nonconformities in accordance with Sub-Clause IB.27.3; and
- (e) the additional evaluation factors are specified in Section Evaluation Criteria and Qualification Updating Forms.

29.3 The estimated effect of the price adjustment provisions of the Conditions of Contract, applied over the period of execution of the Contract, shall not be taken into account in Bids' comparison.

IB.30 Abnormally Low Bids

30.1 If the Bid Price of the successful Bidder is more than 15% below the lower of the Employer's estimate of the cost of work to be performed under the Contract or average of other lowest two evaluated substantially responsive Bids, the Employer may require the Bidder to produce detailed price analyses for any or all items of the Bill of Quantities to demonstrate the internal consistency of those prices with the construction methods and schedule proposed. After evaluation of the price analyses, the Employer may require an additional Performance Security by 10% of the difference of the Bid Price as determined hereinabove upto issuance of Taking Over Certificate at the expense of the successful Bidder to a level sufficient to protect the Employer against financial loss in the event of default of the successful Bidder under the Contract. The Bids having Bid Price lower than 25% shall be liable to be rejected.

IB.31 Unbalanced or Front Loaded Bids

31.1 If the Bid of the successful Bidder is seriously unbalanced (Front Loaded) in relation to the average of other evaluated substantially responsive Bids, the Employer during execution of contract may pay against measured quantities of significantly higher quoted line item(s) rate(s) with respect to same line item(s) rate(s) determined from the average of other lowest two evaluated substantially responsive Bids as instructed by the Engineer. The balance line item(s) rate(s) may be paid against the same measured quantities at the time of issuance of Taking Over Certificate or as instructed by the Engineer.

F. AWARD OF CONTRACT

IB.32 Award Criteria

32.1 Subject to Clauses IB.33 and IB.39, the Employer will award the Contract to the Bidder whose Bid has been determined as most advantageous Bid (substantially responsive to requirements of the Bidding Documents with the lowest evaluated Bid Price).

- IB.33 Employer’s Right to Annul the Bidding Process**
- 33.1 Notwithstanding Clause IB.32, the Employer reserves the right to annul the bidding process and reject all Bids, at any time prior to award of Contract, without thereby incurring any liability to the affected Bidders or any obligation.
- The Employer shall upon request communicate to any Bidder who submitted a Bid, the grounds for its rejection of all Bids but is not required to justify those grounds. Rejection of all Bids shall be notified to all Bidders promptly.
- IB.34 Notification of Award**
- 34.1 Prior to expiration of the period of Bid validity prescribed by the Employer, the Employer will notify the successful Bidder in writing (“Letter of Acceptance”) that his Bid has been accepted. This letter shall name the sum which the Employer will pay the Contractor in consideration of the execution and completion of the Works by the Contractor as prescribed by the Contract (hereinafter and in the Conditions of Contract called the “Accepted Contract Amount”).
- The Letter of Acceptance will also state the remedies with respect to Sub-Clauses IB.30 & IB.31 if applicable.
- 34.2 No negotiation with the Bidder having submitted most advantageous Bid or any other Bidder shall be permitted, however, Employer may have clarification meetings before issuing Letter of Acceptance to get clarified any item in the Bid evaluation report.
- 34.3 The Letter of Acceptance/ notification of award and its acknowledgement/acceptance by the Bidder will constitute the formation of the Contract, binding the Employer and the Bidder till signing of the formal Contract Agreement.
- 34.4 Upon furnishing by the successful Bidder of a Performance Security, the Employer will promptly notify the other Bidders that their Bids have been unsuccessful and return their Bid securities in accordance with Sub-Clause IB.16.5.
- IB.35 Performance Security**
- 35.1 The successful Bidder shall furnish to the Employer a Performance Security in the form and the amount stipulated in the Conditions of Contract and additional Performance Security if applicable under IB.30 as stated in the Letter of Acceptance, within a period of 28 days after the receipt of Letter of Acceptance.
- 35.2 Failure of the successful Bidder to comply with the requirements of Sub Clause IB.35.1 or Clauses IB.36 or IB.37 shall constitute sufficient grounds for the annulment of the award, forfeiture of the Bid security and to award the Contract to the Bidder having submitted next advantageous Bid.
- IB.36 Signing of Contract Agreement**
- 36.1 Within 14 days from the date of furnishing of acceptable Performance Security under the Conditions of Contract, the Employer will notify the successful Bidder to depute its representative with appropriate Power of Attorney to sign the Contract Agreement in the form provided in the Bidding Documents, incorporating all agreements between the parties.

- 36.2 The formal Agreement between the Employer and the successful Bidder shall be executed within 14 days of the receipt of the above stated notification by the successful Bidder from the Employer.
- IB.37 Integrity Pact** 37.1 The Bidder shall sign and stamp the Integrity Pact provided at Schedule-J to Bid in the Bidding Documents for all Federal Government procurement contracts exceeding PKR ten million. Failure to provide such Integrity Pact shall make the Bidder non-responsive.
- IB.38 Instructions not Part of Contract** 38.1 Bids shall be prepared and submitted in accordance with the Instructions to Bidders which are provided to assist the Bidders in preparing Bids but do not constitute part of the Contract.
- IB.39 Corrupt and Fraudulent Practices** 39.1 The Employer will reject a Bid if it determines that the Bidder recommended for award, or any of its personnel, or its agents, or its sub-contractors, service providers, suppliers and/or their employees, has, directly or indirectly, engaged in corrupt, fraudulent, collusive, coercive, or obstructive practices in competing for the contract under this bidding.
- 39.2 The Employer will blacklist and hence forthwith debar a Constructor or individual, at any time, in accordance with the prevailing Public Procurement Rules 2004.

BIDDING DATA (BD)

BIDDING DATA

IB Clause Reference	Bidding Data
1.1	<p>This bidding process is being conducted through EPADS on single stage two envelope bidding procedure.</p> <p>Name and address of the Employer:</p> <p>Manager General Services, Human Resource Division, NESPAK House 1-C, Block-N, Model Town Extension, Lahore - 54700.</p> <p>Name of the Project & Summary of the Works:</p> <p>REPLACEMENT, SUPPLY, INSTALLATION, TESTING & COMMISSIONING OF FIFTEEN (15) NOs. AIR HANDLING UNITS AT NESPAK HOUSE, LAHORE.</p>
1.2	Time for Completion for the Works: 180 days
2.1	Name of the Borrower/Source of Funding:
3.1(a)	The Employer has arranged funds from its own sources.
3.1(b)	The Bidder shall be duly licensed by the <i>Pakistan Engineering Council (PEC)</i> in the category C-5 or higher (in specialization code ME-01).
8.1	Any request for clarification from the bidder to be uploaded through EPADS, and the Employer responds on EPADS.
8.3	<p>Venue, time, and date of the pre-Bid meeting:</p> <p>Venue: NESPAK House 1-C, Block-N, Model Town Extension, Lahore. Time: 1100 Hours Date: July , 2025.</p>
8.4	The Bidders are requested to submit questions, if any, in writing on EPADS so as to reach the Employer not later than five (5) days before the proposed Bid Opening meeting.
9.1	At any time prior to the deadline for submission of bids, the Employer may, for any reason, whether at his own initiative or in response to a clarification requested by a prospective Bidder, modify the Bidding Documents by issuing addendum through EPADS.
9.2	Any addendum thus issued shall be part of the Bidding Documents listed in Sub-Clause IB.7.1 hereof through EPADS. Prospective Bidders shall acknowledge receipt of each addendum in writing to the Employer.

IB Clause Reference	Bidding Data
9.3	Number of days: Seven (07)
11.1	Bid language: English
12.1	<p data-bbox="400 383 1310 416">Entire text of Sub-Clause 12.1 is deleted and replaced with the following:</p> <p data-bbox="400 454 1350 555">The Bid shall comprise two envelopes submitted simultaneously on EPADS, one called the Technical Bid and the other the Price Bid containing the following documents:</p> <p data-bbox="371 602 596 636">(A) Technical Bid</p> <ul style="list-style-type: none"> <li data-bbox="371 651 1401 719">a) Duly filled in, signed and stamped Letter of Technical Bid in accordance with Clause IB.18 hereof, <li data-bbox="371 736 1091 770">b) Bid Security in accordance with Clause IB.16 hereof, <li data-bbox="371 788 1401 891">c) Written power of attorney authorizing the signatory of the Bid to act for and on behalf of the Bidder. The name and position held by each person signing the authorization must be typed or printed below the signature, <li data-bbox="371 909 1401 1048">d) Qualification Forms duly filled in, signed and stamped along with requisite attachments, to establish that the Bidder meets the Eligibility and Qualification Criteria set out in the Section “Evaluation Criteria and Qualification Forms”, <li data-bbox="371 1066 1401 1133">e) furnish a technical proposal taking into account following Schedules to Bid duly filled-in and completed in accordance with Clause IB.18: <ul style="list-style-type: none"> <li data-bbox="432 1151 978 1184">Schedule-C to Bid [Construction Schedule] <li data-bbox="432 1202 1086 1236">Schedule-D to Bid [Method of Performing the work] <li data-bbox="432 1254 995 1288">Schedule-E to Bid [List of Major Equipment] <li data-bbox="432 1305 1358 1339">Schedule-F to Bid [Organization chart for the supervisory staff and labour] <li data-bbox="432 1357 967 1391">Schedule-G to Bid [List of Subcontractors] <li data-bbox="432 1408 1054 1442">Schedule-H to Bid [Estimated Progress Payments] <li data-bbox="432 1460 1182 1494">Schedule-I to Bid [Construction camp and housing facilities] <li data-bbox="432 1512 847 1545">Schedule-J to Bid [Integrity Pact] <li data-bbox="432 1563 948 1597">Schedule-K to Bid [Specific Works Data] <li data-bbox="432 1615 1254 1697">Schedule-L to Bid [List of recommended manufacturers for items/ materials/equipment of HVAC works] <li data-bbox="371 1783 1374 1816">f) JV Agreement (if applicable) in accordance with Clause IB.12.2 hereof, and <li data-bbox="371 1834 1401 1901">g) Any other documents required to be submitted with Technical Bid in accordance with these Bidding Documents. <p data-bbox="371 1948 544 1982">(B) Price Bid</p> <ul style="list-style-type: none"> <li data-bbox="371 2000 1401 2067">a) Duly filled in, signed and stamped Letter of Price Bid in accordance with Clause IB.18 hereof,

IB Clause Reference	Bidding Data
	<p>b) Schedule-B to Bid [Bill of Quantities] duly filled-in and completed in accordance with Clause IB.18; and</p> <p>c) Any other documents required to be submitted with Technical Bid in accordance with these Bidding Documents.</p>
12.2	Maximum number of JV Partners shall be two (02).
14.1	<p>Bidders to quote entirely in Pak. Rs.</p> <p>Foreign Currency Requirement are not applicable.</p>
15.1	Period of Bid Validity: 120 days
16.1	<p>Each Bidder shall furnish, as part of Technical Bid, a Bid Security for an amount of PKR 1,800,000 (Pak Rupees One Million Eight Hundred Thousand only) or an equivalent amount in a freely convertible currency. Scanned copy of Bid Security to be attached on EPADS with Technical Bid & original shall be submitted to the officer specified in the Invitation for Bid before the Bid Submission deadline, failing which bid shall be rejected.</p>
16.2	The text reading as ‘or (c) an Insurance Company listed in the Bidding Data and rated by PACRA/VIS of rating as provided in Tablebelow’ and the corresponding table are deleted.
17.1	Alternative Proposal(s) by the Bidder shall not be considered.
19.2(a)	Bids shall be submitted through EPADS only.
19.2(b)	<p>Name and Number of the Contract:</p> <p>Contract for Replacement, Supply, Installation, Testing & Commissioning of Fifteen (15) Nos. Air Handling Units at NESPAK House, Lahore.</p>
20.1(a)	Bids must be received by the Employer through EPADS not later than the time and date stipulated in the Invitation for Bids.
21.1(a)	AS PER E-PADS Procurement Regulations, 2023.
22.1	A Bidder may modify, substitute or withdraw his Bid on EPADS after Bid submission, prior to the deadline for submission of Bids.
22.2	The modification, substitution or notice for withdrawal of any Bid shall be submitted on EPADS.
23.1	<p>Entire text of Sub-Clause 23.1 is deleted and replaced with the following:</p> <p>The Employer will open the Technical Bids including withdrawals, substitution and modifications made pursuant to Clause IB.22 on EPADS, in the presence of Bidders’ representatives who choose to attend, at the address, date and time specified in the Invitation for Bids. The Bidders’ representatives who are present shall sign a register evidencing their attendance. The Price Bids will remain unopened until the specified time of their opening.</p>

IB Clause Reference	Bidding Data
	<p>The envelopes marked ‘Technical Bids’ shall be downloaded and opened one at a time, and the following read out and recorded:</p> <ul style="list-style-type: none"> a) the name of the Bidder; b) whether there is a modification or substitution; c) the presence or absence of Bid Security with amount; and d) any other details as the Employer may consider appropriate.
23.3	<p>Entire text of Sub-Clause 23.3 is deleted and replaced with the following:</p> <p>At the end of the evaluation of the Technical Bids, the Employer will invite only those bidders who have submitted substantially responsive Technical Bids to attend the opening of the Price Bids on EPADS. The date, time, and location of the opening of Price Bids will be advised in writing by the Employer on EPADS.</p> <p>The ‘Price Bids shall be downloaded and opened one at a time on EPADS and the following read out and recorded:</p> <ul style="list-style-type: none"> (a) the name of the Bidder; (b) whether there is a modification or substitution; (c) the Bid Prices, including any discounts; and (d) any other details as the Employer may consider appropriate. <p>Only discounts read out at Bid opening shall be considered for evaluation. The Employer shall neither discuss the merits of any Bid nor reject any Bid (except for late Bids, in accordance with Sub-Clause IB 21.1).</p>
25.1 & 25.2	<p>The request for clarification from the Employer will be uploaded through EPADS, and bidders will submit the required information via EPADS.</p>
26.5	<p>In second line the Sub-Clause No. IB.12.1(f) is amended to read as ‘Sub-Clause No. IB.12.1(A)(e)’.</p>
7.1, 29.2(e)	<p>‘Qualification Updating Forms’ shall be read as ‘Qualification Forms’.</p>

EVALUATION CRITERIA AND QUALIFICATION FORMS

EVALUATION CRITERIA AND QUALIFICATION FORMS

1. General

This Section contains Eligibility and Qualification Criteria that the Employer shall use to evaluate Bids and qualify Bidders in accordance with Clauses IB.26 of Instructions to Bidders. The Bidder shall provide all the information requested in the relevant forms contained in Bidder's Qualification Forms provided herein.

The information provided in the forms shall be substantiated with valid documentary evidences otherwise the requirement will not be considered as complied.

Wherever a Bidder is required to state a monetary amount, Bidders shall indicate the PKR equivalent using the rate of exchange determined as follows:

- For financial data - Exchange rate prevailing on the last day of the respective calendar year (in which the amounts for that year is to be converted) was originally established.

Exchange rates shall be taken from the publicly available source identified in the Sub-Clause IB.14.2. Any error in determining the exchange rates in the Bid may be corrected by the Employer.

2. Domestic Preference

The Goods manufactured in Pakistan will be granted a margin of preference in accordance with Clause 3 of S.R.O.827(I)/2001 dated December 3, 2001 issued by Ministry of Commerce, Government of Pakistan. Bidders claiming eligibility for domestic preference should fill in for supply items only, all columns hereunder and provide necessary documentation to substantiate their claim.

Sr. No.	Description of Indigenous Goods	Unit	Qty	Total Price of Goods Ex-Factory (PKR)	Amount of Value Addition (PKR)	Domestic Value Added in the Manufacturing Cost As Percentage of Ex-Factory Price
1	2	3	4	5	6	7

3. Evaluation (IB 29.2(e))

In addition to the criteria listed in IB 29.2 (a) - (d) the following criteria shall apply:

3.1 Assessment of adequacy of Technical Proposal with Requirements

3.2 Multiple Contracts, if permitted under Sub-Clause 1.1 of Bidding Data, will be evaluated as follows: **[Not Applicable]**

3.3 Price Adjustments, if permitted under IB.29.2(d), will be evaluated as follows:

(a) Price Adjustment for Completeness in Scope of Work

In case of omission in the scope of work of a quoted item, no price adjustment for the omitted item(s) shall be applied provided that the Bidder has mentioned in his Bid that the same is covered in any other item. Otherwise the adjustments will be applied for comparison purpose only, taking the average price quoted by other lowest two evaluated substantially responsive Bidders in their original Bids for corresponding item. In case of non-availability of price from other Bidders, the price will be estimated by the Employer from a suitable CSR, adjusted to the date 28 days earlier to the Bid submission date or the Employer shall use its best assessment.

The price adjustment shall not justify any additional payment by the Employer and the price(s) of omitted item(s) shall be deemed covered by other prices of the Bill of Quantities.

(b) Price Adjustment for Technical/ Commercial Non Compliance

The cost of making good any deficiency resulting from technical/commercial non-compliance will be added to the Corrected Total Bid Price for comparison purpose only.

The adjustments will be applied taking the average price quoted by other lowest two evaluated substantially responsive Bidders in their original Bids for corresponding item. In case of non-availability of price from other Bidders, the price will be estimated by the Employer in accordance with sub-para (a) hereof.

4. Eligibility and Qualification

Eligibility and Qualification information described here below must be met by the legal entity(ies) comprising the Bidder, and not the Bidder's/JV partner's sister or parent companies, subsidiaries or affiliates.

Eligibility and Qualification Criteria			Compliance Requirements				Documentation
No.	Subject	Requirement	Single Entity	Joint Venture			Submission Requirements
				All Partners Combined	Each Member	Lead Member	
1. Eligibility							
1.1	PEC Licencing	Licencing by Pakistan Engineering Council (PEC) in accordance with paragraph (b) of Sub-Clause IB.3.1.	must meet requirement	must meet requirement	must be PEC Licencee	N/A	Provisional/ Standard PEC Licence. Foreign Constructor must submit JV Agreement with Pakistani Constructor.
1.2	Pakistani Constructor's Tax Registration	Requirement of Pakistani Constructor on Active Taxpayer List (ATL) of FBR in accordance with paragraph (c) of Sub-Clause IB.3.1.	must meet requirement	N/A	must meet requirement	N/A	Extracts of ATL

Eligibility and Qualification Criteria			Compliance Requirements				Documentation
No.	Subject	Requirement	Single Entity	Joint Venture			Submission Requirements
				All Partners Combined	Each Member	Lead Member	
1.3	Debarment/ Blacklisting	Not having been debarred/blacklisted in accordance with paragraph (d) of Sub-Clause IB.3.1.	Must meet requirement	N/A	Must meet requirement	N/A	Undertaking in the Letter of Technical Bid
2. Pending Litigation							
2.1	Pending Litigation	Bidder's financial position and prospective long term profitability sound according to criteria established in 3.1 below and assuming that all pending litigation will be resolved against the Bidder	Must meet requirement	N/A	Must meet requirement	N/A	Form CON – 1
3. Financial Situation and Performance							
3.1	Financial Capabilities	(i) The Bidder shall demonstrate that it has access to, or has available, liquid assets, unencumbered real assets, lines of	Must meet requirement	Must meet requirement	N/A	N/A	Form FIN – 3.1, FIN-3.2, FIN-3.3, with attachments

Eligibility and Qualification Criteria			Compliance Requirements				Documentation
No.	Subject	Requirement	Single Entity	Joint Venture			Submission Requirements
				All Partners Combined	Each Member	Lead Member	
		credit, and other financial means (independent of any contractual advance payment) sufficient to meet the construction cash flow requirements estimated as Eq. PKR <u>15 Million</u> for the subject contract(s) net of the Bidders other commitments. (ii) The Bidders shall also demonstrate, to the satisfaction of the Employer, that it has adequate sources of finance to meet the cash flow requirements on works currently in progress and for future contract commitments.	Must meet requirement	Must meet requirement	N/A	N/A	
		(iii) The audited balance sheets or, if not required by the laws of the Bidder's country,	Must meet requirement	N/A	Must meet requirement	N/A	

Eligibility and Qualification Criteria			Compliance Requirements				Documentation
No.	Subject	Requirement	Single Entity	Joint Venture			Submission Requirements
				All Partners Combined	Each Member	Lead Member	
		other financial statements acceptable to the Employer, for the last three (03) years shall be submitted and must demonstrate the current soundness of the Bidder's financial position and indicate its prospective long-term profitability.					
4. Experience							
4.1	Project Experience	Experience in minimum seven (07) projects of similar nature (AHU/Central HVAC System supply and installation work) as prime contractor completed in the last ten (10) years.	Must meet requirement	must meet requirement	N/A	N/A	Form EXP-1 with attachments

Eligibility and Qualification Criteria			Compliance Requirements				Documentation
No.	Subject	Requirement	Single Entity	Joint Venture			Submission Requirements
				All Partners Combined	Each Member	Lead Member	
4.2	HVAC Operation and Maintenance Contracts	Minimum three (03) HVAC Operation and Maintenance contracts with Air Handling Units.	Must meet requirement	must meet requirement	N/A	N/A	

5. Personnel

The Bidder must demonstrate that it has the suitably qualified personnel for the key positions that meet the following requirements and will be made available for this contract as per requirements:

The nominated person CV, certified last four months pay slips shall be provided to demonstrate its presence in the company.

Sr. No.	Position	Total Work Experience [years]	Experience In Similar Work [years]
01	Mechanical Engineer (PEC registered)	05	05
02	Mechanical Inspector (DAE, MECH/HVAC)	10	05

The Bidder shall provide details of the above-mentioned personnel that the Bidder considers appropriate to perform the Contract together with their academic qualifications and experience. The Bidder shall also complete the Forms PER-1 and PER-2.

6. Equipment

The Bidder must demonstrate that it has owned the following key equipment:

Sr. No.	Equipment Type	*Minimum Numbers Required
1	Sheet Bending Machines	01
2	Sheet Roller Machines	01
3	Lock Former Machines	01
4	Sheet Cutting Machines Heavy Gauge	01
5	Sheet Presses	01
6	Roller Cutter Machines	01
7	Power Die	01
8	Racet Die	01
9	Drill Machines with Stone Cutters	01
10	Hand Drill Machines with all Size Drill Bits	01
11	Portable Hand Grinding Machines	01
12	Welding Transformers	01
13	Generator	01
14	Pipe Cutters	01
15	Power Hacksaw Machines	01
16	Hydraulic Pressure Testing Pumps	01
17	Riveting Machine	01

* These are the minimum requirements. However, the Bidder should have sufficient resources to

complete the Project within scheduled time. The Bidder shall provide details of proposed items of equipment using the Forms provided under **Schedule-E to Bid**. The Bidder shall also submit an 'Undertaking' for access to all the equipment.

Bidders Qualification Forms

To establish its qualifications to perform the contract in accordance with Section (Evaluation Criteria and Qualification Forms) the Bidder shall provide the information requested in the corresponding Information Sheets included hereunder.

Form ELI -1.1
Bidder Information Form

Date: _____
Bid Reference No. (if any) and title: _____
Page _____ of _____ pages

Bidder's name
In case of Joint Venture (JV), name of each member:
Bidder's country of registration: <i>[indicate country of Constitution]</i>
Bidder's year of incorporation:
Bidder's legal address [in country of registration]:
Bidder's authorized representative information Name: _____ Address: _____ Telephone/Fax numbers: _____ E-mail address: _____
1. Attached are copies of original documents, in case of JV, JV agreement, in accordance with Sub-Clause IB 3.1.

Form ELI -1.2

**Bidder's JV Information Form
(to be completed for each member of Bidder's JV)**

Date: _____
Bid Reference No. (if any) and title: _____
Page _____ of _____ pages

Bidder's JV name:
JV member's name:
JV member's country of registration:
JV member's year of constitution:
JV member's legal address in country of constitution:
JV member's authorized representative information Name: _____ Address: _____ Telephone/Fax numbers: _____ E-mail address: _____

Form CON – 1

Pending Litigation

Bidder's Name: _____

Date: _____

JV Member's Name _____

Bid Reference No. (if any) and title: _____

Page _____ of _____ pages

Pending Litigation, in accordance with Eligibility and Qualification Criteria			
<input type="checkbox"/> No pending litigation in accordance with Eligibility and Qualification Criteria, Sub-Factor 2.1.			
<input type="checkbox"/> Pending litigation in accordance with Eligibility and Qualification Criteria, Sub-Factor 2.1 as indicated below.			
Year of dispute	Amount in dispute (currency)	Contract Identification	Total Contract Amount (currency), Eq. PKR (exchangerate)
		Contract Identification: _____ Name of Employer: _____ Address of Employer: _____ Matter in dispute: _____ Party who initiated the dispute: _____ Status of dispute: _____	
		Contract Identification: Name of Employer: Address of Employer: Matter in dispute: Party who initiated the dispute: Status of dispute:	

**Form FIN – 3.1:
Financial Situation and Performance**

Bidder's Name: _____

Date: _____

JV Member's Name _____

Bid Reference No. (if any) and title: _____

Page _____ of _____ pages

1. Financial data

Type of Financial information in (currency)	Historic information for last year, (amount in currency, currency, exchange rate*, Eq. PKR)
Statement of Financial Position (Information from Balance Sheet)	
Total Assets (TA)	
Total Liabilities (TL)	
Total Equity/Net Worth (NW)	
Current Assets (CA)	
Current Liabilities (CL)	
Working Capital (WC)	
Information from Income Statement	
Total Revenue (TR)	
Profits Before Taxes (PBT)	
Cash Flow Information	
Cash Flow from Operating Activities	

*Refer to IB 14.2 for the exchange rate

2. Financial documents

The Bidder and its parties shall provide copies of financial statements for last year pursuant to Eligibility and Qualification Criteria, Sub-factor 3.1. The financial statements shall:

- (a) reflect the financial situation of the Bidder or in case of JV member, and not an affiliated entity (such as parent company or group member).
- (b) be independently audited or certified in accordance with local legislation.
- (c) be complete, including all notes to the financial statements.
- (d) correspond to accounting periods already completed and audited.

Attached are copies of financial statements¹ for the last year required above; and complying with the requirements

¹ If the most recent set of financial statements is for a period earlier than 12 months from the date of bid, the reason for this should be justified.

Form FIN – 3.2:**Financial Resources**

Specify proposed sources of financing, such as liquid assets, unencumbered real assets, lines of credit, and other financial means, net of current commitments, available to meet the total construction cash flow demands of the subject contract or contracts as specified in Eligibility and Qualification Criteria.

No.	Source of financing	Amount (Eq. PKR)
1		
2		
3		

Form FIN – 3.3:

Current Contract Commitments / Works in Progress

Bidders and each member to a JV should provide information on their current commitments on all contracts that have been awarded, or for which a letter of intent or acceptance has been received, or for contracts approaching completion, but for which an unqualified, full completion certificate has yet to be issued.

Current Contract Commitments					
No.	Name of Contract	Employer's Contact Address, Tel, Fax	Value of Outstanding Work [Eq. PKR]	Estimated Completion Date	Average Monthly Invoicing Over Last Six Months [Eq. PKR /month]
1					
2					
3					
4					
5					

Form EXP – 1: Experience in Contracts of Similar Size and Nature

Each Bidder or partner of a JV must fill this form.

Fill out one (1) form per contract.

Contract of Similar Size and Nature	
Name of Firm:	
Contract No	Contract Identification
Award Date:	Completion Date:
Total Contract Amount	in respective currency _____: in PKR Equivalent*:
If partner in a Joint Venture, specify participation of total contract amount	Percentage share in Total: Corresponding Amount (in PKR):
Employer’s name Address Telephone number Fax number E-mail	
Description of the Similarity in Accordance with Eligibility and Qualification Criteria, Sub-factor 4	

* Converted to PKR at the rate of exchange at the date of contract.

Form PER - 1: Proposed Personnel

The Bidder shall provide the names of suitably qualified personnel to meet the specified requirements stated in Eligibility and Qualification Criteria, Sub-factor 5. The data on their experience should be supplied using the Form below for each candidate.

1.	Title of Position*
	Name
2.	Title of Position*
	Name
3.	Title of Position*
	Name
4.	Title of Position*
	Name

*As listed in Eligibility and Qualification Criteria, Sub-factor 5.

Form PER - 2: Resume of Proposed Personnel

Position		
Personnel Information	Name	Date of birth
	Professional qualifications along with PEC registration No. (if applicable):	
	Total Work Experience [Years]:	Experience in Similar Work [Years]:
Present Employment	Name of Employer	
	Address of Employer	
	Telephone	Contact (manager / personnel officer)
	Fax	E-mail
	Job title	Years with present Employer

Summarize professional experience in reverse chronological order. Indicate particular technical and managerial experience relevant to the project.

From	To	Company/Project/Position/Relevant Technical and Management Experience

**LETTERS OF
BID AND
SCHEDULES TO BID**

LETTER OF TECHNICAL BID

Bid Reference No. _____

REPLACEMENT, SUPPLY, INSTALLATION, TESTING & COMMISSIONING OF FIFTEEN (15) NOS. AIR HANDLING UNITS AT NESPAK HOUSE, LAHORE

To:

**Manager General Services,
Human Resource Division,
NESPAK House 1-C, Block-N,
Model Town Extension, Lahore.**

Gentleman,

1. Having examined the Bidding Documents including Instructions to Bidders, Bidding Data, Conditions of Contract, Specifications, Schedules to Bid including Bill of Quantities, Drawings and Addenda Nos. _____ for the execution of the above-named Works, we, the undersigned, offer to execute and complete such Works and remedy any defects therein in conformity with the said Bidding Documents and Addenda.
2. We meet the eligibility requirements in accordance with IB.3.
3. We, including any Subcontractors for any part of the Contract, are not debarred/blacklisted by the Employer, any Government/Semi Government/Public Department in Pakistan or foreign country, international organizations or other foreign institutions.
4. Our subcontractors or suppliers for any part of the Contract, if any, shall have nationalities from eligible countries, in accordance with IB.4.4.
5. We understand that all the Schedules attached hereto form part of this Bid.

As security for due performance of the undertakings and obligations of this Bid, we submit herewith a Bid Security in the amount of PKR _____ (Pak. Rupees. _____) drawn in your favor or made payable to you and valid for a period of ___ days beginning from the date Bids are opened, inclusive of 14 days beyond Bid validity period (as mentioned at Sr. No. 8 above).

6. We undertake, if our Bid is accepted, to commence the Works and to complete the whole of the Works comprised in the Contract within the time stated in Contract Data.
7. We agree to abide by this Bid (Technical Bid and Price Bid) for the period of ___ days, and it shall remain binding upon us and may be accepted at any time before the expiration of that period.
8. Unless and until a formal Agreement is prepared and executed, this Bid, together with your written acceptance thereof, shall constitute a binding contract between us.

9. We do hereby declare that the Bid is made without any collusion, comparison of figures or arrangement with any other Bidder for the Works.
10. We understand that you are not bound to accept the lowest or any Bid you may receive.
11. We undertake that all the information and documents submitted with the Bid are genuine, and in case of incorrect information of fake documents we shall be liable for punitive action under the Applicable Law.

Dated this _____ day of _____ 20_____

Signature: _____

in the capacity of _____ duly authorized to sign Bids for and on behalf of

(Name of Bidder in Block Capitals)
(Seal)

Address: _____

Witness:

Signature: _____

Name: _____

Address. _____

Occupation _____

LETTER OF PRICE BID

Bid Reference No. _____

REPLACEMENT, SUPPLY, INSTALLATION, TESTING & COMMISSIONING OF FIFTEEN (15) NOS. AIR HANDLING UNITS AT NESPAK HOUSE, LAHORE

To:

**Manager General Services,
Human Resource Division,
NESPAK House 1-C, Block-N,
Model Town Extension, Lahore.**

Gentleman,

1. Having examined the Bidding Documents including Instructions to Bidders, Bidding Data, Conditions of Contract, Specifications, Schedules to Bid including Bill of Quantities, Drawings and Addenda Nos. _____ for the execution of the above-named Works, we, the undersigned, offer to execute and complete such Works and remedy any defects therein in conformity with the said Bidding Documents and Addenda for the sum of PKR _____ (Pak Rupees) or such other sum as may be ascertained in accordance with the said conditions, excluding any discounts offered in item (2) below.
2. The discounts offered and the methodology for their application are:.....
3. We understand that all the Schedules attached hereto form part of this Bid.
4. Unless and until a formal Agreement is prepared and executed, this Bid, together with your written acceptance thereof, shall constitute a binding contract between us.
5. We do hereby declare that the Bid is made without any collusion, comparison of figures or arrangement with any other Bidder for the Works.
6. We understand that you are not bound to accept the lowest or any Bid you may receive.

Dated this _____ day of _____ 20_____

Signature: _____

in the capacity of _____ duly authorized to sign Bids for and on behalf of

(Name of Bidder in Block Capitals)
(Seal)

Address: _____

Witness:

Signature:

Name: _____

Address. _____

Occupation _____

SCHEDULE OF ADJUSTMENT DATA

Schedule of Cost Indexation

[NOT USED]

Table I. Local Currency (LC) For Bill Nos. _____

[NOT USED]

Table II. Foreign Currency (FC) For Bill Nos. _____

[NOT USED]

Table III. Foreign Currency Requirements

[NOT USED]

Table IV. Summary of Payment Currencies

[NOT USED]

BILL OF QUANTITIES

A. Preamble:

1. The Bill of Quantities shall be read in conjunction with the Conditions of Contract, Specifications and Drawings.
2. The quantities given in the Bill of Quantities are estimated and provisional, and are given to provide a common basis for bidding. The basis of payment will be the actual quantities of work executed and measured by the Contractor and verified by the Engineer and valued at the rates and prices as given in the priced Bill of Quantities, where applicable, and otherwise at such rates and prices as the Engineer may fix as per the Contract.
3. The rates and prices as given in the priced Bill of Quantities shall, except insofar as it is otherwise provided under the Contract include all costs of Contractor's plant, labour, supervision, materials, execution, insurance, profit, taxes and duties, together with all general risks, liabilities and obligations set out or implied in the Contract. Furthermore, all duties, taxes and other levies payable by the Contractor under the Contract, or for any other cause, as on the date 28 days prior to deadline for submission of Bids, shall be included in the rates and prices and the total Bid Price submitted by the Bidder.
4. A rate or price shall be entered against each item in the priced Bill of Quantities, whether quantities are stated or not. The cost of items against which the Contractor will have failed to enter a rate or price shall be deemed to be covered by other rates and prices entered in the Bill of Quantities.
5. The whole cost of complying with the provisions of the Contract shall be included in the items provided in the priced Bill of Quantities, and where no items are provided, the cost shall be deemed to be distributed among the rates and prices entered for the related items of the Works, or the same shall be determined by the Engineer in accordance with Clause 13, General Conditions.
6. General directions and description of work and materials are not necessarily repeated nor summarised in the Bill of Quantities. References to the relevant sections of the Bidding Documents shall be made before entering prices against each item in the Bill of Quantities.
7. Provisional sums included and so designated in the Bill of Quantities shall be expended in whole or in part at the direction and discretion of the Engineer in accordance with Sub-Clause 13.4 of General Conditions of Contract.
8. The following abbreviations for units have been used in Bill of Quantities:

Units	Abbreviations
Cubic Foot	= cft
Square Foot	= sft
Pound	= lb
Provisional Sum	= PS
Lump-Sum	= LS

B-2
Schedule-B to Bid

BILL OF QUANTITIES

BOQ IS ATTACHED AS ANNEXURE-I

CONSTRUCTION SCHEDULE

Pursuant to Sub-Clause 8.3 of the General Conditions, the whole of the Works, and each Section (if any), shall be completed within the Time for Completion for the Works or Section (as the case may be) stated as hereunder and mentioned in Contract Data:

Description	Time for Completion (days)
Whole Works	180 days

[The Bidder shall provide, the Construction Schedule in the bar chart (CPM, PERT or any other to be specified herein) showing the sequence of work items and the period of time during which he proposes to complete each work item in such a manner that his proposed programme for completion of the whole of the Works and Sections of the Works may meet Employer's completion targets in days noted above and counted from the Commencement Date (Attach sheets as required for the specified form of Construction Schedule)]

METHOD OF PERFORMING THE WORK

[The Bidder is required to submit a narrative outlining the method of performing the Work. The narrative should indicate in detail and include but not be limited to:

1. **Organization Chart:**

Shall indicate head office and field office personnel involved in management and supervision, engineering, equipment maintenance and purchasing.

2. **Mobilization:**

In Pakistan, the type of facilities including personnel accommodation, office accommodation, provision for maintenance and for storage, communications, security and other services to be used.

3. **Method of executing the Works:**

The procedures for installation of equipment and machinery and transportation of equipment and materials to the site.]

LIST OF MAJOR EQUIPMENT

[The Bidder will provide on Sheet E-2 of this Schedule a list of all key equipment listed in Eligibility and Qualification Criteria, Sub-factor 6, under separate heading for items owned, to be purchased or to be arranged on lease by him to carry out the Works. The information shall include make, type, capacity, and anticipated period of utilization for all equipment.

The Bidder shall provide adequate information to demonstrate clearly that it has the capability to meet the requirements for the key equipment listed in Eligibility and Qualification Criteria, Sub-factor 6.]

LIST OF MAJOR EQUIPMENT
Owned, Purchased or Leased

Owned Purchased or Leased	Description of Unit(Make, Model, Year)	Capacity HP Rating	Conditio n	Present Location or Source	Date of Delivery at Site	Period of Work on Project
1	2	3	4	5	6	7
a. Owned						
b. To be Purchased						
c. To be arranged on Lease						

LIST OF MAJOR EQUIPMENT
Equipment details

Item of equipment		
Equipment information	Name of manufacturer	Model and power rating
	Capacity	Year of manufacture
Current status	Current location	
	Details of current commitments	
Source	Indicate source of the equipment <input type="checkbox"/> Owned <input type="checkbox"/> Rented <input type="checkbox"/> Leased <input type="checkbox"/> Specially manufactured	
The following information shall not be applicable for equipment owned by the Bidder		
Owner	Name of owner	
	Address of owner	
	Telephone	Contact name and title
	Fax	Telex
Agreements	Details of rental / lease / manufacture agreements specific to the project	

[This Table shall be used for each item of Equipment separately]

**ORGANIZATION CHART
FOR THE
SUPERVISORY STAFF AND LABOUR**

**G-1
Schedule-G to Bid**

LIST OF SUBCONTRACTORS

I/ We intend to subcontract the following parts of the Work to subcontractors. In my/ our opinion, the subcontractors named hereunder are reliable and competent to perform that part of the work for which each is listed.

Enclosed are documentation outlining experience of subcontractors, the curriculum vitae and experience of their key personnel who will be assigned to the Contract, equipment to be supplied by them, size, location and type of contracts carried out in the past and a copy of valid electrical license (if applicable).

Part of Works (Give Details)	Subcontractor (With Complete Address)
1	2

ESTIMATED PROGRESS PAYMENTS

Bidder's estimate of the value of work which would be executed by him during each of the periods stated below, based on his Programme of the Works and the Rates in the Bill of Quantities, expressed in thousands of PKR:

Months	Amounts (in %age of Bid Price)
1	2
1 st	
2 nd	
3 rd	
4 th	
5 th	
6 th	
Bid Price	100%

CONSTRUCTION CAMP AND HOUSING FACILITIES

[The Bidder in accordance with Clause 6 of the Conditions of Contract shall provide description of his construction camp's facilities and staff housing requirements.

The Bidder shall list or explain his plans for providing these facilities for the service of the Contract as follows:

- 1. Site Preparation (clearing, land preparation, etc.).*
- 2. Provision of Services.*
 - a) Electrical power (expected power load, etc.).*
 - b) Water (required amount and system proposed).*
 - c) Sanitation (sewage disposal system, etc.)*
- 3. Construction of Facilities*
 - a) Contractor's Office, Workshop and Work Areas (areas required and proposed layout, type of construction of buildings, etc.).*
 - b) Warehouses and Storage Areas (area required, type of construction and layout).*
 - c) Housing and Staff Facilities (Plans for housing for proposed staff, layout, type of construction, etc.).*
- 4. Construction Equipment Assembly and Preparation (detailed plans for carrying out this activity).*
- 5. Other Items Proposed (Security services, etc.)]*

Note:

The Contractor shall be responsible for pumps, electrical power, water and electrical distribution systems, and sewerage system including all fittings, pipes and other items necessary for servicing the Contractor's construction camp.

**INTEGRITY PACT
DECLARATION OF FEES, COMMISSION AND BROKERAGE, ETC. PAYABLE BY
THE BIDDERS/CONTRACTORS OF GOODS, SERVICES & WORKS IN
CONTRACTS WORTH PAK. RS. 10.00 MILLION OR MORE**

Contract No. _____ Dated _____

Contract Value: As stated in the Price Bid

Contract Title: _____

..... [Name of Bidder/Contractor] hereby declares that it has not obtained or induced the procurement of any contract, right, interest, privilege or other obligation or benefit from Government of Pakistan (GoP) or any administrative subdivision or agency thereof or any other entity owned or controlled by GoP through any corrupt business practice.

Without limiting the generality of the foregoing, [Name of Bidder/ Contractor] represents and warrants that it has fully declared the brokerage, commission, fees etc. paid or payable to anyone and not given or agreed to give and shall not give or agree to give to anyone within or outside Pakistan either directly or indirectly through any natural or juridical person, including its affiliate, agent, associate, broker, consultant, director, promoter, shareholder, sponsor or subsidiary, any commission, gratification, bribe, finder’s fee or kickback, whether described as consultation fee or otherwise, with the object of obtaining or inducing the procurement of a contract, right, interest, privilege or other obligation or benefit in whatsoever form from GoP, except that which has been expressly declared pursuant hereto.

[Name of Bidder/Contractor] certifies that it has made and will make full disclosure of all agreements and arrangements with all persons in respect of or related to the transaction with GoP and has not taken any action or will not take any action to circumvent the above declaration, representation or warranty.

[Name of Bidder/Contractor] accepts full responsibility and strict liability for making any false declaration, not making full disclosure, misrepresenting facts or taking any action likely to defeat the purpose of this declaration, representation and warranty. It agrees that any contract, right, interest, privilege or other obligation or benefit obtained or procured as aforesaid shall, without prejudice to any other rights and remedies available to GoP under any law, contract or other instrument, be voidable at the option of GoP.

Notwithstanding any rights and remedies exercised by GoP in this regard, [name of Bidder/Contractor] agrees to indemnify GoP for any loss or damage incurred by it on account of its corrupt business practices and further pay compensation to GoP in an amount equivalent to ten time the sum of any commission, gratification, bribe, finder’s fee or kickback given by [name of Bidder/Contractor] as aforesaid for the purpose of obtaining or inducing the procurement of any contract, right, interest, privilege or other obligation or benefit in whatsoever form from GoP.

Name of Employer:
Signature:
[Seal]

Name of Bidder/Contractor:
Signature:
[Seal]

SPECIFIC WORKS DATA

SPECIFIC WORKS DATA HAS BEEN PRESCRIBED IN
SPECIFIC AND TECHNICAL SPECIFICATIONS OF BIDDING DOCUMENTS

Initials of Signatory to Bid: _____

**LIST OF RECOMMENDED MANUFACTURERS FOR ITEMS/
MATERIALS/EQUIPMENT OF HVAC WORKS**

The Bidder should note that only Equipment/materials from the following recommended manufacturers or approved equivalent shall be allowed to be used on this Project provided their products meet the specified requirements.

SR. NO.	EQUIPMENT/ MATERIAL	RECOMMENDED MANUFACTURER/ SUPPLIER	COUNTRY (ORIGIN, MANUFACTURING, ASSEMBLY, TESTING & SUPPLY)
1.	AIR HANDLING UNITS	LANCER, SABRO SPRING AIRE EUROCON MECAIR, SWIFT AIRE ECO KLIMA/COOLMAX OR APPROVED EQUAL	PAKISTAN
2.	Valves & Accessories a) VALVES, STRAINER DRAIN COCKS	KITZ,ECONOSTO,HATTERSLEY TOZEN,SCON,DUYER,VIR, WATTS,FLOWCON, GALA	AS PER MANUFACTURER'S FACILITY
	b) BALANCING VALVES	DUYER,ECONOSTO,VIR OVENTROP,CALEFI,WATTS, FLOWCON, GALA	USA/WEST EUROPE
3.	G.I PIPE	IIL, JAMAL PIPES	PAKISTAN
4.	SEAMLESS BLACK STEEL PIPES (SCH-40)	HUFFAZ, ECONOSTO BAOSTEEL, LONTRIN, HEIBI SHENGTION, PROTEX	PAKISTAN/CHINA
5.	DUCT/PIPE INSULATION SOUND LINER	KIMMCO,AFICO,ODE OWENS CORNING, KNUAF	KUWAIT/SAUDI ARABIA/TURKEY/ EUROPE/USA

6.	G.I SHEETS	PAK STEEL MILLS KARACHI, ILL, IMPORTED MAKE AVAILBLE LOCALLY, APPROVED BY ENGINEER	PAKISTAN/ IMPORTED
7.	PRESSURE GUAGES & THERMOMETERS	WEISS INSTRUMENTS, INC,DWYER, WEKSELER, TRERICE, FEMIT	USA
8.	TESTING AND MAINTENANCE INSTRUMENTS	DWYER, FLUKE OR APPROVED EQUAL	USA
9.	VFD	SIEMENS , ABB DANFOSS	CHINA/WEST EUROPE
10.	Motor	SIEMENS , ABB	CHINA/WEST EUROPE
11.	DUCT SEALANT	DOW CORNING ZAHBIA	USA/TURKEY
12.	WHITE GLUE	FOSTER	USA/EUROPE
13.	AIR VENT	SPIRAZ-SACRO, VENN	USA/EUROPE
14.	SOUND ATTENUATOR	INDUSTRIAL, ACOUSTIC, CLIMATECH, AEROTECH AMEKSAN	MALAYSIA, AUSTRIA, TURKEY
15.	PVC CONDUIT, & ACCESSORIES	BETA, POPULAR GALCO	PAKISTAN
16.	STEELCONDUIT, CABLE TRAYS & ACCESSORIES	HILALL, INDUSTRIES, IIL, JAMAL, PIONEER, NIB ASHRAF INDUSTRIES	PAKISTAN

17.	AIR INLET / OUTLET INCLUDING VCD's	MEHRAN STEEL CRAFT PAK PROPELLER EAP	PAKISTAN
-----	---------------------------------------	---	----------

NOTE 1: ALL EQUIPMENT/MATERIAL MUST BE SUPPLIED FROM AUTHORIZED/SOLE DISTRIBUTORS. MANUFACTURERS AUTHORIZATION CERTIFICATE IN ORIGINAL MUST BE PROVIDED.

NOTE 2: MINIMUM QUALIFICATION CRITERIA REQUIREMENT OF ALL AIR HANDLING UNITS' EQUIPMENT MANUFACTURER IS MENTIONED BELOW

All proposed equivalent equipment manufacturer shall meet the minimum following criteria:

- Experience record of Manufacturer in local/international market for proposed equipment shall be minimum 20 years.
- Experience of local sole/authorized distributor in local market shall be minimum 7 years.
- All equipment/ material must be supplied from authorized/sole distributors.
- Manufacturer's Authorization Certificate in original must be provided.
- Compliance to the mentioned country (origin, manufacturing, assembly, testing & supply) for offered/supplied equipment is mandatory.

Any approved equivalent brand other than the above-mentioned recommended manufacturer shall submit the following additional information in addition to qualification information with the technical bid.

- Compliance of equipment parts and their origin as mentioned in specifications.
- Compliance statement of specifications from the equipment manufacturer.
- Comparison of each part/system of proposed brand with one of the brands provided in suggested manufacturer's list along with the test reports.

Approved equivalent brand shall clearly be mentioned in the Technical Bid along with above said information

BIDDER'S EQUIPMENT DATA

Note: Data provided hereunder will be scrutinized for general conformity with requirements of Bidding Documents. Acceptance of Bid will not mean acceptance of these data. The Contractor will have to submit detailed equipment submittals for approval of the Engineer in accordance with Special Provisions of Specifications later after award of Contract. Failure to complete these forms may make the Bid non-responsive.

Typewritten technical data on loose sheets if submitted by the Bidder will not be considered and will be simply ignored.

Technical catalogues are required only to substantiate the data provided in these forms. Catalogues of equipment not listed in these forms shall not be submitted and if submitted, will be ignored. Acceptance of Bid will not mean the acceptance of information given in those catalogues.

Fill the empty spaces in the form & "complied" items are necessary to be complied.

A. AIR HANDLING UNIT

a) (IMPORTED AIR HANDLING UNITS)

- | | | |
|----|---|-----------------|
| 1. | Make | _____ |
| 2. | Name of Manufacture | _____ |
| 3. | Authorized Distributor in Pakistan | _____ |
| 4. | Manufacturer Selection Sheet Attached | <u>Complied</u> |
| 5. | Manufacturer Catalogue attached | <u>Complied</u> |
| 6. | Overall Dimensions
(Existing available space at Site) | <u>Complied</u> |
| 7. | Manufacturer warranty One Year
(From Successfully Commissioning) | <u>Complied</u> |

b) (LOCAL AIR HANDLING UNITS)

- | | | |
|-----|--|-----------------|
| 1. | Make | _____ |
| 2. | Name of Manufacture | _____ |
| 3. | Authorized Distributor in Pakistan | _____ |
| 4. | Manufacturer Selection Sheet Attached | <u>Complied</u> |
| 5. | Manufacturer Catalogue attached | <u>Complied</u> |
| 6. | Overall Dimensions
(Existing available space at Site) | <u>Complied</u> |
| 7. | Manufacturer Warranty 3 years
(From Successfully Commissioning) | <u>Complied</u> |
| 8. | Fan Manufacturer
(COMEFRI/NICOTRA/YILIDA) | _____ |
| 9. | Copper Coil Manufacturer/Origin | _____ |
| 10. | Motor Manufacturer/Origin | _____ |

	(Siemens/ABB)	_____
11.	VFD/Inverter Manufacturer	_____
	(SIEMENS/ABB/DANFOSS)	_____
12.	Bearing Manufacturer/Origin	_____
13.	Louver/ Dampers Manufacturer	_____
14.	Leakage Test Class	_____
15.	Copper Tube Thickness	_____
	(24G)	<u>Complied</u>
16.	Drain Pan Material	_____
	(3mm SS-304)	<u>Complied</u>
17.	Body thickness (Panel & Insulation)	_____
18.	Motor	_____
	a) IP 55 (Insulation Class)	<u>Complied</u>
	b) IE-3 (Efficiency)	<u>Complied</u>
	c) Ambient Temp (40° C)	<u>Complied</u>
19.	Variable Frequency Drive (VFD)	_____
	a) Ambient Temp -5° to 45 °C	<u>Complied</u>
	b) IP rating 55	<u>Complied</u>
20.	All above major equipment including Motor, VFD, Fan, Bearing, Shaft, Copper Tubes/ Coils, and Louvers are provided through the local Authorized distributors. The Bidder will provide the Complete verifiable shipping documents Including Bill of Lading, Invoice, LC, Country of Origin and GD.	<u>Complied</u>
B.	VALVES & ACCESSORIES	
1.	Make	_____
2.	Country of Manufacture	_____
3.	Pressure Rating	_____
4.	Authorized Distributor in Pakistan	_____
5.	Warranty for Local Manufacturer (3 years from Successfully Commissioning)	<u>Complied</u>
6.	Warranty for Imported Manufacturer (1 year from Successfully Commissioning)	<u>Complied</u>

Initials of Signatory to Bid: _____

STANDARD FORMS

FORM OF BID SECURITY

Security Executed on _____
(Date)

Expiry on _____
(Date)

Name of Surety with Address: _____

Name of Principal (Bidder) with Address _____

Penal Sum of Security PKR _____ (Pak Rupees _____)

Bid Reference No. _____

KNOW ALL MEN BY THESE PRESENTS, that in pursuance of the terms of the Bid and at the request of the said Principal (Bidder) we, the Surety above named, are held and firmly bound unto _____
(hereinafter called the 'Employer') in the sum stated above for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the Bidder has submitted the accompanying Bid dated _____ for _____
_____ (Particulars of Bid) to the said Employer; and

- (1) WHEREAS, the Employer has required as a condition for considering said Bid that the Bidder furnishes a Bid Security in the above said sum to the Employer, conditioned as under: that the Bid Security shall remain in force for a period fourteen (14) days beyond the Bid Validity date i.e., upto _____.
- (2) that the Bid Securities of the Bidders except the lowest three will be returned by the Employer within twenty eight (28) days from the opening of Bids, provided a Bidder request for the return of its Bid Security, or on the expiry of original validity of Bid Security or as extended, whichever is earlier;
- (3) that the Bid Security of the lowest three Bidders comprising the successful Bidder will be returned when the successful Bidder has furnished the required Performance Security; and
- (4) that in the event of failure of the successful Bidder to furnish the required Performance Security, the entire said sum be paid immediately to the said Employer pursuant to IB.16 and IB.35 of the Instructions to Bidders for the successful Bidder's failure to perform.

NOW THEREFORE, if the successful Bidder shall, within the period specified therefor, on the prescribed form presented to him for signature enter into a formal Contract with the said Employer in accordance with his Bid as accepted and furnish within twenty eight (28) days of his being requested to do so, a Performance Security with good and sufficient surety, as may be required, upon the form prescribed by the said Employer for the faithful performance and proper fulfilment of the said Contract or in the event of non-withdrawal of the said Bid within the time specified for its validity then this obligation shall be void and of no effect, but otherwise to remain in full force and effect.

BS-2

PROVIDED THAT the Surety shall forthwith pay the Employer the said sum upon first written demand of the Employer (without cavil or argument) and without requiring the Employer to prove or to show grounds or reasons for such demand, notice of which shall be sent by the Employer by registered post duly addressed to the Surety at its address given above.

PROVIDED ALSO THAT the Employer shall decide, whether the Principal (Bidder) has duly performed his obligations to sign the Contract Agreement and to furnish the requisite Performance Security within the time stated above, or has defaulted in fulfilling said requirements and the Surety shall pay without objection the said sum upon demand from the Employer forthwith and without any reference to the Principal (Bidder) or any other person.

IN WITNESS WHEREOF, the above bounden Surety has executed the instrument under its seal on the date indicated above, the name and seal of the Surety being hereto affixed and these presents duly signed by its undersigned representative pursuant to authority of its governing body.

SURETY
(Scheduled Bank)

WITNESS:

1. _____

Corporate Secretary (Seal)

2. _____

Name, Title & Address

Signature _____

Name _____

Title _____
Corporate Guarantor (Seal)

FORM OF PERFORMANCE SECURITY

Guarantee No. _____

Executed on _____

Expiry date _____

[Letter by the Guarantor to the Employer]

Name of Guarantor with address: _____

Name of Principal (Contractor) with address: _____

Penal Sum of Security (*express in words and figures*) _____

Letter of Acceptance No. _____ Dated _____

KNOW ALL MEN BY THESE PRESENTS, that in pursuance of the terms of the Bidding Documents and above said Letter of Acceptance (hereinafter called the Documents) and at the request of the said Principal we, the Guarantor above named, are held and firmly bound unto the _____ (hereinafter called the Employer) in the penal sum of the amount stated above for the payment of which sum well and truly to be made to the said Employer, we bind ourselves, our heirs, executors, administrators and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the Principal has accepted the Employer's above said Letter of Acceptance for _____

_____ (*Name of Contract*) for the _____

_____ (*Name of Project*).

NOW THEREFORE, if the Principal (Contractor) shall well and truly perform and fulfill all the undertakings, covenants, terms and conditions of the said Documents during the original terms of the said Documents and any extensions thereof that may be granted by the Employer, with or without notice to the Guarantor, which notice is, hereby, waived and shall also well and truly perform and fulfill all the undertakings, covenants terms and conditions of the Contract and of any and all modifications of said Documents that may hereafter be made, notice of which modifications to the Guarantor being hereby waived, then, this obligation to be void; otherwise to remain in full force and virtue till all requirements of Clause 11, Defects After Taking Over, of Conditions of Contract are fulfilled.

Our total liability under this Guarantee is limited to the sum stated above and it is a condition of any liability attaching to us under this Guarantee that the claim for payment in writing shall be received by us within the validity period of this Guarantee, failing which we shall be discharged of our liability, if any, under this Guarantee.

We, _____ (the Guarantor), waiving all objections and defense under the Contract, do hereby irrevocably and independently guarantee to pay to the Employer without delay upon the Employer's first written demand without cavil or arguments

and without requiring the Employer to prove or to show grounds or reasons for such demand any sum or sums up to the amount stated above, against the Employer's written declaration that the Principal has refused or failed to perform the obligations under the Contract which payment will be effected by the Guarantor to Employer's designated Bank & Account Number.

PROVIDED ALSO THAT the Employer shall decide, whether the Principal (Contractor) has duly performed his obligations under the Contract or has defaulted in fulfilling said obligations and the Guarantor shall pay without objection any sum or sums up to the amount stated above upon first written demand from the Employer forthwith and without any reference to the Principal or any other person.

IN WITNESS WHEREOF, the above-bounden Guarantor has executed this Instrument under its seal on the date indicated above, the name and corporate seal of the Guarantor being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

Guarantor
(Scheduled Bank)

WITNESS:

1. _____

Corporate Secretary (Seal)

2. _____

Name, Title & Address

Signature _____

Name _____

Title _____
Corporate Guarantor (Seal)

Letter of Acceptance

[letterhead paper of the Employer]

NAME OF CONTRACT: _____

CONTRACT NUMBER: _____

TO : _____

Date: _____

Your Reference: _____

Our Reference: _____

We thank you for your Bid dated _____ for the execution and completion of the Works comprising the above-named Contract and remedying of defects therein, all in conformity with the terms and conditions contained in the Contract.

We have pleasure in accepting your Bid for the Accepted Contract Amount of:

[currency and amount in figures]

[currency and amount in words]

In consideration of you properly and truly performing the Contract, we agree to pay you the Accepted Contract Amount or such other sums to which you may become entitled under the terms of the Contract, at such times and as prescribed by the Contract.

We acknowledge that this Letter of Acceptance creates a binding Contract between us, and we undertake to fulfil all our obligations and duties in accordance with the terms of this Contract.

Signature: _____

Signed by: _____

For and on behalf of: _____

Date: _____

FORM OF CONTRACT AGREEMENT

THIS CONTRACT AGREEMENT (hereinafter called the "Agreement") made on the _____ day of _____ (month) 20____ between _____ (hereinafter called the "Employer") of the one part and _____ (hereinafter called the "Contractor") of the other part.

WHEREAS the Employer is desirous that certain Works, viz., _____ should be executed by the Contractor and has accepted a Bid by the Contractor for the execution and completion of such Works and the remedying of any defects therein.

NOW this Agreement witnessed 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 hereinafter referred to.
2. The following documents, in the order of priority, after incorporating addenda, if any, except those parts relating to Instructions to Bidders shall be deemed to form and be read and construed as part of this Agreement:
 - a) This Contract Agreement;
 - b) The Letter of Acceptance;
 - c) The Letters of Bid (Letter of Technical Bid & Letter of Price Bid);
 - d) The Particular Conditions Part A - Contract Data;
 - e) The Particular Conditions Part B - Special Provisions;
 - f) The General Conditions;
 - g) The Specifications Part A - Specific Provisions;
 - h) The Specifications Part B - Technical Provisions;
 - i) The Drawings;
 - j) The Completed Schedules to Bid including Schedule of Prices;
 - k) the JV Undertaking (if the Contractor is a JV); and
 - l) *[Employer to insert any other documents forming part of the Contract]*

The addenda/corrigenda, if any, (Excluding part relating to Instructions to Bidders along with Bidding Data) shall be deemed to have been incorporated at the appropriate places in the "Documents forming the Contract".

3. In consideration of the payments to be made by the Employer to the Contractor as hereinafter mentioned, the Contractor hereby covenants with the Employer to execute and complete the Works and remedy defects therein in conformity and in all respects with the provisions of the Contract.
4. The Employer hereby covenants to pay the Contractor, in consideration of the execution and completion of the Works as per provisions of the Contract, the Contract Price or such other sum as may become payable under the provisions of the Contract at the times and in the manner prescribed by the Contract.

IN WITNESS WHEREOF the parties hereto have caused this Agreement to be executed on the day, month and year first before written in accordance with their respective laws.

Signature of Contractor

Signature of Employer

(Seal)

(Seal)

Signed, Sealed and Delivered in the presence of:

Witness

Witness

(Name, Title and Address)

(Name, Title and Address)

DAAB Agreement

[All italicised text and any text within square brackets (except sub-clause headings) in this form of agreement is for use in preparing the form and should be deleted from the final product].

Name and details of the Contract _____

This Agreement made the _____ day of _____ [month], _____ [year], between

Name and contact details of the Employer _____ (name)
_____ (address)
_____ (telephone)
_____ (email / other contact details);

Name and contact details of the Contractor _____ (name)
_____ (address)
_____ (telephone)
_____ (email / other contact details);

Name and contact details of the DAAB Member _____ (name)
_____ (address)
_____ (telephone)
_____ (email / other contact details);

(“DAAB Agreement”)

Whereas:

- A. the Employer and the Contractor have entered (or intend to enter) into the Contract;
- B. under the Contract, the **“DAAB”** or **“Dispute Avoidance/Adjudication Board”** means the sole member or three members (as stated in the Contract Data of the Contract) so named in the Contract, or appointed under Sub-Clause 21.1 [*Constitution of the DAAB*] or Sub-Clause 21.2 [*Failure to Appoint DAAB Members*] of the Conditions of Contract;
- C. the Employer and the Contractor desire jointly to appoint the above-named DAAB Member to act on the DAAB as:
 - a. the sole member of the DAAB, and where this is the case, all references to the “Other Members” do not apply; or
 - b. one of three members / chairman [*delete the one which is not applicable*] of the DAAB and, where this is the case, the other two persons are:

_____ (name)	_____ (name)
_____ (address)	_____ (address)
_____ (telephone)	_____ (telephone)
_____ (email/ other contact details)	_____ (email/ other contact details)

the “**Other Members**”; and

D. the DAAB Member accepts this appointment.

The Employer, Contractor and DAAB Member jointly agree as follows:

1. The conditions of this DAAB Agreement comprise:
 - (a) Clause 21 [*Disputes and Arbitration*] of the Conditions of Contract, and any other provisions of the Contract that are applicable to the DAAB’s Activities; and
 - (b) the “General Conditions of Dispute Avoidance/Adjudication Agreement”, which is appended to the General Conditions of the “Conditions of Contract for Construction” Second Edition 2017 published by FIDIC (“GCs”), as amended and/or added to by the following provisions.
2. [Details of amendments to the GCs, if any. For example:
In the procedural rules annexed to the GCs, Rule _ is deleted and replaced by: “ ... “]
3. The DAAB Member shall be paid in accordance with Clause 9 of the GCs. The currency of payment shall be _____.
In respect of Sub-Clauses 9.1 and 9.2 of the GCs, the amounts of the DAAB Member’s monthly fee and daily fee shall be:
monthly fee _____ per month, and
daily fee of _____ per day
(or as otherwise set under Sub-Clause 9.3 of the GCs).
4. In consideration of the above fees, and other payments to be made to the DAAB Member in accordance with the GCs, the DAAB Member undertakes to act as DAAB Member in accordance with the terms of this DAAB Agreement.
5. The Employer and the Contractor shall be jointly and severally liable for the DAAB Member’s fees and other payments to be made to the DAAB Member in accordance with the GCs.
6. This DAAB Agreement shall be governed by the law of _____ (if not stated, the law that governs the Contract under Sub-Clause 1.4 of the Conditions of Contract).

SIGNED by: _____	SIGNED by: _____	SIGNED by: _____
Print name: _____	Print name: _____	DAAB Member
Title: _____	Title: _____	Title: _____
for and on behalf of the Employer	for and on behalf of the Contractor	
in the presence of	in the presence of	in the presence of
Witness: _____	Witness: _____	Witness: _____
Name: _____	Name: _____	Name: _____
Address: _____	Address: _____	Address: _____
_____	_____	_____
Date: _____	Date: _____	Date: _____

FORM OF MOBILIZATION ADVANCE GUARANTEE

Guarantee No. _____ Date _____

WHEREAS _____ (hereinafter called the 'Employer')

has entered into a Contract for _____

(Particulars of Contract)

with _____ (hereinafter called the "Contractor").

AND WHEREAS, the Employer has agreed to advance to the Contractor, at the Contractor's request, an amount of Pak Rupees _____ (PKR _____) which amount shall be advanced to the Contractor as per provisions of the Contract.

AND WHEREAS, the Employer has asked the Contractor to furnish Guarantee to secure the mobilization advance for the performance of his obligations under the said Contract.

AND WHEREAS, _____

(hereinafter called the "Guarantor") at the request of the Contractor and in consideration of the Employer agreeing to make the above advance to the Contractor, has agreed to furnish the said Guarantee.

NOW, THEREFORE, the Guarantor hereby guarantees that the Contractor shall use the advance for the purpose of above mentioned Contract and if he fails and commits default in fulfilment of any of his obligations for which the advance payment is made, the Guarantor shall be liable to the Employer for payment not exceeding the aforementioned amount.

Notice in writing of any default, on the part of the Contractor, of which the Employer at his discretion of making decision, shall be given by the Employer to the Guarantor, and on such first written demand, payment shall be made by the Guarantor of all sums then due under this Guarantee without any reference to the Contractor and without any objection.

This Guarantee shall remain in force until the advance is fully adjusted against payments from the Interim Payment Certificates of the Contractor or until _____ whichever is earlier. *(Date)*

The Guarantor's liability under this Guarantee shall not in any case exceed the sum of PKR _____ (Pak Rupees _____).

This Guarantee shall remain valid up to the aforesaid date and shall be null and void after the aforesaid date or earlier if the advance made to the Contractor is fully adjusted against payments from Interim Payment Certificates of the Contractor provided that the Guarantor

agrees that the aforesaid period of validity shall be deemed to be extended if on the above mentioned date the advance payment is not fully adjusted.

Guarantor
(Scheduled Bank)

WITNESS:

1. _____

Corporate Secretary (Seal)

2. _____

Name, Title & Address

Signature _____

Name _____

Title _____
Corporate Guarantor (Seal)

CONDITIONS OF CONTRACT

CONDITIONS OF CONTRACT

The Conditions of Contract comprise two parts:

- (a) General Conditions
- (b) Particular Conditions

General Conditions

These Conditions are the “General Conditions” which form part of the “FIDIC Conditions of Contract for Construction for Building and Engineering Works Designed by the Employer Second Edition (2017 Red book, Reprinted 2022 with amendments)” published by:

International Federation of Consulting Engineers
(Fédération Internationale des Ingénieurs – Conseils) – (FIDIC)
World Trade Center II - Geneva Airport
P. O. Box 311
CH-1215 Geneva 15
Switzerland
Email: fidic@fidic.org, fidic.pub@fidic.org
Website: <https://fidic.org/bookshop>

Particular Conditions

The Particular Conditions (PC) complement the General Conditions (GC) to specify dates, contractual requirements, and special circumstances related to the Works. The PC consists of two parts, Part A - Contract Data and Part B - Special Provisions. The provisions to be found in the Special Provisions (Particular Conditions - Part B) take precedence over the equivalent provisions found under the same Sub-Clause number(s) in the General Conditions, and the provisions of the Contract Data (Particular Conditions - Part A) take precedence over the Special Provisions (Particular Conditions - Part B).

Part A - Contract Data

Sub-Clause	Data to be Given	Data
1.1.27	Defects Notification Period (DNP):	<u>365</u> days
1.1.31	Employer's name and address:	Manager General Services Human Resource Division National Engineering Services (Pvt.) Limited NESPAK House, 1-C, Block N, Model Town Extension Lahore-54700. Ph: 92-42-99231944/99090000, Ext:545 Fax: 92-42-99231950
1.1.35	Engineer's name and address:	National Engineering Services (Pvt.) Limited New Ventures Division 17-C-1, IEEEEP Building, Civic Center, Faisal Town, Lahore. Ph: 92-42-99232261-74 Fax: 92-42-99232275
1.1.73	Sections:	"None"
1.1.84	Time for Completion:	<u>180</u> days for whole of the Works
1.3(a)(ii)	agreed methods of electronic transmission:	For Notices, electronic transmission is not permitted. For other communications, SMS, Email, WhatsApp, or any other such means used by the Employer required for supplementing pace of work/decision making for timely completion of the Project.

Conditions of Contract

1.3(d)	address of Employer for communications:	As stated hereof in Sub-Clause 1.1.31
	address of Engineer for communications:	As stated hereof in Sub-Clause 1.1.35
	address of Contractor for communications:	[To be filled in at the time of signing of the Contract]
1.4	Contract shall be governed by the law of:	Islamic Republic of Pakistan
	ruling language:	English
	language for communications:	English
2.1	after receiving the Letter of Acceptance, the Contractor shall be given right of access to all or part of the Site within:	No later than the Commencement Date
2.4	Employer's financial arrangements	The Employer's financial arrangements are in well in place and payments under the Contract shall be made effectively.
3.2 (e)(ii)	Engineer's Duties and Authority	Variation resulting in an increase of the Accepted Contract Amount in excess of one percent (1%) subject to accumulative Variations not exceeding five percent (5%) of the Accepted Contract Amount
4.2	Performance Security (as percentage of the Accepted Contract Amount in Currencies) percent: currency:	Ten percent (10%) denominated in PKR or in a freely convertible currency acceptable to the Employer.
4.7.2	period for notification of errors in the items of reference	Twenty Eight (28) days
4.19	period of payment for temporary utilities	each month
4.20	number of additional paper copies of progress reports	One (01)
5.1(a)	maximum allowable accumulated value of work subcontracted (as a percentage of the Accepted Contract Amount)	None
5.1(b)	parts of the Works for which sub-contracting is not permitted	None

Conditions of Contract

6.5	Normal working hours on the Site	The building is occupied and prior approval will be required before working. 08 Hours/Day
8.3	number of additional paper copies of programmes	One (01)

Sub-Clause	Data to be Given	Data
8.8 & 14.15(b)	Delay Damages payable for each day of delay	0.25% of the Accepted Contract Amount for delay in completion of whole of the Works
8.8	maximum amount of Delay Damages	Ten percent (10%) of the Accepted Contract Amount
8.14	Applicability of Incentives for Early Completion	No
12.3	Percentage profit	Ten percent (10%)
13.4.(b)(ii)	percentage rate to be applied to Provisional Sums for overhead charges and profit	Twenty percent (20%)
14.3	period of payment	one month
14.3(b)	number of additional paper copies of Statements	Six (06)
14.3 (iii)	percentage of retention	Five percent (5%)
14.3 (iii)	limit of Retention Money (as a percentage of the Contract Price)	Five percent (5%)
14.5(b)(i)	Plant and Materials for payment when shipped	Not Used
14.5(c)(i)	Plant and Materials for payment when delivered to the Site	Not Used

Sub-Clause	Data to be Given	Data
14.6.2	minimum amount of Interim Payment Certificate (IPC)	5 Million
14.7(a)	period of payment of Advance Payment to the Contractor	14 days
14.7b(i)	period for the Employer to make interim payments to the Contractor under Sub-Clause 14.6 [Interim Payment]	28 Days
14.7b(ii)	period for the Employer to make interim payments to the Contractor under Sub-Clause 14.13 (Final Payment)	28 days
14.7(c)	period for the Employer to make final payment to the Contractor	56 days
14.8	Financing charges for delayed payment	None
14.11.1(b)	number of additional paper copies of draft Final Statements	Six (06)
14.15	currencies of payment of Contract Price	PKR only
14.15(a)(i)	Proportions or amounts of Local and Foreign currencies	Only local currency, i.e., PKR. Foreign Currency is not applicable.
14.15(c)	currencies and proportions for payment of Delay Damages	PKR only
14.15(f)	rates of exchange	Not Applicable

Sub-Clause	Data to be Given	Data
17.2(d)	forces of nature, the risks of which are allocated to the Contractor	Nil
19.1	permitted deductible limits: i) insurance required for the Works ii) insurance required for Goods iii) insurance required for liability for breach of professional duty iv) insurance required against liability for fitness for purpose (if any is required) v) insurance required for injury to persons and damage to property vi) insurance required for injury to employees vii) other insurances required by Laws and by local practice	i) <u>Ten percent (10%)</u> of loss amount on each & every loss ii) Nil iii) Nil iv) Nil v) Nil vi) Nil vii) Nil
19.1	Periods for submission of insurance: a) evidence of insurance b) relevant policies	Not later than the Commencement Date Within twenty eight (28) day from the Commencement Date
19.2.1(b)	additional amount to be insured (as a percentage of the replacement value)	15% of the replacement value of the Accepted Contract Amount
19.2.2	extent of insurance required for Goods amount of insurance required for Goods	from Ex-Works (i.e., works, factory, warehouse, etc) to delivery at the Site Full replacement value
19.2.3(a)	amount of insurance required for liability for breach of professional duty	Full replacement value of the Works to be designed by the Contractor
19.2.3(b)	insurance required against liability for fitness for purpose	Yes
19.2.3	period of insurance required for liability for breach of professional duty	Until the date of issuance of Performance Certificate

Sub-Clause	Data to be Given	Data
19.2.4	amount of insurance required for injury to persons and damage to property	Injury to person and Fatal case: in accordance with Workmen Compensation Act Damage to Property: 2,000,000 without limit to the number of incidents
19.2.6	other insurances required by Laws and by local practice	All insurances as applicable, to the extent of execution of the project, under Federal and Provincial laws of Islamic Republic of Pakistan
21.1	time for appointment of the DAAB	Appointment of the DAAB shall be made when Dispute arises between the Parties.
21.1	the DAAB shall comprise	Sole Member
21.1	List of proposed members of DAAB - proposed by Employer - proposed by Contractor	<i>[to be inserted at the time of signing of the Contract]</i> 1. _____ 2. _____ 1. _____ 2. _____
21.2	Appointing entity (official) for DAAB members	Chairman Pakistan Engineering Council (PEC) from the list of PEC approved arbitrators published at its website
21.6	Rules of Arbitration	Pakistan Arbitration Act of 1940. The place of Arbitration shall be: Lahore (Pakistan)

Particular Conditions

Part B - Special Provisions

1.1 Definitions

1.1.76 “Specification”

Following is added at the end:

“and consists of two parts i.e.,

- i) “Part A - Specific Provisions”; and
- ii) “Part B - Technical Provisions”.”

1.2 Interpretation

“and” is deleted from the end of sub-paragraph (i) and added at the end of sub-paragraph (j).

Sub-paragraph (k) is added:

“(k) The word “tender” is synonymous with “bid” the word tenderer with “bidder”, the words “tender documents” with “bidding documents” and “Schedule of Prices” with “Bill of Quantities”, as applicable.”

1.5 Priority of Documents

The documents listed at (a) through (k) of this Sub-Clause are deleted and substituted with the following:

- (a) the Contract Agreement;
- (b) the Letter of Acceptance;
- (c) the Letter of Bid;
- (d) the Particular Conditions Part A - Contract Data;
- (e) the Particular Conditions Part B - Special Provisions;
- (f) the General Conditions;
- (g) the Specification Part A - Specific Provisions;
- (h) the Specification Part B - Technical Provisions;
- (i) the Drawings;
- (j) the completed Schedules to Bid including Bill of Quantities;
- (k) the JV Undertaking (if the Contractor is a JV); and
- (l) any other documents forming part of the Contract.

The addenda/corrigenda, if any, shall be deemed to have been incorporated at the appropriate places in the documents forming the Contract.

1.6 Contract Agreement

In the last line of the 1st paragraph the text “shall be borne by the Employer” is substituted by “shall be reimbursed by the Employer to the Contractor”.

3.1 The Engineer

In sub-paragraph (a) the text “as defined in the Pakistan Engineering Council Act, 1975 (Act No. V of 1976)” are added after the words “professional engineer”.

3.2 Engineer's Duties and Authority

The Engineer shall obtain the consent in writing of the Employer before taking action under the following Sub-Clauses of these Conditions:

- (a) Consenting to the subcontracting of any part of the Works under Sub-Clause 5.1 [Subcontractors]
- (b) Any action under Sub-Clauses 8.9 [Employer's Suspension] and 8.12 [Prolonged Suspension]
- (c) Issuance of "Taking Over Certificate" under Sub-Clause 10.1 [Taking Over the Works and Sections].
- (d) Issuing the "Performance Certificate" under Sub-Clause 11.9 [Performance Certificate].
- (e) Sub-Clause 13.1 [Right to Vary]: instructing a Variation, except;
 - (i) in an emergency situation as determined by the Engineer, or
 - (ii) if such a Variation would increase the Accepted Contract Amount by less than the percentage specified in the Contract Data.
- (f) Sub-Clause 13.3 [Variation Procedure]: approving a proposal for Variation submitted by the Contractor in accordance with Sub-Clause 13.3.2 [Variation by Request for Proposal] or 13.2 [Value Engineering].
- (g) Certifying release of second half of the Retention Money under Sub-Clause 14.9 [Release of Retention Money].
- (h) Issuing Final Payment Certificate under Sub-Clause 14.13 [Issue of FPC]

Any such requirement shall not be applied to any action by the Engineer under Sub-Clause 3.7 [Agreement or Determination], as stated in Sub-Clause 3.2 [Engineer's Duties and Authority] of the General Conditions.

Notwithstanding the obligation, as set out above, to obtain approval, if, in the opinion of the Engineer, an emergency occurs affecting the safety of life or of the Works or of adjoining property, he may, without relieving the Contractor of any of his duties and responsibility under the Contract, instruct the Contractor to execute all such work or to do all such things as may, in the opinion of the Engineer, be necessary to abate or reduce the risk. The Contractor shall forthwith comply, despite the absence of approval of the Employer, with any such instruction of the Engineer. The Engineer shall determine an addition to the Contract Price, in respect of such instruction, in accordance with Clause 13 and shall notify the Contractor accordingly, with a copy to the Employer.

Following is added after the words "the Employer's consent is required" in 4th paragraph:

"stating that the Employer's consent has been obtained for that specified authority"

- 4.2 Performance Security**
- 4.2.1 Contractor's Obligations
- The entity issuing the Performance Security and its form shall be as under:
- The Performance Security shall be, at the option of the Contractor, issued in the prescribed form included in the Bidding Documents, by (a) a Scheduled Bank in Pakistan or (b) a foreign bank duly counter-guaranteed by a Scheduled Bank in Pakistan. In case of Joint Venture, the Performance Security shall be in the name of the Joint Venture or in the name of Lead/either firm of the JV or in ratio of shares of the individual JV partners.
- Following paragraph is added at the end of this Sub-Clause:
- “The amount of Performance Security shall be released only after the issuance of Performance Certificate.”
- 4.3 Contractor's Representative**
- In second paragraph the text “professional engineer as defined in the Pakistan Engineering Council Act, 1975 (Act No. V of 1976) (having temporary licence in case of foreign engineer under Section 12 of the Pakistan Engineering Council Act, 1975 (Act No. V of 1976)” are added after the words “qualified, experienced”.
- In the 3rd paragraph the words “28 days” are substituted by “14 days”. In 2nd line of 4th paragraph the text “or appoint a replacement” is substituted by “except appointment of a suitable temporary replacement is deployed at the Site”
- 4.4 Contractor's Documents**
- 4.4.2 As-Built Records
- First paragraph is deleted and the text in the last paragraph is substituted with the following:
- “The Contractor shall furnish to the Engineer 6 copies, one reproducible and one electronic copy (provided the Engineer has made available to the Contractor editable form of the Drawings) of all Drawings amended to conform to the Works as built. In case the Engineer does not make available to the Contractor editable form of the Drawings, the Contractor shall furnish to the Engineer as-built data for incorporation in the Drawings. Upon receipt of PDF versions of the as-built drawings prepared by the Engineer, the Contractor shall furnish to the Engineer 6 copies and one reproducible of these Drawings.
- The price of such Drawings shall be deemed to be included in the Contract Price.”
- Following Sub-Clause is added:
- 4.4.4 Shop Drawings
- The Contractor shall submit to the Engineer for review 3 copies of all shop and erection drawings applicable to this Contract as per provision of relevant Sub-Clause of the

Contract.

Review and approval by the Engineer shall not exceed 21 days and be construed as a complete check but will indicate only that the general method of construction and detailing is satisfactory and the Engineer's review or approval shall not relieve the Contractor of any of his responsibilities under the Contract.

4.8 Health and Safety Obligations

The following text is added at the end of this Sub-Clause:

In the event of work being carried out outside the normal working hours and in the event of work being carried out at night, the Contractor shall at his own cost, provide and maintain such good and sufficient light as will enable the work to proceed satisfactorily and without danger. The approaches to the Site and the Works where the night work is being carried out shall be sufficiently lighted. All arrangement adopted for such lighting shall be to the satisfaction of the Engineer.

4.20 Progress Reports

At the end of sub-paragraph (g) the word "and" is deleted and at the end of sub-paragraph (h) the full stop (.) is replaced with ":", and the following new sub-paragraphs are added as:

- (i) planned programme for the execution of the Works for next 56 days to enable the Engineer to determine its programme of inspection and testing;
- (j) monthly summery of daily job record indicating weather conditions, deployment of Contractor's Equipment, labour employment, local material procurement and materialimport, if any; and
- (k) salient contractual and project information.

5.1 Subcontractors

Add the following text at the end of paragraph (ii):

"under Schedule to Bid"

The following is added at the end of the last paragraph of Sub- Clause 5.1:

"All subcontracts relating to the Works shall include provisions which entitle the Employer to require the subcontract to be assigned to the Employer under sub-paragraph (a) of Sub- Clause 15.2.3 [*After Termination*].

The Contractor shall give reasonable opportunity to contractors from Islamic Republic of Pakistan for subcontracts for the Works, and endeavour to employ such contractors as Subcontractors."

5.2 Nominated Subcontractors

5.2.2 Objection to Nomination

In sub-paragraph (c), "and" is deleted from the end of (i); "." at the end of (ii) is replaced with: ", and".

The following is then added as (iii):

“(iii) be paid only if and when the Contractor has received from the Employer payments for sums due under the Subcontract referred to under Sub-Clause 5.2.3 [*Payment to nominated Subcontractors*].”

6.1 Engagement of Staff and Labour

The following paragraph is added at the end of the Sub-Clause:

“The Contractor shall, to the extent practicable and reasonable, employ staff (not less than 50%) and labour (not less than 85%) with appropriate qualifications and experience from sources within the Islamic Republic of Pakistan.”

6.7 Health and Safety of Personnel

The existing text is substituted with the following:

“In order to provide for the safety, health and welfare of persons, and for prevention of damage of any kind, all operations for the purposes of or in connection with the Contract shall be carried out in compliance with the Safety Requirements of the Government of Pakistan with such modifications thereto as the Engineer may authorize or direct and the Contractor shall take or cause to be taken such further measures and comply with such further requirements as the Engineer may determine to be reasonably necessary for such purpose. The Contractor shall also provide all other medical services and appoint a health and safety officer at Site if stated in the Specifications. In case of any fatality or serious accident, the Contractor shall, in addition, notify the Engineer immediately by the quickest available means.”

6.8 Contractor’s Superintendence

Insert at the end of sub-paragraph (a) of this Sub-Clause:

"or, if not, the Contractor shall make competent interpreters available during all working hours, in a number sufficient for those persons to properly perform their superintendence duties"

The following text is added at the end of this Sub-Clause:

“The Contractor’s authorized representative and his other engineers working at site shall possess valid registration with the Pakistan Engineering Council.

The Contractor’s authorized representative at Site shall be authorized to exercise adequate administrative and financial powers on behalf of the Contractor so as to achieve completion of the Works as per the Contract.”

6.12 Key Personnel

The following is inserted at the end of the last paragraph:

“If any of the Key Personnel are not fluent in this language, the Contractor shall make competent interpreters available during all working hours in a number deemed sufficient by the Engineer.”

The following Sub-Clauses 6.13 to 6.26 are added at the end of Sub-Clause 6.12:

- 6.13 Foreign Personnel** The Contractor may bring in to the Country any foreign personnel who are necessary for the execution of the Works to the extent allowed by the applicable Laws. The Contractor shall ensure that these personnel are provided with the required residence visas and work permits. The Employer will, if requested by the Contractor, use all reasonable endeavor in a timely and expeditious manner to assist the Contractor in obtaining any local, state, national, or government permission required for bringing in the Contractor’s personnel.
- The Contractor shall be responsible for the return of these personnel to the place where they were recruited or to their domicile. In the event of the death in the Country of any of these personnel or members of their families, the Contractor shall similarly be responsible for making the appropriate arrangements for their return or burial.
- 6.14 Supply of Food stuffs** The Contractor shall arrange for the provision of a sufficient supply of suitable food as may be stated in the Specification at reasonable prices for the Contractor’s Personnel for the purposes of or in connection with the Contract.
- 6.15 Supply of Water** The Contractor shall, having regard to local conditions, provide on the Site an adequate supply of drinking and other water for the use of the Contractor’s Personnel.
- 6.16 Measures against Insect and Pest Nuisance** The Contractor shall at all times take the necessary precautions to protect the Contractor’s Personnel employed on the Site from insect and pest nuisance, and to reduce the danger to their health. The Contractor shall comply with all the regulations of the local health authorities, including use of appropriate insecticide.
- 6.17 Alcoholic Liquor or Drugs** The Contractor shall not, otherwise than in accordance with the Laws of the Country, import, sell, give, barter or otherwise dispose of any alcoholic liquor or drugs, or permit or allow importation, sale, gift, barter or disposal thereto by Contractor’s Personnel.

- 6.18 Arms and Ammunition** The Contractor shall not give, barter, or otherwise dispose of, to any person, any arms or ammunition of any kind, or allow Contractor's Personnel to do so.
- 6.19 Festivals and Religious Customs** The Contractor shall respect the Country's recognized festivals, days of rest and religious or other customs.
- 6.20 Funeral Arrangements** The Contractor shall be responsible, to the extent required by local regulations, for making any funeral arrangements for any of its local employees who may die while engaged upon the Works
- 6.21 Forced Labour** The Contractor, including its Subcontractors, shall not employ or engage forced labour which consists of any work or service, not voluntarily performed, that is exacted from an individual under threat of force or penalty, and includes any kind of involuntary or compulsory labour, such as indentured labour, bonded labour or similar labour-contracting arrangements.
- 6.22 Child Labour** The Contractor, including its Subcontractors, shall not employ or engage child labour in accordance with relevant law(s) in force in Islamic Republic of Pakistan.
- 6.23 Employment Records of Workers** The Contractor shall keep complete and accurate records of the employment of labour at the Site. The records shall include the names, ages, genders, hours worked and wages paid to all workers. These records shall be summarized on a monthly basis and submitted to the Engineer. These records shall be included in the details to be submitted by the Contractor under Sub-Clause 6.10 [*Contractor's Records*].
- 6.24 Workers' Organizations** The Contractor shall comply with the relevant labour laws of Pakistan which recognize workers' rights to form and to join workers' organizations/Trade Union of their choosing and to bargain collectively without interference.
- 6.25 Non-Discrimination and Equal Opportunity** The Contractor shall not make decisions relating to the employment or treatment of Contractor's Personnel on the basis of personal characteristics unrelated to inherent job requirements. The Contractor shall base the employment of Contractor's Personnel on the principle of equal opportunity and fair treatment, and shall not discriminate with respect to any aspects of the employment relationship, including recruitment and hiring, compensation (including wages and benefits), working conditions and terms of employment,

access to training, job assignment, promotion, termination of employment or retirement, and disciplinary practices.

Special measures of protection or assistance to remedy past discrimination or selection for a particular job based on the inherent requirements of the job shall not be deemed discrimination. The Contractor shall provide protection and assistance as necessary to ensure nondiscrimination and equal opportunity, including for specific groups such as women, persons with disabilities, migrant workers and children (of working age in accordance with Sub-Clause 6.22).

6.26 Epidemics

In the event of any out-break of illness of epidemic nature, the Contractor shall comply with and carry out such regulations, orders and requirements as may be made by the Government or the local medical or sanitary authorities for the purpose of overcoming the same.

7.7 Ownership of Plant and Materials

The following is added before the first paragraph: "Except as otherwise provided in the Contract,"

The following is added at the end of the Sub-Clause:

"No Plant and/or Materials that is the property of the Employer

shall be removed from the Site. If it becomes necessary to:

- (i) remove any item of such Plant from the Site for the purposes of repair, the Contractor shall give a Notice, with reasons, to the Engineer requesting consent to remove the defective or damaged item off the Site. This Notice shall clearly identify the item of defective or damaged Plant, and shall give details of: the defect or damage to be repaired; the place to which defective or damaged item of Plant is to be taken for repair; the transportation to be used (and insurance cover for such transportation); the proposed inspections and testing off the Site; and the planned duration required before the repaired item of Plant shall be returned to the Site. The Contractor shall also provide any further details that the Employer may reasonably require; or
- (ii) replace any item(s) of such Plant and/or Materials, the Contractor shall give a Notice, with reasons, to the Engineer clearly identifying the item(s) of Plant and/or Materials to be replaced, and giving details of the due date of delivery to the Site of the replacement item(s).

Where any item of Plant and/or Materials has become the property of the Employer under this Sub-Clause before it has been delivered to the Site, the Contractor shall ensure

that such an item is not moved except for its delivery to the Site.

The Contractor shall indemnify and hold the Employer harmless against and from the consequences of any defect in title or encumbrance or charge (except any reasonable restriction arising from the intellectual property rights of the manufacturer or producer) on any item of Plant and/or Materials that has become the property of the Employer under this Sub-Clause."

- 7.9 Use of Pakistani Materials and Services** The Contractor shall, so far as may be consistent with the Contract, make the maximum use of materials, supplies, plant and equipment indigenous to or produced or fabricated in Pakistan and services available in Pakistan provided such materials, supplies, plant, equipment and services shall be of required standard.
- 8.1 Commencement of Works** The following is added before the first paragraph:
 "After signing of the Contract Agreement by both Parties," and thereafter the word "The" is replaced with the word "the".
- 8.5 Extension of Time for Completion** The following is added after paragraph (c):
 "for last five years".

The following Sub-Clause 8.14 is added after Sub-Clause 8.13:

- 8.14 Incentives For Early Completion** If Contract Data does not state applicability of incentives for early completion, this Sub-Clause shall not apply.
- The Contractor shall be entitled subject to Sub-Clause 20.2 [*Claims for Payment and/or EOT*] to bonus payment if the Works and/or each Section is completed earlier than the Time for Completion for the Works or Section (as the case may be). The amount of bonus for early completion of the Works and/or each Section shall be upto a limit and at a rate to 50% of the relevant limit and rate of delay damages prescribed in Contract Data and shall be paid for every day which shall elapse between the relevant Date of Completion of the Works or Section and the relevant Time for Completion.
- For the purposes of calculating any bonus payment, the applicable Time for Completion stated in the Contract Data is fixed and no adjustments of this time by reason of granting an EOT will be allowed.

The following Sub-Clause 11.12 is added after Sub-Clause 11.11:

- 11.12 Supervisory Assistance During DNP** If provided under the Schedule of Prices, the Contractor shall provide supervisory assistance to the Employer during the DNP for the Works. Such supervisory assistance shall be as described in the Specification for the purpose of supporting the Employer's operation and maintenance of the Plant for the period specified in the Schedule of Prices after the Date of Completion.
- 12.2 Method of Measurement** The following paragraph is added at the end of the Sub-Clause:
 “Summary of measured quantity for payment shall be delineated item-wise under four heads namely; “Schedule of Prices Quantity”, “Quantity Executed To-date”, “Quantity Certified Previously” and “Net Quantity Executed under this Certificate”.
- 12.3 Valuation of the Works** The following text is added at the end of fifth paragraph of the Sub-Clause:
 “Sum of overhead charges and profit for sub-paragraph (a) shall be Twenty percent (20%)”.
- 13.4 Provisional Sums** The following paragraph is inserted as the penultimate paragraph:
 “The Provisional Sum shall be used to cover the Employer’s share of the DAAB members’ fees and expenses, in accordance with Clause 21. No prior instruction of the Engineer shall be required with respect to the work of the DAAB. The Contractor shall submit the DAAB members’ invoices and the satisfactory evidence of having paid 100% of such invoices as part of the substantiation of those Statements submitted under Sub-Clause 14.3.
- 13.6 Adjustments for Changes in Laws** The following paragraph is added at the end of the Sub-Clause:
 “Notwithstanding the foregoing, the Contractor shall not be entitled to an extension of time if the relevant delay has already been taken into account in the determination of a previous extension of time and such Cost shall not be separately paid if the same shall already have been taken into account in the indexing of any inputs to the Table of Adjustment Data in accordance with the provisions of Sub-Clause 13.7 [*Adjustments for Changes in Cost*].”
- 14.4 Schedule of Payments** The Contract Price shall be paid according to the following Schedule of Payments:
 A) Payment against Supply, Installation, Testing and

Commissioning of Equipment imported from abroad or from local market (including AHU's) shall be made in the following manner:

1. Ten percent (10%) of Contract value as interest free non-recoverable advance shall be paid after (i) receipt of an acceptable Performance Security by the Employer in accordance with Sub-Clause 4.2; (ii) signing of Contract Agreement by the Parties; (iii) receipt of an acceptable bank guarantee by the Employer for the same amount and currency of the advance payment from a scheduled bank in Pakistan having at least 'AA' rating, in the prescribed format; and (iv) receipt of Contractor's invoice for advance payment by the Engineer.

In case of Joint Venture, the Advance Payment Guarantee(s) shall be in the name of the Joint Venture or in the name of Lead/either firm of the JV or in ratio of shares of the individual JV partners.

Such advance Payment Guarantee shall be released after the delivery of equipment at site up to the satisfaction of Engineer.

2. Twenty percent (20%) of total amount shall be paid after approval of Technical Submittal of Air Handling Units up to satisfaction the Engineer.
3. Twenty Percent (20%) of the total amount shall be paid after inspection & Testing at factory.
4. Twenty Percent (20%) of the total amount shall be paid after delivery of the Air Handling Units at site up to satisfaction of the Engineer

Thirty Percent (30%) of the total amount shall be paid after inspection of Installation, Testing & Commissioning of AHU's at designated AHU rooms in all respect at Site up to satisfaction of the Engineer.

B) Payment against Supply, Installation, Testing and Commissioning of all remaining BOQ Items (except AHUs):

- a. Ten percent (10%) of material (other than AHU) as non-recoverable advance shall be paid after signing of Contract Agreement and submission of acceptable Performance Security by the Contractor and receipt of Contractor's invoice for advance payment along with advance payment guarantee in the same amount of advance payment, from Schedule Bank in Pakistan having at least 'AA' rating in the prescribed format.

In case of Joint Venture, the Advance Payment Guarantee(s) shall be in the name of the Joint Venture or in the name of Lead/either firm of the JV or in ratio of shares of the individual JV partners

In case the Contractor does not opt for this payment

under a). then same will be paid under b), without the need for Bank guarantee.

In case the contractor opt for payment under a). the bank guarantee against advance payment shall be valid until issuance of Taking Over Certificate (TOC) and shall be returned within fourteen (14) days after issuance of TOC.

- b. Sixty percent (60%) of the Contract value of local market goods shall be paid on pro-rata basis upon delivery at Site, submission of invoice and after issuance of inspection certificate by the Engineer or Engineer's Representative following inspection of such Plant up to his satisfaction.
- c. Fifteen percent (15%) of the Contract value of local market goods shall be paid on completion of installation up to the satisfaction of Engineer or Engineer's Representative and submission of invoice duly certified by the Engineer or Engineer's Representative.
- d. Fifteen percent (15%) of the Contract value of local market goods shall be paid on completion of testing and commissioning up to the satisfaction of Engineer or Engineer's Representative and submission of invoice duly certified by the Engineer or Engineer's Representative.

All above payments under Paragraphs (A) and (B) shall be made after deduction of all applicable taxes and Retention Money of five percent (5%) as per Sub- Clause 14.3(iii) hereof.

14.5 Plant and Materials intended for the works

This Sub-Clause shall not apply.

14.6 Issue of IPC

14.6.1 The IPC

In the first line of the 1st paragraph the words "28 days" are substituted by "14 days".

14.7 Payment

The words "or through crossed cheque in favour of the Contractor or JV partners. The Payment to JV partners shall be made at the request of the Joint Ventures in the ratio of their shares specified by them" are added at the end of the Sub-Clause.

14.8 Delayed Payment

In the first paragraph, third line, the words "compounded

monthly” are deleted. The text of 2nd paragraph is deleted and substituted with the following:

“The Employer shall pay to the Contractor compensation at the rate stated in the Contract Data.”

15.2 Termination for Contractor’s Default

Notice

Following text is added at the end of sub-paragraph (h) of this Sub-Clause:

“For the purposes of this Contract, corrupt and fraudulent practices have been defined in Public Procurement Rules 2004.”

15.2.3 After Termination

The word “and” at the end of sub-paragraph (ii) of paragraph (b) is deleted the following paragraph is added after sub-paragraph (iii):

“(iv) all Employer-Supplied Materials and/or Employer's Equipment made available to the Contractor in accordance with Sub-Clause 2.6 [*Employer-Supplied Materials and Employer's Equipment*], and”

15.4 Payment after Termination

The following text is added at the end of this Sub-Clause:

“The Employer shall be entitled to sell any of the Contractor’s Equipment, Temporary Works and unused materials and apply the proceeds of sale towards payment of any debt due from the Contractor to the Employer under this Clause including any outstanding payments to the Subcontractors.”

16.2 Termination by Contractor

16.2.1 Notice

The sub-paragraph (j) is deleted in its entirety.

At the end of sub-paragraph (i) “; or” is replaced with “.” and at the end of sub-paragraph (h) “;” is replaced with “; or”.

In sub-paragraph (f) “84 days” are replaced with “180 days” and text “for reasons not attributable to the Contractor” is added at the end.

16.3 Contractor’s Obligations After Termination

Sub-paragraph (c) is deleted and replaced with:

"(c) deliver to the Engineer all Employer-Supplied Materials and/or Employer's Equipment made available to the Contractor in accordance with Sub-Clause 2.6 [*Employer-Supplied Materials and Employer's Equipment*]; and

(d) remove all other Goods from the Site, except as necessary for safety, and leave the Site."

17.1 Responsibility for Care of the Works

After the two instances of “Goods” in the last paragraph, the words “Employer-Supplied Materials and/or Employer's Equipment” are added.

The following Sub-Clause 17.7 is added after Sub-Clause 17.6:

- | | | |
|-------------|--|---|
| 17.7 | Use of Employer’s Accommodation/ Facilities | <p>The Contractor shall take full responsibility for the care of the items of the Employer’s facilities and/or accommodation, if any, as detailed in the Specification, from the date of use and/or occupation by the Contractor until the date on which such use and/or occupation is re-vested in the Employer.</p> <p>If any loss or damage happens to any of the above items during a time while the Contractor is responsible for its care, arising from any cause other than a cause for which the Employer is responsible or liable, the Contractor shall promptly rectify the loss or damage at the Contractor’s risk and cost.</p> |
| 18.1 | Exceptional Events | <p>The words “or disorder” are replaced with “disorder or sabotage” in sub-paragraph (c) of the Clause.</p> |
| 18.4 | Consequences of an Exceptional Event | <p>The following is added at the end of sub-paragraph (b) after deleting the “.”:</p> <p>“, including the costs of rectifying or replacing the Works and/or Goods damaged or destroyed by Exceptional Events, to the extent they are not indemnified through the insurance policy referred to in Sub-Clause 19.2 [<i>Insurance to be provided by the Contractor</i>].”</p> |
| 18.5 | Optional Termination | <p>In sub-paragraph (c), the words “and necessarily” are added after the words “was reasonably”.</p> |
| 19.1 | General Requirements | <p>Following text is added at the end of first paragraph:</p> <p>“The Contractor shall immediately after the date of the Letter of Acceptance submit the draft of insurance policies for the Employer’s consent.”</p> <p>Following text is added at the end of third paragraph:</p> <p>“The Contractor shall, within the respective periods stated in the Contract Data submit to the Engineer and the Employer a) evidence that the insurances described in this Clause have been effected, and b) copies of policies of the insurances described in Sub-Clauses 19.2.1, 19.2.4 and 19.2.5.”</p> |
| 19.2 | Insurance to be provided by the Contractor | <p><u>19.2.5 Injury to employees</u></p> <p>The words “sickness, disease” are deleted in the third line of first paragraph.</p> <p>The following Sub-Clause is added after Sub-Clause 19.2.6</p> <p><u>19.2.7 Insurance Company</u></p> |

“The Contractor shall be obliged to place all insurances described in this Clause with insurers listed in the Contract Data and rated by PACRA/VIS of rating as provided in Table below:

Accepted Contract Amount (In Eq. million PKR)	Minimum Rating of Insurance Companies
Up to 1000	A (+)
1001 to no limit	AA

21.6 Arbitration

The word “international” is deleted in the sixth line of first paragraph. The text of sub-paragraph (a) is substituted with the following:

“The Dispute shall be finally settled under the Rules of Arbitration, specified in the Contract Data;”

The following Clauses are added after Clause 21:

22 Custom Duty

The Employer shall assist the Contractor in obtaining clearance through the customs of the Goods. The customs, import duties and other fees/levies in respect of importation of Goods required for the Works shall be paid by the Contractor.

23 Taxes

The Contractor, Subcontractors and their employees shall be liable to pay income tax, withholding tax, super tax and other taxes on income arising out of the Contract. The rates and prices as stated in the contract shall be deemed to cover all such taxes.

24 Integrity Part

If it is found and established at any stage that the Contractor or any of his Subcontractors, agents or servants have violated or involved in violation of the Integrity Pact signed by the Contractor then the Employer shall be entitled to:

- (a) recover from the Contractor an amount equivalent to ten times the sum of any commission, gratification, bribe, finder’s fee or kickback given by the Contractor or any of his Subcontractors, agent or servants;
- (b) terminate the Contract; and
- (c) recover from the Contractor any loss or damage to the Employer as a result of such termination or of any other corrupt business practices of the Contractor or any of his Subcontractors, agent or servants.

The termination under sub-paragraph (b) of this Sub-Clause shall proceed in the manner prescribed under Sub-Clause 15.1 to 15.4 and the payment under Sub-Clause 15.4 shall be made after having deducted the amounts due to the Employer under sub- paragraph (a) and (c) of this Sub-Clause.

SPECIFICATIONS
PART A – SPECIAL PROVISIONS

SPECIAL PROVISIONS

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SPECIAL PROVISIONS

SP-01 GENERAL

SP-01.1 Location of Project

The new AHU's shall be replaced with existing AHU's at NESPAK (National Engineering Services Pakistan Pvt Ltd) House, Lahore.

SP-01.2 Building for the Project

The Building is old building already constructed and the Contractor shall be responsible to intimate to Engineer any omission in civil construction with respect to provisions of space, openings in walls, floors, roof slabs, false ceilings, drain points and electrical requirements for HVAC Works. All civil work mentioned in Bidding documents and relevant electrical work is in scope of contractor.

SP-01.3 Service Conditions for Auxiliaries

a) Power Supply

Electrical Circuit Voltages:

Nominal, 3-Phase: 415 volts

1-Phase: 240 volts

For equipment ratings, 3-Phase: 400 volts

1-Phase: 230 volts

Fluctuation in voltage applied (+/-) 10% to equipment rated voltage.

Frequency: 50 HZ.

SP-01.4 Units

The units used in these specifications are as under:

Unit System: SI/British/FPS

Gauge: US Gauges as per ASTM

TR: Tons of refrigeration equivalent to 12000 BTU/H (12 MBH) or 3516 W

SP-02 WORK BY THE CONTRACTOR

SP-02.1 Scope of Work

- a) The work under this Contract comprises of replacement, supply, installation, balancing, testing and commissioning of brand new fifteen (15) nos. Air Handling Units, complete in all respect covering all the features as mentioned in the Technical Specifications, equipment schedule and Bill of Quantities as per terms and conditions mentioned in the

bidding documents.

- b) The work under this Contract also includes the dismantling, safe handling, removal and buy back of existing fifteen (15) nos. Air Handling Units.
- c) The Contractor shall furnish all labor, materials, equipment tools, appurtenances, services, temporary work and storage necessary to completely supply, install, test, commission, the new AHU's all in the perfect operating conditions in accordance with these Specifications. The Contractor shall also test, adjust, balance, re-adjust all the air and water systems as specified and shown.
- d) The complete civil work as mentioned in schedule of price and any relevant civil work require to complete the job is included in contractor's scope of work.
- e) The contractor shall plan and coordinate his activities and schedules so as not to interfere with the work of other contractors and Client office work. Also interference with other building associated work shall be totally avoided and contractor shall prepare the schedule of work accordingly. It shall also be his responsibility to maintain the facility constructed by him till the end of the Contract period.

Any problem of interface with other contractor, associated proceedings shall be brought to the notice of the Engineer/Employer whose decision in this respect shall be final and binding on all parts.

The contractor shall inform for the schedule of any construction activity well in advance.

If any part of the work is damaged or has to dismantle or redone due to negligence/omission/incorrect position of the embedment etc. as part of the contractor, all such loses/expenses shall be borne by the Contractor.

- f) The Specifications are only general guidelines and by no means cover details of each equipment. These only spell out the intent of the requirements. The details have to be provided by the Contractor along with details of performance, construction and technical literature with the Bid.

All equipment and materials shall be brand new, bearing stamped ratings as required by Equipment Schedules and must be approved by the Engineer prior to their use. Any doubts about the practicability and implementation of Specifications must be expressed along with submission of Bid. Inability of the Contractor to implement these specifications after the acceptance of the Contract shall be considered breach of Contract.

- g) The Contractor is to schedule a visit and make himself familiar with the site. The Contractor is to verify the dimensions of the existing AHU

rooms to confirm that new AHUs could be placed in that room or required to be customized accordingly.

SP-02.2 Services by the Contractor

a) Erection Supervisor

The Contractor shall provide competent Erection Supervisor to direct and be responsible for the erection, starting and operation of the Equipment supplied by the Contractor until issue of Substantial Completion Certificate. Further details concerning Erection Supervisors are covered in Clause SP-17, "Erection Supervisors and Operating Staff". In addition, the Contractor shall also provide services of Factory Engineer authorized by manufacturer to direct and supervise the installation, testing & commissioning.

b) Training of Employer's Operative Personnel.

The Contractor shall arrange for free of cost on-site training of operative personnel, nominated by the Employer, in the operations and maintenance of all HVAC equipment and system. The period of training shall not be less than fifteen (15) days.

The group of operative personnel will comprise of Engineers/Supervisors and Technicians. The training shall be delivered by a qualified Engineer having at least ten (10) years experience in the operation and maintenance of similar HVAC systems.

The Trainer shall fully orient the group with the actual system and impart thorough training in the operations and maintenance of the system and equipment with the help of drawings, charts, hand-outs, diagrams, video aids, lectures, etc. Details and time of training shall be approved by the Employer/Engineer before training is commenced.

SP-02.3 Erection Plant

Under this clause the Contractor shall provide erection plant and tools for his own use during erection period only; he would take back these tools on completion.

The Contractor shall furnish special erection plant and tools in accordance with the requirements of Clause SP-15, "Fabrication, Erection Testing and Maintenance Tools Plant and Instruments.

SP-02.4 Related Works

The Contractor shall provide all works related to HVAC system, whether specifically mentioned or not, except those specifically stated in exclusion Clause SP-03, "Work Not Included". These related works shall include, but not be limited to:

- a) Power supply and earthing shall be provided by the Employer and incoming power feeders and earth continuity conductors shall be terminated at locations as stated in the Technical Provisions, Section 7.
- b) Water supply shall be provided by others from overhead tank or city water main supply, in the central plant room, each AHU room and near cooling tower at roof. Plumbing works from the points indicated on the drawing to make-up water point shall be the responsibility of the Contractor.
- c) All works related to water and cooling coil condensate disposal from HVAC system up to nearest floor drains shall be the responsibility of the Contractor.
- d) Cutting, patching and repairing in accordance with Section 1.0 of the Technical Provisions.
- e) Providing written information regarding location and sizes of door louvers, where required, to the persons responsible for door louvers, through the Engineer. This information shall be provided within thirty (30) days of issue of the Engineer's Order to Commence Work.
- f) Providing shop drawings at scale (1:50) and other written information regarding Concrete Pads and foundations for HVAC equipment to the Civil Contractor through the Engineer. Catalogue cuts showing foundation details will not be accepted.
- g) Providing steel frames for inertia pads and cork sheet/neoprene sheet for other pad.
- h) All foundations for HVAC equipment including concrete foundations, housekeeping pads and concreting for inertia pads (where required) shall be provided by the HVAC Contractor.
- i) Coordinating HVAC installation with other trades work, by way of study of other trades drawings and pointing out the areas of conflict to the Engineer before installing items of HVAC system.

SP-03 WORK NOT INCLUDED

(NOT USED)

SP-04 DESIGN CONDITIONS

HVAC System has been designed with conditions listed hereunder.

SP-04.1 Outside Design Conditions

- a) Summer dry Bulb Temp: (Max.) 111.9 °F
- b) Dry Bulb Temp: 108 °F

- c) Coincident Wet Bulb Temp: 84 °F
- d) Daily range: (Max.) 22 °F
- e) Winter Dry Bulb Temp: 35.1 °F
- g) Climate: Tropical with dust storms in April-May-June and torrential Rains in July - August - September.
 - i) Latitude: 32 Degrees North
 - ii) Longitude 74 Degrees East
 - iii) Elevation 702 ft

SP-04.2 Inside Design Conditions

- a) Office Room
 - Summer dry bulb 74 °F – 78 °F
 - Summer RH bulb 50% - 60%
 - Winter dry bulb 70 °F – 74 °F
- b) Conference Room
 - Summer dry bulb 74 °F – 78 °F
 - Summer RH bulb 40% - 60%
 - Winter dry bulb 68 °F – 74 °F
- c) Noise Criteria:
Air inlets/outlets shall be selected by the Contractor to obtain the following noise criteria:
 - Office NC 35 – 45
 - Conference Room NC 35 – 45

SP-04.3 Air Filtration

Air filtration based on ANSI/ASHRAE Filter Test Standards 52.2-2017, "Atmospheric Dust Spot Efficiency". Filter efficiencies are stated in AHU Equipment Schedules.

SP-05 DRAWINGS, EQUIPMENT SUBMITTALS, INFORMATION MANUALS, SAMPLES & CONTRACTOR'S OTHER SUBMISSIONS

SP-05.1 General

All drawings, other information and samples must be supplied to the Engineer as laid down in these Specifications and as and when agreed during site meetings, in the Progress Chart or as instructed by the Engineer.

The Contractor shall submit, for approval, detailed submittals as specified and no

material or equipment may be delivered to the job site or installed until the Contractor has in his possession with the approved Data Sheet, Catalogue cuts or samples of particular material. Approval rendered on submittals shall not be considered as a guarantee of measurements or building conditions.

Where submittals are approved, said approval does not in any way relieve the Contractor from his responsibility for necessity of furnishing material or performing work as required by the Drawings and Specifications.

Failure of the Contractor in providing submittals in ample time for checking shall not entitle him to an extension of the Contract time and no claim for extension by reason of such default will be allowed.

SP-05.2 Omitted Particulars

All works and matters omitted from the Contract but which may reasonably be implied or inferred from them and in the opinion of the Engineer obviously are necessary for the efficiency, stability, completion and maintenance of the works and which are ordered by the Engineer to be carried out shall be executed by the Contractor accordingly as if they had been expressly described in or shown on the Contract documents and the costs thereof shall be deemed to be included in and covered by the Contract Price.

SP-05.3 Drawings Supplied by Engineer

The Engineer may supply to the Contractor after signing the contract working drawings/detail drawings and instructions as may be necessary for preparing shop drawings and for the guidance of the Contractor in the construction, completion and maintenance of the works, and the Contractor shall execute, obey and be bound by the same.

The Contractor shall not be entitled to any payment in addition to the Contract Price in respect of any work shown or directed to be done by such working/detail drawings or instructions unless the Engineer shall have given and approved a variation order for the same.

Any additional drawings found necessary or desirable by the Contractor to show different combinations of drawings supplied by the Engineer shall be prepared by the Contractor at his own expense. The Contractor shall carefully check all drawings and advise the Engineer of any errors or omissions discovered. The Contractor shall be furnished with one copy of all detail drawings and graphic instructions prepared by the Engineer. Additional copies, within reasonable quantity, will be furnished to the Contractor, upon request, at cost.

The Contractor shall be furnished with one copy of all textual instructions as may be issued by the Engineer.

SP-05.4 Shop Drawings

The Contractor shall make detailed analysis of the requirements of the works.

Based upon such analysis and working drawings supplied by the Engineer, he shall revise and amplify the Drawings and shall prepare detailed Shop Drawings at his own cost for complete HVAC System and Equipment. Initially he shall submit 3 preliminary copies each of all such Shop Drawings to the Engineer for obtaining approval. Once basic agreement is reached with the Engineer regarding the details then the Contractor shall submit 6 copies each of all such Shop Drawings and one copy to the Engineer for obtaining approval of the Engineer. After obtaining approval and after having in possession these approved Shop Drawings, the Contractor shall use these Shop Drawings for fabrication, construction and installation.

The work described on any shop drawing submitted shall carefully be checked by the Contractor for all clearances, field conditions, maintenance of architectural conditions and proper coordination with all trades on the job. To this end, the Contractor during the shop drawing stage, shall ensure that he receives drawings of all other trades that might interfere with the proper installation of his work. No payment shall be made for any variations or alterations on site due to lack of knowledge of other trades. Any unresolved conflict between trades shall be referred to the Engineer for decision.

Equipment layout is to be detailed on shop drawings, showing the exact method of installing and clearly illustrating components to be used in making all connections.

The Contractor shall submit shop drawings of all sheet metal work for approval, before work is fabricated and installed. Ductwork drawings must show clearances between ductwork and masonry. All dampers, splitter dampers, fresh air inlets, exhaust air outlets, connections to equipment and methods of support and any other details necessary for the satisfactory installation of the system must be indicated. Each type of grill, register, diffuser and louver is to be referenced in a schedule and the type and size clearly indicated at each location. Taper and flat sides of ductwork at all transitions must be indicated, and all equipment piping and ductwork must be located exactly by showing exact dimensions with column lines or other reference lines.

Duct bottom and piping centre-line height from finished floor level shall be marked with every change in level

Position of hangers and supports with type and method of installation of each hanger shall be given, detailing the type of hanger fixing with a reference number for each type

Piping drawings must be fully detailed, showing all piping in double line and indicating the precise size of fittings, valves and equipment. Positions of hangers and supports with reference numbers must be given showing the type and method of installation of each hanger detailing the type of hanger fixings with a reference number for each type.

All general layout drawings shall be drawn to 1:50 (1':1/4") scale. Details of hangers, methods of fixing of pipes and ducts, detailed cross section of pipe,

ducts and risers, details of control and piping hook-ups to equipment shall be drawn to 1:10 (1':1") scale.

The Contractor shall prepare Drawings and Schedules showing precise details of holes in concrete, masonry, etc. and necessary sleeves required for passage of ducts and pipes and fitting of grills, registers, diffusers, louvers, plant, plant supports etc. Drawings and Schedules, approved by the Engineer must be available before any structural work requiring holes or other modifications, is constructed.

Signed and approved drawings shall not be departed from unless a signed variation order or site instruction is issued in writing by the Engineer. Drawings returned to the Contractor for alteration or amendments are to be resubmitted for approval.

Amended or altered drawings shall show the nature of the amendment or alteration in a revision block on the drawing, together with revision number or letter and the date of the revision.

The Contractor shall be responsible for any discrepancies, errors or omissions in the drawings and other particulars supplied by him whether such drawings and particulars have been approved by the Engineer or not, provided that such discrepancies, errors, or omissions are not due to inaccurate information or particulars furnished in writing to the Contractor by the Engineer.

SP-05.5 As-Built Drawings

The Contractor shall supply to the Engineer a set of "As-Built" drawings showing the Contract works as installed, together with any other information necessary for operation and maintenance. Six copies of each drawing (scale as per shop drawing) and other information shall be supplied, along with a reproducible and a soft copy.

SP-05.6 Manufacturer's Data

Manufacturer's performance data, certified factory drawings and/or curves of apparatus giving full information as to capacity, performance at different operating and ambient conditions, dimensions, materials, electrical data and all information pertinent to the adequacy of the submitted equipment shall be submitted for approval. One original and 5 copies of catalogues and other information shall be submitted.

Manufacturer's names, sizes, catalogue numbers and/ or samples of all materials shall also be submitted for approval.

Orders for equipment submitted for approval must be accompanied by relevant drawings, curves, technical data, catalogues and samples. Where data, certified drawings or other required information is not available until after orders have been placed, the Engineer shall give provisional approval until all requested drawings and information have been supplied to the Engineer and approved by

him. It is the Contractor's responsibility to ensure that all necessary information is supplied to the Engineer in accordance with the progress of works.

Should the Engineer give provisional approval only for an order due to lack of complete information and should the missing information not eventually meet with the approval, the Engineer shall not be held responsible for any delay incurred. For equipment where information from the manufacturers is likely to be delayed, it is essential that the Contractor places provisionally approved orders at the earliest possible date so as to ensure approval of orders in complete conformity with the progress of the works.

Submittals and shop drawings should, as far as possible, be complementary so that drawings and submittals can be cross-checked.

SP-05.7 Samples

Contractor shall provide at his cost, samples of materials, instruments, gauges and electrical items, for approval by the Engineer before order is placed for the same. Engineer may waive this requirement, if detailed published catalogues submitted by the Contractor provide sufficient information for approval. These samples shall include, but not limited to:

- i) G.I. sheet (Each Gauge to be used)
- ii) Pipes and fittings
- iii) Valves (all types), strainers, air vents, pressure gauges and thermometers
- iv) Duct insulation, liner and covering
- v) Pipe insulation and covering
- vi) Insulation adhesive and tapes
- vii) Diffusers, grilles and registers
- viii) Outside Air/Exhaust Air louvers
- ix) All types of dampers
- x) Power and control cables
- xi) Electrical items; push buttons, HOA & toggle switches, pilot lamp, contactor, relays, circuit breakers and isolating switches
- xii) Vibration isolating springs, pipe hangers and rollers
- xiii) Flexible duct connections
- xiv) Pipe flexible connection/expansion joints (when specified local)
- xv) Air filters
- xvi) Electrical conduits and fittings
- xvii) Paints
- xviii) Anchor bolts, studs, etc. for hanging arrangements
- xix) Round insulation flexible duct
- xx) Any other item required by the Engineer

SP-05.8 Copies of Drawings and Specifications

One set of Bidding Documents and two (02) sets of Drawings will be issued by the Employer to the Contractor free of cost after award of Contract. Additional sets will be provided at cost upon written request to the Engineer by the Contractor.

SP-05.9 Sound Absorption Data

The Contractor shall provide data for sound absorption from HVAC machinery, air terminals, etc. to ensure NC ratings as specified in SP-04.2 and TP-1.12.

SP-05.10 Photographs and Progress Reports

The Contractor shall arrange, at his cost, color photographs of Works in progress at Site. At least six photographs per month shall be taken from approved locations, commencing with the first month up to the completion of the Works. A professional camera shall be used. The Contractor shall submit, not later than seventh of each month, a negative and six prints of 10x8 inch of each photograph taken during the previous month, with a brief report indicating progress of Works to date.

SP-06 APPROVAL OF MATERIALS AND EQUIPMENT

As soon as practicable after the award of Contract, the Contractor shall submit for the approval of the Engineer specifications, drawings, catalogue - cuts, diagrams and other descriptive data for all materials, components and equipment which the Contractor proposes for use under this Contract. For certain materials and equipment, data may be required to be submitted in accordance with a detailed form furnished by the Engineer. Items submitted shall be properly labeled to indicate the Contract number, project, manufacturer, source of supply, Contract Item number, and other data required by the Specifications. All items shall be submitted in sufficient time to permit proper consideration and action thereon without delaying the construction schedule. These data shall include original copies of proforma invoices for placing orders, a type written specification sheet of each SOP item, and technical literature (complete bound published catalogue) with relevant portions highlighted by a marker. Accessories to be included shall clearly be marked in catalogue and indicated in specification sheet.

SP-07 TIME FOR DELIVERY

All equipment plant and machinery shall be delivered at Site on such dates so as to ensure adherence to scheduled dates stated in Programs of works submitted by the Contractor and approved by the Engineer subsequent to the award of contract. The Contractor shall keep the Engineer informed of the progress of the shipment and notify them approximately 3 weeks in advance, in writing, as to when the equipment will be ready for inspection at Site by the Engineer and shall supply lists covering each consignment in sufficient detail to enable Engineer to check the contents of the packages, if he so desires.

SP-08 STANDARDS AND CODE REQUIREMENT

SP-08.1 All equipment and materials under HVAC Scope of Works shall be furnished in conformity with the latest edition of Applicable Standards of ASME, ASHRAE, ARI, SMACNA, TIMA, AMCA and applicable Government and Local Codes governing the same. In case of conflict, the strict requirements shown/specified shall govern. All equipment shall be rated and tested as per standards listed in

ASHRAE Handbook (latest Edition).

SP-08.2 Abbreviations for Codes and Standards referred in the Contract are as under:

- 1) ASME - American Society of Mechanical Engineers
- 2) ASTM - American Society for Testing & Materials
- 3) ASHRAE - American Society of Heating, Refrigerating and Air-conditioning Engineers
- 4) NFPA - National Fire Protection Association, USA
- 5) AHRI - Air-conditioning and Refrigeration Institute, USA
- 6) SMACNA - Sheet Metal and Air-conditioning Contractors National Association, USA
- 7) CTI – Cooling Tower Institute
- 8) EUROVENT – European Committee of Ventilating Equipment Manufacturers
- 9) GOVERNMENT - Government of Pakistan
- 10) LOCAL - Local authorities of the city where the Project is located
- 11) I.E.E. - Institute of Electrical Engineers, London
- 12) NEMA - National Electrical Manufacturers Association, USA
- 13) AMCA - Air Moving and Control Association Inc., USA
- 14) P.S. - Pakistan Standards.
- 15) B.S. - British Standards.
- 16) TIMA - Thermal Insulation Manufacturer's Association, US

SP-09 STANDARDS OTHER THAN THOSE SPECIFIED

Where the specifications provide requirements for material or equipment by specifying a standard such as for example, one of the American Society of Heating, Refrigerating and Air Conditioning Engineers which has its origin in one country, it is not the intention to restrict the requirements solely to that standard and that country. Other standards, including standards of other countries, will be accepted provided the requirements thereof, in the sole opinion of the Engineer are at least equal to the requirements of the standards specified. The Contractor may propose to the Engineer an equivalent standard other than that specified, in which case he shall submit the proposed standards and all other information to demonstrate and prove his proposed standard is equivalent in all significant respects to the standard specified. All submissions must be made in the English language.

SP-10 PERMIT

The Contractor shall secure and pay for any necessary approvals, permits and inspections from Government or other controlling agencies where applicable as required by law, before commencing any work so as to avoid all delays during erection and turn over the official records of granting of permits to the Engineer. No reimbursements shall be made for such payments.

SP-11 SHOP INSPECTION, DAMAGES AND MATERIAL ORDER

SP-11.1 Inspection

SP-11.1.1 Inspection at Factory Premises

As per clause no. 2-02.1.1 (TESTING) given in Technical Provision.

SP-11.2 Material Orders

Triplicate copies of material or equipment orders required in this Contract shall be furnished to the Engineer. All orders shall state the specification designation under which the material is to be furnished and shall bear reference to the drawing number, if any, pertinent thereto. Orders shall also state that material is subject to inspection and testing and shall show the required date of delivery of the material to destination.

SP-11.3 Acceptance of Materials

The acceptance of any material or equipment prior to shipment shall in no way relieve the Contractor of any of his responsibilities for meeting all of the requirements of the specifications and shall not prevent subsequent rejection if such material or equipment is later found to be defective.

SP-11.4 Damages, During Transportation, Storage and Installation

The Contractor shall be responsible for any damage of the Equipment/ material during transportation to site, storage and until satisfactory handling over the works. The Contractor shall replace any damaged equipment/ materials at his own cost.

SP-12 NAMEPLATES

The Contractor shall provide and attach to each major piece of equipment, a metal name and rating plate to be approved by the Engineer, giving the name and address of the manufacturer, the date and rating data. All ratings shall be in the British system. Large lettering on any of the parts will not be permitted. All ratings shall be in the unit system adopted for the project, unless otherwise authorized by the Engineer.

SP-13 DIRECTED AND REQUIRED ETC.

Unless otherwise stated, wherever in the Specifications or upon the Drawings the words, "directed", "required", "permitted", "ordered", "designated", "prescribed" or words of like import are used, it shall be understood that the direction, requirement, permission, order, designation, or prescription of the Engineer is intended, and similarly the words "approved", "accepted", "satisfactory", or words of like import shall mean approved by, or acceptable or satisfactory to the Engineer unless otherwise indicated.

SP-14 SEQUENCE OF ERECTION

The sequence of erection of the Equipment shall conform to the requirements of the civil construction and of the Erection Instructions. Such information will be furnished to the Contractor by the Engineer upon request.

SP-15 FABRICATION, ERECTION, TESTING AND MAINTENANCE TOOLS PLANT & INSTRUMENTS

SP-15.1 The Contractor shall furnish special plant and tools for the complete and proper fabrication, erection and maintenance tools, plant & instruments of the HVAC Equipment. Tools shall include the type of tools not normally available in the market as standard tools and is generally manufactured especially for use with the HVAC Equipment. All lifting devices shall be accurately machined to fit the parts to be handled. The wrenches and tools for maintenance, insofar as practicable, shall be mounted on a suitable hardwood or steel board arranged for wall mounting and provided with means for ready identification. The Contractor shall also provide refrigerant charging Plant if and when required. No separate payment shall be made for providing Plant and Tools and the Contractor may withdraw the Plant and Tools after its use.

SP-15.2 The Contractor shall furnish and install sign board showing information about the project, name of Employer, Engineer and the Contractor, as directed by the Engineer.

SP-16 ERECTION SUPERVISORS AND OPERATING STAFF

SP-16.1 General

The Contractor shall provide the services of Erection Supervisors and Operating Staff in accordance with the requirements of the Conditions of Contract, of sub-clause SP-02.2 Services by the Contractor, and as specified herein.

SP-16.2 Work by Erection Supervisor

- a) The Erection Supervisor shall direct the activities of Contractor's employees as they concern the installation, commissioning balancing and testing of the Equipment furnished under this Contract. The Contractor through his Erection Supervisor shall cooperate with other Contractors to whatever extent is necessary to produce an installation satisfactory to the Engineer in accordance with the requirements of the time schedule, the Drawings and the Specifications.
- b) Erection Supervisor shall be present from the Commencement of Work and remain on Site until the substantial completion.
- c) Should a disagreement arise between other Contractors and the Erection Supervisor, the matter shall be submitted without delay to the Engineer for his decision. Upon such decision, the Erection Supervisor shall proceed with the work in accordance therewith, immediately.

- d) Erection Supervisor shall be a graduate HVAC or mechanical engineer, registered with Pakistan Engineering Council, having at least 7-8 years of experience in HVAC installation works of similar nature.
- e) If the Contractor fails to fulfill his obligations under clause SP-02.2(a) and also fails to provide the Services of the Erection Supervisor having the minimum qualifications as stated in sub-clause (d) of this Clause then the Contractor would be obligated to pay to the Employer an amount of Rs.1500 per day for the number of days when the services of such Erection Supervisor are not provided. The Employer would be entitled to deduct the amount due from the Contractor in this regard from his running Bill/any payable sums.
- f) Provision of (e) above shall not apply when the Erection Supervisor is on authorized legal leave (casual), sick leave and official holidays only. His absence up to a period of ten (10) days will also be allowed when the contractor intends to replace the Erection Supervisor with the consent of the Engineer.

SP-17 RIGHT TO OPERATE PLANT

The Employer reserves the right to operate any and all Equipment after it has been Commissioned and prior to substantial completion of whole Works. All repairs or alterations found to be necessary during such operation, and required of the Contractor, shall be made by the Contractor at such time as directed by the Engineer. The repairs or alterations shall be made in such a manner and at such a time as will cause the minimum interruption in the use of the Equipment by the Employer.

SP-18 ERECTION INSTRUCTIONS

Erection Instructions in form of published installation manual, as furnished by the manufacturer of each HVAC equipment listed hereunder shall be provided by the Contractor.

1. Air handling units

These instructions shall include full and detailed instructions for the guidance of the Erection Supervisor as to all procedures and precautions to be observed in erecting, assembling and adjusting the Equipment and as to the use of the Erection Plant. It shall include or be accompanied by drawings, clearly showing erection marking and particularly any matchmaking and shall embody in particular a full statement as to erection tolerances to be observed.

These shall also include full instructions for the maintenance of the Equipment not only during the period of Contractor's liability but more particularly during its operating life. The directions shall be set out simply, clearly and systematically. In particular, this section shall include a full list of all routine checks and their timing, directions as to fault finding, detail of all routine attentions (such as greasing), in the form of check sheets for daily, weekly, monthly, quarterly, half-

yearly, yearly and any other periodic checks recommended by the manufacturer. This section should also provide detailed and complete instructions for trouble shooting, maintenance and all necessary adjustments to the Equipment Technical leaflets and brochures in respect of all equipment supplied under this Contract including all relays, instruments, switches, controllers, regulators etc., should be supplied with the erection instruction. This should also include complete catalogue of spare parts with exploded views of the equipment and relevant part numbers to facilitate identification and ordering of spares throughout the operating life of the Equipment.

The Contractor shall submit 6 copies to the Engineer for approval.

SP-20 WATER, POWER AND GAS DURING ERECTION AND TESTING

Water and power supply for Erection and Preliminary Tests shall be the responsibility of the Contractor. Water, power and gas supply for Balancing & Commissioning, Performance Tests and Reliability Trial Tests and operation during Defects Liability Period will be provided by the Employer.

SP-21 APPROVAL FROM GOVERNMENT

The Contractor shall arrange and be responsible for all tests, test reports and approvals regarding electrical works under this contract, any other works under this Contract requiring tests/Government approvals. All the requirements to be completed for this purpose, whether specified or not shall be at the cost of the Contractor. The Contractor shall handover all test results and approval certificates to the Engineer within one week of obtaining such approval.

SP-22 PERFORMANCE GUARANTEE

The Contractor shall be required to furnish a Performance Guarantee in accordance with Conditions of Contract.

SP-23 SITE FACILITIES

Except for the Site facilities specifically stated in Conditions of Contract and/or Special Provisions, no other site facility shall be provided by the Employer to the Contractor.

SP-24 SUFFICIENCY OF RATES AND CURRENCY FOR PAYMENT

All rates and amounts filled in the SOP by the Contractor for equipment/material whether locally procured or imported shall be deemed to include, but not limited to, the cost of items, custom duties, sales tax and surcharges, freight, marine insurance, local duties, sales tax and surcharges, clearance charges, inland transport and insurance, *octroi*, L/C opening charges, bank charges, etc. Payments to the Contractor shall be made in local currency.

SP-25 IMPORT LICENSE

The Contractor will arrange the import licenses if required for all the imported Equipment, Plant, Tools and Machinery to be incorporated in permanent works. All the costs and charges for arranging import licenses will be paid by the Contractor. The Contractor shall be responsible to arrange foreign exchange for import of all equipment and materials.

SP-26 GUARANTEES AND WARRANTIES

SP-26.1 Performance Guarantee

The contractor shall guarantee the performance of the complete HVAC system, viz.-a viz. his workmanship for the work executed at site, and quality of material, as specified. He shall replace the material/workmanship, whenever found not meeting the specified requirements, at his own cost.

SP-26.2 Manufacturer's Warranties

The contractor shall obtain manufacturer's standard warranties for all equipment extended for a period up to one year from the date of completion at his own cost. In case the completion is delayed, the contractor should obtain further extension of warranties. The contractor shall be responsible for cost of such extension, if the delay is due to his fault.

SP-27 PACKING OF EQUIPMENT AND MATERIALS

All equipment and material shall be adequately packed at the manufacturer's works to protect them against damage, scratching, corrosion, dust, rain and moisture during handling, transportation and storage. The packaging shall be rigid enough to withstand normal service incidental to shipping and handling. Wherever necessary, crates/boxes shall be provided with lifting hooks attached by means of vertical rods or plates to strong bottom supports to enable rigging.

The following information shall appear inside all packages:

- a) Stock or identification number
- b) Description of contents/packing list
- c) Quantity of each item
- d) Invoice number
- e) Year of manufacture

SP-28 INSPECTIONS AND TESTS

SP-28.1 Inspection by Engineer at Site

The Engineer shall inspect the works in progress at site as and when considered necessary by the Engineer and the Contractor shall provide full access and assistance to the Engineer for carrying out inspection to verify the conformity of works to general lay-out of HVAC System as designed and as shown on Drawings and as specified. Such inspection if made shall not relieve the

Contractor from any obligations under the Contract.

SP-28.2 Tests

A) General

- i) All Tests as specified shall be carried out unless otherwise specified. The Engineer shall witness the tests.
- ii) The Contractor shall give the Engineer at least seven days notice in writing of the date on which any equipment will be ready for inspection and/or testing as provided in the Specifications and unless the Engineer shall attend within seven days of the date which the Contractor has stated in his notice the Contractor may proceed with the tests in the Engineers absence and shall forthwith forward to the Engineer five duly certified copies of test readings, on the forms prescribed by the Engineer. The Engineer shall give twenty-four hours' notice in writing of his intention to attend any test.
- iii) The Contractor shall provide all labor, materials, electricity, fuel, stores, apparatus machines and instruments as may be necessary to carry out tests, unless otherwise specified.
- iv) The cost of all tests carried out by the contractor under this Clause shall be borne by the Contractor if such tests are clearly intended by or provided for in the Specifications or Schedule of Prices.
- v) As and when any equipment or HVAC System or part thereof shall have passed any inspection/test the Engineer shall furnish to the Contractor a certificate in writing to that effect.
- vi) The Engineer may reject any part or parts of Equipment, and HVAC System which he shall after inspection/ testing decide is not in accordance with the Specifications and Drawings and he shall give to the Contractor within fourteen (14) days of such inspection/ testing notice in writing of such rejection stating therein the grounds upon which his decision is based.
- vii) The test results shall be filled out by the Contractor in the forms proposed by the Contractor and approved by the Engineer. Six copies of filled out forms shall be submitted to the Engineer for review and approval.

- B)** Once the inspection/test certificate has been obtained by the contractor, as stated in A (v) above, the contractor shall test and balance the system in accordance with NEBB (National Environmental Balancing Bureau), USA, code of practices. The Contractor shall be responsible for all remedial measures if any, required. The Contractor shall be responsible for the following:

Supply and fixing of any test hole covers, paint, gauges, gadgets, testing and balancing instruments, or any such thing which is necessary to carry out this work.

To provide all supervision, labor and materials required to carry out these balancing works.

C) Preliminary Inspection & Tests

Preliminary Inspection/Tests as specified in Technical Specifications shall be carried out on all or any major HVAC equipment and such other equipment as the Engineer may require, on completion of installation of that equipment or at such time which the Engineer may require.

D) Balancing & Commissioning

Balancing and Commissioning shall be carried out on all or any major equipment, as Specified in Technical Specifications, when such is ready for operation. The Engineer must witness the Balancing and Commissioning procedures and Contractor shall proceed further after Engineer's written satisfactory approval.

E) Performance Tests

These tests as specified in Technical Provisions shall be carried out on each equipment of HVAC system after successful completion of Commissioning of that equipment, during appropriate season, on the dates proposed by the Contractor and approved by the Engineer. The Engineer keeping in view the weather conditions may fix the test date on any equipment of HVAC system within 6 months of Completion of Commissioning of that equipment.

F) Reliability Trial Tests

i) During the Defects Liability Period the Contractor shall inform the Engineer in writing of his readiness to commence the Reliability Trial Test of HVAC System or part thereof. Cooling or Heating Tests shall be carried in appropriate season and the Engineer shall, within fourteen (14) days of receipt of such information shall forward his consent for commencement of Reliability Trial Test as specified in Technical Specifications, after having satisfied that all the requirements for such Tests have been completed.

ii) If any Reliability Trial Test be not fulfilled to the satisfaction of the Engineer, such test shall be repeated at such time as the Engineer.

SPECIFICATIONS
PART B - TECHNICAL PROVISIONS

TECHNICAL PROVISIONS

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TECHNICAL PROVISIONS

SECTION 1 - GENERAL REQUIREMENTS

1-01 MATERIALS

All materials shall be of the highest grade, free from defects and imperfections, of recent manufacture and unused, and of the classification and grades designated, conforming to the requirements of the latest issue of the appropriate specifications cited herein. All materials, supplies, and articles forming part of major equipment and not fabricated by the manufacturer of the equipment shall be the products of the recognized reputable manufacturers.

1-02 WORKMANSHIP

Workmanship and general finish shall be of the highest grade, in accordance with the requirements specified herein, and the best modern standard practice.

1-03 EQUIPMENT

- a) For ratings and characteristics of manufactured equipment, Equipment Schedule as appended to Technical Provisions shall be followed.
- b) All equipment shall be manufactured by companies, which have had at least ten years previous experience in the design and manufacture of equipment of comparable type, capacity and operating conditions. Unless otherwise approved by the Engineer.
- c) Where the requirement of this Clause make any equipment proprietary or non-obtainable, the Engineer reserves the right to waive any portion or portions of it as required to obtain the intent of the technical provisions.
- d) When a manufacturer's product is specified by name, or equivalent, it shall be in the sole judgment of the Engineer as to acceptability of any product, which is offered as equal to that specified.
- e) Where two or more units of the same class of equipment are furnished, product of the same manufacturers shall be used component parts of entire system need not be product of same manufacturer.

1-04 CHASSES AND OPENINGS

The Contractor shall provide shop drawings, templates or details for chases and openings to be left in concrete walls, concrete partitions, and floor or roof slabs to accommodate work under HVAC scope of works.

1-05 PROTECTION

The Contractor shall keep pipe, duct and other openings closed to prevent entry of foreign matter. All fixtures, equipment and apparatus shall be covered and

protected against dirt, water, chemical or mechanical damage, before and during the construction period. All fixtures, apparatus, or equipment damaged including damaged shop coats of paint shall be restored to original conditions prior to Commissioning and also again prior to Final Acceptance. All bright finished shafts bearing housings and similar items shall be protected until in service: no rust will be permitted.

1-06 CUTTING, PATCHING AND REPAIRING (EXCEPT CUTTING IN CONCRETE)

Required for proper installation and completion of HVAC works, including masonry work, concrete work, and carpentry work, painting and re-painting shall be performed by skilled craftsmen in respective trades, at expense of the Contractor. Construction shall be cut only after obtaining written permission from the Engineer.

1-07 LINES, LEVELS AND SPACES

The Contractor shall check dimensions at the building site and establish lines and levels for work specified in Specifications. The Contractor shall check with work of other trades to ensure proper clearance of piping, ductwork, conduit and other items. Any deviations observed between drawings and actual construction shall be brought to the notice of the Engineer. The erection supervisor shall regularly inspect, during progress of civil works, the areas allocated for installation of HVAC equipment and any conflict observed shall immediately be reported to the Engineer.

1-08 MACHINERY GUARDS

All moving parts of machinery are to be protected by strong guards to adequately protect all personnel working on or in the vicinity of equipment.

Wherever possible, moving parts should be protected by guards supplied by the equipment manufacturer. All guards must be strongly attached to equipment and should be designed for easy removal for access, servicing, adjustment and maintenance.

1-09 TOOLS

The Contractor shall supply in a toolbox, full sets of tools suitable for maintenance of all components of the plant furnished by him including the electrical equipment, for use by the Employer after completion of Defects Liability Period. List of Tools shall be subject to approval by the Engineer.

1-10 OIL AND GREASES

Not Used

1-11 SPARE PARTS

Not Used

1-12 ACOUSTIC TREATMENT

Sound measurements will be made at approximately five (5) feet above floor level in the occupied area served and not more than five (5) feet from the grills, diffusers or other air devices being tested. Instruments for sound measurement shall be provided by the Contractor.

Provision is to be made to minimize noise and vibration. However, different manufacturers equipment have varying sound and vibration characteristics and it is, therefore, the responsibility of the Contractor to ensure that the requirements in these specifications are fully met by the equipment he is offering. If the Contractor has any requirements for additional vibration or sound isolation, these must be incorporated into the price quoted.

All equipment installed should not be audible inside the occupied areas and the Contractor must ensure that all equipment he is offering is quiet and have satisfactory sound levels. Where silencers are required, these must be incorporated into the price quoted.

1-13 ACCESS PANELS

The Contractor shall mark locations of, and give sizes of, access panels required in false ceiling and wall paneling for adjustment and maintenance of HVAC Equipment, such as Dampers, Fire Dampers, valves, ceiling-hung equipment, etc. This information shall be provided to the Engineer before commencement of false ceiling work by the concerned persons.

1-14 SEALING OF OPENINGS

The contractor shall seal all openings in external walls and roof where HVAC ducts/pipes penetrate in external membrane. The sealing shall be air tight to prevent penetration of outside air and water into building. The method and materials for sealing shall be subject to Engineer's approval.

SECTION 2 – EQUIPMENT

2-01 GENERAL

All equipment shall be of such overall dimensions, operating weights, service area requirements and configuration that it can be located where shown on the plans without any adverse effect on its performance and clearance requirements. Any change in other trades work, anticipated by offering alternate equipment, shall be estimated by the Contractor and its cost shall be included in the quoted price for HVAC Works.

Provision for clearance and service spaces shall be made around all mechanical equipment as recommended by equipment manufacturers.

All equipment supplied under this section shall be brand-new, factory manufactured and factory assembled (unless otherwise specified) and complete in all respects. The type, characteristics, capacity ratings, component sections of all equipment shall be as Scheduled.

All equipment furnished by the Contractor shall include vibration isolation mounting pads, anchor bolts, frames or any other mounting or supporting accessories.

All power driven equipment shall include drives, motors and adjustable motor foundation bases and accessories including machinery guards where applicable.

All equipment shall be complete with all accessories necessary to serve the intended purpose, whether specified or not.

All equipment installed on roof or intermediate floors shall include suitable vibration isolators to prevent any vibration traveling to building structure.

2-02 EQUIPMENT

2-02.1 AIR HANDLING UNITS

The air-handling units shall be package type sectionalized construction having filter section, control/mixing section, cooling coil section, eliminators, fan section, suction plenum section and drain pan. Capacity (TR), Airflow & External Static Pressure of the air-handling unit has been indicated in the air handling unit schedule. AHU design shall be robust & as per requirements.

AHUs shall be locally manufactured as approved by the Engineer.

For purpose of calculation of motor BHP, specified external SP and AHU manufacturer's internal SP should be added. Filter pressure drop shall be part of internal SP, which shall be calculated on average of clean (initial) and filter manufacturer's-recommended dirty (final) pressure drop. Published recommendation of filter manufacturer shall be furnished along with technical

submittal. In case published recommendation is not available, a recommendation on the printed stationery of filter manufacturer shall be acceptable provided the manufacturer certified that no such published data is available. The AHU shall be equipped with Access Doors(Sight Glass is compulsory as per Access requirement) for each section.

The AHUs Shall be equipped with mixing Box Section & Sections required as per requirement mentioned in the equipment schedule. AHU manufactured with thermal Break Aluminum Profile with Plasticized/Powder Coated G.I. sheet on outside and 0.63mm (24 SWG) pre coated GI sheet on inside and insulation in between two sheets. Dampers to be of G.I/Aluminum Blades with Gas ket (To Avoid leakage rate) for regulating fresh Air and return air requirements

AHU shall be selected for the lowest operating noise level, and operating noise level should not exceeding 85 DB at 2 M distance.

2-02.1.1 CONSTRUCTION

These shall be factory assembled draw-through Modular air handling units (AHU's) of capacities and characteristics as scheduled. Air handling units shall be horizontal or vertical with component and configuration as scheduled

Casing & Drain Pan:

The housing /casing of AHUs shall be of double skin compact construction. The framework shall be of extruded aluminum hollow sections filled with preformed insulation. The entire frame shall be assembled using mechanical joints to make a sturdy & strong framework for various joints. Double skin panels shall be made of minimum 24 SWG(0.6mm) Plasticized/Powder Coated G.I. sheet on outside and 0.6 mm. SWG 24 pre coated GI sheet on inside with minimum 50 mm thick polyurethane foam insulation in between and panel sheets. These panels shall be bolted from inside on to the framework with soft rubber gasket in between to make the joints airtight. All necessary hardware/fasteners shall be of Stainless Steels (304). Suitable doors with SS-304/PVC hinges and latches shall be provided for access to various panels to facilitate removal of cooling/heating coils and fans for maintenance. The entire housing shall be mounted on steel channel framework.

Drain pan shall be constructed of 3mm SS-304 sheet with necessary slope to facilitate fast removal of condensate. Drain outlet shall be provided as per site actual conditions or according to the provided schematics layout. Drain connection should be raised from drain pan of AHU & left near the floor drain trap with a "U" shape.

Drain-pan shall be at least 150 mm wider than the width of respective cooling/heating coils. Between drain-pan and Eliminator pan of bottom surface shall be made of 3mm SS-304 sheet.

COIL SECTION:

The coil shall be designed as heavy duty type and inlet water temperature and outlet water temperature as per mentioned requirement on the equipment

schedule for cooling and similarly for the heating Coils. Cross flow process of heat Transfer shall be used for cooling coil design. Number of fins in the cooling coil shall be restricted to maximum 8 fins/in for the coil. Each coil shall be complete with drain and vent connections. Chilled water coil shall be constructed of 99.9% pure seamless Copper tubes with minimum 24G (0.56 mm) thick and with (0.13 mm) thick aluminum fins firmly bonded to tubes assembled in zinc coated steel frame. The Tube shall be hydraulically/Mechanically expanded for minimum thermal contact resistance with fins. Each coil shall be factory tested to 500 PSI of Nitrogen Pressure for minimum 48 Hours. Flanges of cooling coils shall be of galvanized Mild Steel plates of thickness as per ANSI B 16.5 class 150 lb. Supply and return headers shall be given two coats of rust inhibiting paint on either side.

AHU shall be provided with PVC eliminator to be provided after coil to avoid water carry over having suitable depth as per requirement. Eliminator pan shall be constructed of sandwich type construction with both the skin made of 1mm SS-304/ Aluminum sheet, necessary slope to facilitate fast removal of water.

FAN SECTION:

Fan shall be double inlet centrifugal (Backward Curve) mounted on a common shaft. Fan impeller shall be statically and dynamically balanced and shall have permanently lubricated bearings. Fan shall be belt driven with adjustable sheaves. Fan shall have spring isolation from the casing. The fan shall be selected for a speed not exceeding 1450 RPM. Fan shall be AMCA Certified. The Make of fans shall be "NICOTRA, YILIDA OR COMEFRI" as approved by the engineer.

FILTER SECTION:

Flat filters installed in Air Handling Units, shall be permanent, impingement, dry type, washable, all metal, panel type, at least 2 inch thick unless otherwise scheduled. Media shall be aluminum screen, arranged in alternate layers of flat and herringbone-crimp, 4 layers of each per one inch reinforced and enclosed in a frame of 16 gauge galvanized steel with flush mitered corners. Initial pressure drop at 500 FPS shall not exceed 0.1 inch WG. Holding frame shall be factory-built of 16-gauge steel; with felt air seal. Filters shall have at least 35% efficiency on 0-5 microns range. Filter Media shall be upon International Standards.

Variable Frequency Drive (VFD):

The VFD shall be enclosed in a UL/NEMA Type enclosure, completely assembled and tested by the manufacturer. The VFD shall provide full rated output from a line of $\pm 10\%$ of nominal voltage. The VFD shall continue to operate without faulting from a line of $+30\%$ to -35% of nominal voltage.

VFDs shall be capable of continuous full load operation under the following environmental operating conditions:

- a. -5 to 45 °C ambient temperature. Operation to 50 °C shall be allowed

with a 10%reduction from VFD full load current.

b. Humidity less than 95%, non-condensing.

All circuit boards shall be coated to protect against corrosion. All VFDs shall have the same customer interface, including digital display, and keypad, regardless of horsepower rating.

The keypad shall include Hand-Off-Auto selections and manual speed control. The drive shall incorporate “bumpless transfer” of speed reference when switching between “Hand” and “Auto” modes.

VFD programming shall be held in non-volatile memory and shall not be dependent on battery power. The VFD’s shall utilize pre-programmed application macros specifically designed to facilitate start-up.

The VFD shall be capable of starting into a coasting load (forward or reverse) up to full speed and accelerate or decelerate to set point without tripping or component damage (flying start).

The VFD shall have the ability to automatically restart after over-current, over-voltage,under-voltage, or loss of input signal protective trip. The number of restart attempts, trial time, and time between attempts shall be programmable.

The overload rating of the drive shall be 110% of its normal duty current rating for 1minute every 10 minutes, 130% overload for 2 seconds every minute. The input current rating of the VFD shall not be greater than the output current rating. Input and output current ratings must be shown on the VFD nameplate.

The VFD shall have programmable “Sleep” and “Wake up” functions to allow the drive to be started and stopped from the level of a process feedback signal.

All VFDs to have the following adjustments:

- Two (2) programmable analog inputs shall accept current or voltage signals.
- Two (2) programmable analog outputs (0-20ma or 4-20 ma). The outputs may be programmed to output proportional to Frequency, Motor Speed, Output Voltage, Output Current, Motor Torque, Motor Power (kW), DC Bus voltage and other data.
- Two (2) programmable digital inputs for maximum flexibility in interfacing with external devices. All digital inputs shall be programmable to initiate upon an application or removal of 24VDC.
- One (1) programmable digital output

The voltage/frequency ratio shall be suitable for speed control of fans. It should not be possible to set a constant voltage/frequency ratio to prevent damage to

connected equipment and to optimize energy consumption. The converter shall regulate the output to adapt it continuously to the current flow so as to minimize energy consumption

MOTORS:

All motors shall be totally enclosed fan cooled, of squirrel cage construction and shall be equipped with VFD. All motors shall be of Siemens or ABB make only.

Insulation on all motors shall be equal to Class F (IP 55). The efficiency of motors shall not be less than IE-3. All motors shall be designed for continuous operation in the ambient temperature of 105 °F (40 °C). All Motors shall be properly de-rated for operation in an ambient temperature of 105 °F (40 °C).

All motors and accessories such as protection and control devices etc. shall comply in all respects with NEMA, current B.S. Standards and I.E.E. Regulations. Single phase motors shall be capacitor-start induction run construction, unless otherwise indicated or specified.

All motors shall be quiet operating guaranteed to fulfill specified requirements without producing any sound audible outside of plant rooms. All belt-driven motors shall have adjustable bases and set screws to maintain proper belt tension, with proper belt guards. Motors installed in the building should be super silent sleeve bearing type.

The starting current of all motors above 10 hp. shall not exceed twice its rated full load current. For motors of rating 10 hp. and below the starting current shall not exceed 7 times its rated full load current or one hundred amps, per line, whichever is larger. Motors rating ampere chart shall be provided with the supplied motor.

TESTING:

A. Factory Inspection During Manufacturing

All material for the AHU's shall be checked/quality assured by AHU manufacturer before starting the manufacturing process. Material of Copper tubes of coil and G.I Sheets to be checked and verified as per standard method approved by the Engineer. Coil test report shall be submitted on minimum 500 psi for 48 hours. The material test will be performed before equipment manufacturing. The engineer shall visit the factory to verify the materials as mentioned above before AHU assembling. All the expenses (lodging, Boarding, Transportation and all travelling charges including Air tickets) to carry out such inspection by the Engineer & Engineer's representative (02nos.) shall be borne by the contractor.

B. Factory Inspection after Completion of Manufacturing

FAT shall be performed before equipment supply to the site, after completion of manufacturing process, the supplier shall offer Factory Acceptance Test (FAT) to the Engineer/ Engineer representative. The Following tests shall be witnessed

during FAT:

- i. CFM & Static pressure as per equipment schedule.
- ii. Fan RPM
- iii. Sound Level
- iv. Motor Ampere
- v. Motor RPM
- vi. Any other test as required or approved by the Engineer.

Only after satisfactory FAT of AHU's the supplier shall be allowed to deliver AHUs to Project site. All the expenses (lodging, Boarding, Transportation and all travelling charges including Air tickets) to carry out such inspection by the Engineer & Engineer's representative (02nos.) shall be borne by the contractor.

SECTION 3 - FOUNDATIONS AND SUPPORTS

3-01 GENERAL

All equipment, piping and ductwork where used shall be mounted on or suspended from foundations and supports, all as specified, as shown and as required. All concrete foundations where required, including thickened structural slab, housekeeping pads and concrete for inertia pads will be provided by the Employer or other Contractor appointed by the Employer.

Shop drawings, other information and templates for all concrete foundations where used, shall be provided by Contractor as per recommendations of the manufacturer of the equipment. Necessary integral steel framings, concrete reinforcing rods welded to frame, required anchor bolts, spring mountings, and neoprene pads, shall be provided by the Contractor. The Contractor shall cooperate with those doing the flooring work to ensure proper installation of all these elements.

Foundations and vibration isolation mountings for various equipment, piping, and ductwork where used shall be as per requirements specified. Vibration isolators where used shall be of approved make.

Springs used for vibration isolation shall be single, open coil type and laterally stable, having a ratio of loaded height to mean coil diameter not greater than 1.25. To preclude possibility of spring coils "shortening" when motor starts or slows down, the springs shall be selected so that there remains when the spring is design loaded, a reserve deflection of between 25 and 30% of maximum deflection of free spring. When fully compressed, maximum stress in steel should not exceed yield stress of spring material. Springs shall be unhoused and held well clear of any part of suspended mass. Isolated system if supported on a flat slab type base, shall be held clear of supporting structure or pad by the minimum distance thought necessary for efficient housekeeping or 1 inch. Lower end of each spring shall be supported on a rigid, square steel base plate sufficiently thick to withstand a bearing pressure of 427 kPa. This plate should be complete with 3 thickness of type W neoprene waffle pad between under inside of plate and supporting structure. A 16 gauge steel shim plate bonded to pad surfaces shall separate adjacent thicknesses. Spring base plate shall also be bounded to top layer of pad. Pad area should be chosen to suit hardness of neoprene. For 40 durometer neoprene, bearing pressure on supporting structure shall be 276-352 kPa when spring is design loaded. Waffle pads may have to be cut away in the middle of pads since pads shall have same overall dimensions as spring base plate.

All pipe hangers must be insulated from the building by cork inserts between the hanger bar fixing and the connection to the structure. Details of the Contractor's method of achieving this shall be submitted to the Engineer for approval. All ceiling hung equipment having fans and motor as integral part of equipment shall have adequate vibration isolators.

Flexible duct connections, as specified elsewhere, shall be fitted wherever ducts

cross building expansion joints, at suction and discharge end of each air handling unit and fan wherever ducts are connected to such unit, and/or wherever shown on the drawings. Details of all vibration isolators, flexible connections and bases shall be submitted to the Engineer for approval.

3-02 MOUNTING OF EQUIPMENT

3-02.1 Floor Mounted Equipment

All floor or roof mounted equipment shall be generally placed on at least 4 inch concrete house keeping pads, unless otherwise indicated. The pads shall be constructed on 1 inch thick cork-sheet. Protective curbs shall be provided on all sides of the pad to protect the cork sheet edges. Special attention shall be given to the equipment at roof and intermediate floors and heavy equipment shall be mounted on spring isolators / inertia pads. The spring isolators shall preferably be supplied by equipment manufacturer and shall be from manufacturers specializing in manufacturing of vibration isolators. Manufacturer's recommendations for prevention of vibration and noise travel to the structure shall be adopted. The foundation details shall be subject to the approval of the Engineer

SECTION 4 - DUCTING AND SHEET METAL WORK

4-01 GENERAL

4-01.1 Ducting Material

All duct work shall be of galvanized steel sheet unless otherwise indicated on Drawings. Galvanized steel shall be of lock forming quality (LFQ) and shall have a galvanized coating of 8 oz total for both sides of one square meter of a sheet. The GI sheet shall conform to ASTM A-525 and ASTM-90.

Galvanized steel sheet shall be Cut Lengths coated by the Hot-Dip Method and manufactured per ISO Standard 3575-76 zinc coating designation Z-275, and base metal quality 02.

4-01.2 Structural Steel

Structural Steel shall be M.S. members rolled from Pakistan Steel billets or equivalent conforming to ASTM designation A-36 standard specifications for structural steel.

4-01.3 Canvas Cloth

Canvas Cloth shall have specified weight with flame retardant quality.

4-01.4 Painting

All steel work in connection with supports for ductwork etc. exposed to the elements is to be painted with two coats of an approved rust preventive paint.

All exposed metal surface of hangers, brackets, etc. must be painted with two under-coats and two finishing coats of enamel paint of approved colour. G.I. sheet is not to be painted. However, all uninsulated pipe work and valves are to be painted as stated above.

Identification bands shall be painted on uninsulated ducting, or on insulation at frequent intervals. Lettering shall be agreed with the Engineer.

All duct hangers in concealed locations shall be given one coat of black asphalt paint before being concealed.

4-02 DUCT CONSTRUCTION

All sheet metal duct work shall be of a standard construction and erected in a first class workmanlike manner. The duct work shall be constructed as per SMACNA Low Velocity Duct Construction Standards.

Where specified, duct work shall be provided with interior insulation. Ducts shall be straight and smooth on the side, with joints neatly finished. Where ducts are lined with interior insulation, the dimensions required shall be for the net free area after insulation is applied. Ducts shall be anchored securely to the structure in an approved manner and shall be installed so as to be completely free from vibration under all conditions of operation.

Sheet metal ducts shall be properly braced and reinforced with steel angles, or other structural members approved by the Engineer Unless otherwise required, the internal ends of all slip joints shall be installed in the direction of flow.

Finished work shall show no flaking or peeling within 1/4" of a cut edge. The construction and gauge of material, size and spacing of stiffeners for duct work shall be as follows:

Larger Dim. of Duct (in.)	Gauge (US)	Traverse Joint Type/Size (Inch)	Interm Bracing, Angle Size (Inch)	Max. Spacing between Traverse Joint &/or Interm Reinforcement
Thru 12	26	Drive slip/-	-	-
13 thru 18	24	Drive slip/-	-	-
19 thru 30	24	Pocket lock/1	1x1x1/8	5
31 thru 42	22	Pocket lock/1	1x1x1/8	5
43 thru 54	22	Pocket lock/1-1/2	1-1/2x1-1/2x1/8	5
55 thru 60	20	Pocket lock/1-1/2	1-1/2x1-1/2x1/8	5
61 thru 84	20	Angled reinforced standing seam	1-1/2x1-1/2x1/8	5
85 thru 96	18	Angled reinforced standing seam	1-1/2x1-1/2x1/4	2.5
Over 96	18	Angled reinforced standing seam	1-1/2x1-1/2x1/4	2.5

Other types of Traverse joints allowed as per ASHRAE/ SMACNA Standards shall be acceptable, subject to Approval of Engineer, in places where pocket lock is not possible due to tight space.

All angles for bracing shall be painted with one coat of approved rust-inhibitive paint before fixing to duct.

All duct work in the finished areas shall be run parallel to the beams wherever possible. All outlet opening and open ends shall be kept closed with sheet metal caps during construction. Rectangular duct shall be constructed by breaking the corners and grooving the longitudinal seams. Elbows and transformation sections may be formed with Pittsburgh corner seams but complicated fittings shall be constructed with double seams. Angle bracing shall be of steel and shall be carried out on all four sides of the ducts. All bracing is to be in accordance with the current addition of the ASHRAE Hand Book/ SMACNA Standards.

4-03 ELBOWS

Ducts shall be built with curves and bends, where required, to affect an easy flow of air. Curved elbows shall have a centre line radius at least equal to 150%

of the width of the duct unless otherwise indicated. All duct curves having an inside radius smaller than the width of the curve shall be equipped with approved single thickness vanes.

Vertical ducts shall have full size bends where horizontal branches are taken off unless otherwise indicated, and/or approved.

Where square elbows are used in changing directions, approved and aerodynamically correct vanes as per latest SMACNA Duct Construction Standards shall be used.

These turning vanes must be free from vibration when the system is in operation.

4-04 HANGERS

Hangers and supports shall be fastened to the structure in a manner approved by the Engineer. All fastening shall be such as to ensure permanent stability and to be capable of supporting at least three times the applied load.

Galvanized sheet metal ducts less than 20" in width (larger dimension) may be suspended by means of galvanized iron straps extended along the bottom of the duct to form a trapeze, only if hanger length above the duct is not more than 12".

All other ducts shall be suspended by means of iron bars securely fastened to the angle iron bracing or angle iron placed under the duct. Bars shall be fastened to bracing only on un-insulated ducts.

Bars shall be welded to angles at ceiling, attached therein by anchor screws and heavy iron washers. Where horizontal ducting is fixed to walls, columns, supported from floor slabs, etc. angle iron frames are to be fabricated and fitted to support rectangular ductwork and associated equipment.

Vertical ducts are to be supported by steel angles bolted to at least two sides of the duct and on the complete circumference of the ducts where the larger duct dimension is greater than 24 inch.

Angle iron extensions shall be either grouted or bolted to the structure. Hangers spacing and sizes shall be as follows.

Larger Duct Dim. (Inch)	Strap Size (Inch)	Bar Dia (Inch)	Bottom Angle Size (Inch)	Maximum Spacing (Feet)
Thru 12	1" x 22 ga.	3/8	1x1x1/8	8
14 thru 18	1" x 22 ga.	3/8	1-1/4x1-1/4x1/8	8
19 thru 30	1" x 18 ga.	3/8	1-1/2x1-1/2x1/8	8
31 thru 42	1" x 18 ga.	3/8	1-1/2x1-1/2x1/8	8
43 thru 54	1" x 16 ga.	3/8	1-1/2x1-1/2x1/8	7

54 over	1" x 16 ga	1/2	2x2x1/4	6
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Hanger rods shall be cross-braced whenever the length of rod above duct work is more than 3 ft. to prevent swing of ducts.

All structural steel including hanger rods and angle iron shall be painted with one coat of approved rust- inhibitive paint before installing.

4-05 QUADRANTS FOR VOLUME DAMPERS

All dampers other than dampers behind registers and diffusers shall be fitted with substantial locking quadrants, mounted outside the duct in an accessible position. On insulated ducts the quadrants shall be fastened to bearing plates flush with the outside finish of the insulation.

4-06 DAMPERS

4-06.1 Volume Dampers (V.D)

A substantially constructed manual volume damper of the butterfly or multiple blade type as per latest SMACNA Duct Construction Standards shall be fitted where shown on the Drawings and at all branch entries or exits with main ducts for balancing purposes. Dampers shall have galvanized or painted steel interlocking blades of 8" maximum blade width. Blades shall be fabricated from 16 gauge steel with seamed edges and a maximum length of 4 ft. It should be noted that these dampers, shall be separate and independent from the dampers, hereinafter specified. Volume Dampers are not required where splitters Dampers, as specified hereinafter, are installed.

4-06.2 Splitter Dampers (S.D)

At each point of division in a supply trunk duct where a branch is taken off a trunk duct, an adjustable splitter or deflecting damper, one gauge heavier than the duct with operating rod and locking quadrant as above, shall be installed. These deflecting dampers shall be permanently set and locked in position after completion of the installation and adjustment with fans running.

Operating rods are to be full blade length extending through the duct to externally mounted bearing plates. Construction shall be as per latest SMACNA Duct Construction Standards.

4-07 ACCESS DOORS AND PANELS

Wherever necessary, suitable access openings, doors and frames to permit inspection, operation and maintenance of all filters, controls, dampers, bearings or other apparatus shall be provided in ducting. Doors shall be of double construction, of not lighter than 20 gauge metal sheet and shall have sponge rubber gaskets around their entire perimeter. On insulated duct work the space between the inner and outer door sheets shall be insulated as specified for the ductwork. All access doors in sheet metal shall have air tight seal, shall be hung

on heavy flat hinges and shall be secured in the closed position by means of wing type nuts and screws or coin operated catches.

4-08 SLEEVES

Where ducts pass through walls, partitions, or floors, wooden sleeves shall be provided by the Contractor and these sleeves shall remain in place permanently. Sleeves shall be packed with non-combustible glass- fibre insulation, minimum of 1.5 lbs/cu.ft. density and sealed with sealant.

4-09 TEST WELLS

The Contractor shall provide test wells for measurement of air velocity and static pressure for balancing purpose. These wells made up of a brass nipple with screwed caps are to be fixed into the duct or casing on the downstream sides of each fan. The design of test well shall be subject to Engineer's approval.

SECTION 5- HVAC PIPING, FITTINGS, VALVES & SPECIALTIES

5-01 GENERAL

Each part of the piping system shall be complete in all details and provided with all control valves and accessories necessary for satisfactory operation. Valves from local manufacturer shall have additional warranty of three (03) years with complete replacement of parts or whole valves.

The Bidding Drawings indicate generally the routes of all main piping and sizes are shown on Drawings for quotation purpose. The Engineer reserves the right to change the runs and sizing of piping to accommodate conditions during construction.

All piping shall comply with the requirements of the ANSI B31.1 Code for Power Piping. The other pressure vessels shall comply with ASME Boiler and Pressure Vessel Code Section VIII.

All piping shall be grouped wherever practicable and shall be erected to present a neat appearance. Pipes shall be parallel to each other and parallel or at right angles to structural members of the building and shall give maximum possible headroom.

All pipe drops shall be truly vertical. No joints shall be formed in the thickness of walls, floors or ceilings. The Contractor is responsible for ascertaining the thickness of plaster and other wall finishes, skirting heights, sill lengths and floor finishes.

Piping shall not pass in front of doorways or windows and shall be generally arranged so that it is at least 3" above finished floor level and at least 1" from finished wall faces. Sufficient space is to be allowed for accessibility for servicing.

Piping shall be pitched for proper circulation and drainage. Run outs shall be graded in such a manner as to prevent air traps being formed within them when the mains expand or contract. Automatic or manual vents are to be provided at high points. All automatic vents shall be piped to suitable drains.

All drain piping shall pitch down in direction of flow. All drains from items such as drip pans of air conditioners and air handlers shall be piped to spill over an open sight drain, floor drain, roof gutter or other acceptable discharge points and shall be terminated with a plain end unthreaded G.I. Pipe, 6" above the drainage. Drain piping from all air handling units except fan coils shall have 3" water seal unless indicated otherwise.

All low points of the system must be fitted with drain valves to permit the complete drainage of the system. Bottoms of all risers must have dirt pocket the size of the riser of at least 12" long with a drain valve fitted. All water piping to equipment and valves shall be connected with either flanges or unions for dismantling and removal. All piping shall be reamed after cutting to remove all

burrs.

Approved pipe fittings shall be used and bending of pipes will not normally be allowed except for black steel pipe 2" diameter and under which shall be permitted where space conditions allow for a bending radius of at least 10 times the diameter of the pipe. A hydraulic pipe bender shall be used to bend all pipes. Bends showing kinks, wrinkles, or other malformations, will not be acceptable.

Piping shall not be installed passing through duct work or directly under electric light fixtures, unless indicated otherwise.

In placing pipes through sleeves, near walls, partitions or in chases, care must be taken to provide sufficient space for pipe fittings and covering.

Where pipes are held in vices, as when screwing, care shall be taken to ensure that the pipe surface is not damaged. Any pipe work so damaged shall not be fitted.

All pipes stored on site shall be kept clean and off the ground and where possible stored under cover. Pipes corroded beyond normal "stock-rust" condition shall not be used. Special care should be taken to prevent dirt entering into pipes. The Contractor shall note that a valve fitted to the open ends of a disconnected pipe is not considered satisfactory to prevent entry of foreign matter. Screwed iron caps or plugs or plastic covers shall be used to seal pipe ends. Wood, rag, paper or other inadequate plugs will not be permitted.

Before connecting up to return mains, the system of piping must be blown and flushed out. After flushing, all strainers shall be opened and baskets cleaned.

Liberal allowance shall be made for expansion and contraction of pipes by means of changes in direction or by the inclusion of expansion joints in the piping system. Flexible connections shall also be provided whenever piping cross building expansion joints. Not less than 2 Pipe Guides as approved by the Engineer shall be used on both sides of expansion joint/loop.

All steel work in connection with supports for pipes exposed to the elements is to be painted with two coats of an approved rust preventive paint.

All exposed metal surface of hangers, brackets, etc. must be painted with two under-coats and two finishing coats of enamel paint of approved color. G.I. sheet is not to be painted. However, all un-insulated pipe work and valves are to be painted as stated above.

Identification bands shall be painted on piping or on insulation at frequent intervals. Lettering shall be agreed with the Engineer. All steel pipes supplied when delivered at site, shall have factory manufacturing date not older than two (02) month for local pipes and three (03) months for imported pipes.

All pipe hangers in concealed locations shall be given one coat of black asphalt

paint before being concealed.

5-02

PIPING, FITTINGS & ACCESSORIES

Pipe Schedule			
Sr. No.	Service	Size	Specifications
(a)	Seamless Steel		
(i)	Chilled/hot & condenser water	All sizes	Schedule 40 black seamless steel, ASTM A 106 Grade B or equivalent
(ii)	Chemical Feed	All sizes	Schedule 40 black seamless steel, ASTM A 106 Grade B or equivalent
(b)	Galvanized steel		
(i)	Cooling Coil condensate drain	All sizes	Galvanized steel, Light Quality BSS 1387
(ii)	Make-up water, and drain copper	All sizes	Galvanized steel, Light Quality BSS 1387
(c)	Piping for auto vents discharge	1/4"	Copper, Type K

5-02.1

FITTINGS

Fittings shall conform to following Schedule; in piping 6" and larger, "stub-in" type connections will be permitted when branch line is at least four pipe sizes smaller than main run.

Fittings Schedule			
Sr. No.	Service	Size	Specifications
(a)	Seamless Steel Piping		
(i)	Chilled/hot & condenser water	2.5" & smaller	150 lb black steel threaded fittings, ANSI B 16.11, ASTM-A105.
(ii)	Chilled/hot and condenser water	3" & larger	Schedule 40 black welded steel, welding fittings to ANSI B 16.9
(iii)	Chemical feed	All sizes	150 lb black cast iron screwed fittings to ANSI B 16.4
(b)	Galvanized Steel Piping		
(i)	Cooling coil condensate drain	All sizes	150 lb malleable iron galvanized screwed fittings to ANSI B16.3
(ii)	Make-up water/drain	All sizes	150 lb malleable iron galvanized screwed fittings to ANSI B16.3

5-03 Unions and Flanges

GENERAL

Unions and flanges shall be provided where indicated and/or required for proper installation and maintenance of the system. They shall conform to the respective schedule given hereunder.

Flanges shall have bolt holes drilled and raised faced and fitted with black mild steel bolts, nuts and washers.

If equipment has different flanges to the type specified then mating flanges must be supplied of the same rating to connect to this equipment. Extend flange bolts through nut at least four full threads when made up.

Union Schedule			
Sr. No.	Services	Size	Description
a)	All services using black steel pipe	All sizes	150 lb malleable iron screwed, conical seat type
b)	All services using galvanized steel pipe	All sizes	150 lb malleable iron, galvanized screwed, conical seat type

Flange Schedule			
Sr. No.	Services	Size	Description
a)	Services using black steel pipe	All sizes	ANSI 150 lb weld-neck or slip-on as indicated or required.
b)	All services using galvanized steel pipe	All sizes	ANSI 125 lb galvanized cast iron screwed pipe

5.04 PIPE SUPPORTS AND ANCHORS:

All supports for steel piping shall be ferrous. Brackets or supports shall be set out so that they do not obstruct the access to valves, flanges or other fittings requiring maintenance.

All pipe work shall be supported by means of approved clips or hangers at centres as specified. In the event of two or more pipes being carried by a single support the spacing shall be for the shorter interval.

All vertical drops shall be supported so as to prevent sagging or swinging. Unless otherwise indicated, pipe hangers are to be spaced as follows:

Pipe Hanger Spacing's		
Nominal Pipe Size (Inch)	Maximum Span (Feet)	Minimum Rod Dia (Inch)
1 and smaller	6	3/8
1 ¼ - 1 ½	8	3/8
2 – 2 ½	10	3/8
3	10	1/2
4	12	1/2
5	14	5/8
6	16	5/8
8	20	7/8
10	20	7/8
12	20	7/8
14	20	1
18	20	1

Piping at all equipment, and control valves shall be supported to prevent strains or distortions in the connected equipment, valves and control valves. Piping shall be supported to allow for removal of equipment valves and accessories with a minimum of dismantling and without requiring additional supports after these items are removed.

All channels, angles, plates, clamps etc. necessary for the fastening hangers shall be furnished by Contractor. All hangers shall be properly sized for the pipe to be supported. Oversized hangers shall not be permitted, without Engineer's approval.

All hangers shall be provided with lock nuts and have provisions for vertical adjustment of pipes.

Individual horizontal piping shall be supported by hangers consisting of malleable split rings with malleable iron sockets, or steel clevis type hangers, or roller hangers as directed by the Engineer. Pipe stands with base flanges and adjustable type yokes shall be used for pipes supported from the floor.

Vertical piping shall have heavy wrought iron or steel clamps securely bolted on the piping with the end extensions bearing on the structure of the building. Piping shall be anchored where required to localize expansion to prevent undue strain on piping and branches. Anchors shall be entirely separate from hangers and shall be heavy forged or welded construction of approved design. Hangers for cold piping shall have hardwood inserts or high density insulation capable of withstanding the compression and allowing the hanger to support the pipe without any metal contact. Upper ends of iron rods shall be welded to angles attached to ceiling (concrete slab) by anchor screws and heavy iron washers.

5-05 PIPE SLEEVES:

All pipe penetrating through walls, partitions and slabs shall have sleeves having an internal diameter at least 1" larger than the outside diameter of the pipe or of the insulation passing through the sleeves. Pipes passing through interior masonry or concrete floor shall be provided with sleeves of galvanized standard wrought steel pipe flush with walls and ceilings and extending 1" beyond external surface of wall or above finished floor.

On the exposed pipes, passing through floors, wall, partitions plaster furrings, split type nickel plated circular steel plates, 3" larger in outside diameter than the outside diameter of the pipe or pipe covering, shall be provided.

5.06 VALVES AND SPECIALTIES GENERAL:

Valve and piping specialties shown on drawing are only schematic and all required valves and specialties are not necessarily shown on drawings.

The Contractor shall furnish all shut-off valves, check valves, drain cocks, dirt traps, automatic vents, manual vents, relief valves, strainers and other specialties as are required for proper operation of the whole system.

All valves of size 2" and larger shall have cast iron body and renewable bronze seal rings, bronze spindles and self-packing feature so that they can be packed while open and under pressure.

All valves smaller than 2" shall be of brass body with threaded connection.

All valves shall be of design and construction to conform to the 1.5 time the maximum design pressure (minimum 150 psi at 250 OF) of the system, but not less than PN-16. All valves shall be provided with epoxy/ powder coating as per standards. The valve rings/ cope shall be made of Teflon.

5-06.1 BALANCING VALVE:

Circuit setter type valves as specified hereunder shall be used for balancing purpose where shown on drawings.

Globe valves shall be used for balancing purpose where shown on drawings.

Shut-off valves shall be installed on both sides of all equipment. Balancing valves shall be installed where required for flow balancing. Make of valves shall be subject to Engineer's approval.

5-06.2 GATE VALVES:

Gate valves shall be used for shut-off purposes. All valves shall be designed for packing under pressure when fully open.

5-06.3 RELIEF VALVES:

Relief valves shall be provided for over-pressure protection. Valves shall have flanged-end connections except for valves 1" and smaller.

5-06.4 CIRCUIT SETTER TYPE VALVES:

These valves shall be calibrated cast iron with bronze disc valve equipped with readout valves. Each readout valve shall be fitted with an integral check valve designed to protect the user from being wetted when setting up to monitor flow. An integral pointer shall register degree of valve opening. Each balance valve to be constructed with internal seals to prevent leakage around rotating element.

The Contractor shall arrange for the Read-out kit specified by the manufacturer for balancing flow through the valves without any additional cost.

5-06.5 STRAINER:

Approved strainers shall be fitted in the suction line of pumps, at make-up connections and at each automatic control valve of all apparatus of an automatic character whose proper functioning would be interfered by dirt on the seat, or by scoring of the seat. All strainers shall be pressure tested at works.

All strainers shall be cast iron or bronze bodies of ample strength for the pressure to which they shall be subjected and with suitable flanges or tapings to connect with the piping they serve.

Strainer basket screens shall be stainless steel and shall be of ample strength to prevent collapsing the basket under shock loading. Perforations shall be in accordance with the following table:

Pipe Size	Perforation Size (inch)	Number of Perforations per sq. in.
All Sizes	3/64	225

Valve dirt blow-out connection suitably piped to the nearest floor drain.

5-07 AIR VENTS:

Wherever possible, all water pipe work systems shall have manual venting at all high points in the system. Where this is not possible an automatic air vent shall be fitted and connected to the nearest drain. Air vents shall be of the flat type,

and of appropriate sizes and working pressures. They shall be fitted with a suitably sized gate type lock shield valve. Manual vents shall be fitted with hose-nozzles.

5-08 FLEXIBLE PIPE CONNECTORS:

Flexible connectors shall be provided wherever pipes cross building expansion joints, at suction and discharge side of each pump and at connections to chillers, and/or wherever shown on the Drawings. These connectors shall be such that the working pressure, temperature and movement encountered will not be more than 75% of that allowable for the joint. One side of joints must have all piping and/or adjacent equipment adequately anchored. The other side must be supported, aligned and guided so as to allow free movement without imposing unnecessary stresses on the joints.

Connectors shall have integral duct and rubber flanges. They shall have individual solid steel ring reinforced with a carcass of highest grade woven cotton or acceptable synthetic fiber. Joints shall be constructed to pipeline size and to meet working pressures, conditions and face measurements as designated. They shall be of archetype construction with the number of arches (corrugations) dependent of the projected movement. All joints must be finish-coated with suitable paint to prevent ozone attack. Split back-up (or retaining) rings shall be furnished and fitted.

5-09 THERMAL EXPANSION JOINT:

Thermal expansion joint bellows shall be fully annealed type 321 stainless steel sheet stock rolled into a tube and seam welded with latest technology in forming the corrugations. The bellows shall be designed to take linear thermal expansion as well as axial load.

The end connections will be fixed flanged type and shall be of stainless steel conforming to ANSI dimensions welded directly to the integral ends of the bellows.

The thermal expansion bellows shall be designed to absorb the thermal expansion of at least +50 mm and working pressure of 16 bars.

SECTION 6 - INSULATION

6-01 GENERAL

6-01.1 The Contractor shall provide insulation for the services and equipment specified hereafter. Insulation shall be as per following Insulation Schedule.

6-01.2 Insulation material shall be complete with vapor barrier protection covering and jacketing (where specified), adhesives, insulation tape, duct sealer and/or sealing tape, fastening material and jacketing.

6-01.3 Identification bands shall be painted on insulation at frequent intervals. Lettering shall be agreed with the Engineer.

All exposed insulation is to be painted to approve colors with one undercoat and one finishing coat of enamel paint. All steel work and other steel equipment specified to be insulated shall be thoroughly wire brushed to the satisfaction of the Engineer and painted with one coat black cold asphalt paint before insulation is applied.

6-02 INSULATION SCHEDULE

Insulation Schedule					
Sr. No.	Services	Thick-ness (Inch)	Insulation Type	Vapour Barrier	Protection
a)	Indoor supply/return duct				
i)	Exposed to vision and plant rooms	2	Glass fiber blanket	Reinforced aluminum foil	4-Oz canvas with water proof paint. GI. sheet metal jacketing.
ii)	AHU rooms	2	Glass fiber blanket	Reinforced aluminum foil	4-Oz canvas with water proof paint.
b)	Supply ducts, up to 10 feet from fan discharge and sheet metal air plenums	1	Acoustic liner applied inside with outside insulation as 6-02 (a)	Same as 6-02 (a)	
c)	Chilled/hot water piping, fitting valves & specialties				
i)	AHU rooms	See 6-02(d)	Sectional glass fiber	Reinforced aluminum foil	4-Oz canvas with water proof paint.

d)	Insulation thickness if not specified above shall be as under:				
i)	Water pipe	Up to 2"	--	--	1" thick
		2-1/2" to 5"			2" thick
		6" and above			2-1/2" thick
ii)	Valves and other specialties	Thickness shall be same as applied to connected pies.			--

6-03 INSULATION MATERIALS

6-03.1 Duct Insulation

Insulation material for ducts and sheet metal air plenums shall be flexible glass fiber, 1.0 lbs/cu.ft. Density and maximum conductivity of 0.27 Btu/hr.sq.ft./inch at 75 deg F

6-03.2.1 Piping Insulation

Piping insulation shall be sectional glass fiber as specified above in Insulation Schedule, bounded to conform to the pipe. All glass fiber pipe insulation shall have a density at least 4 lb/cu.ft. and maximum conductivity of 0.27 Btu/hr.sq.ft.oF/inch at 75 Deg F.

6-03.2.2 Vapour Barrier for Duct and Pipe Insulation

Vapour barrier when specified shall be factory applied flame retardant reinforced aluminum foil, 0.02 mils thick

6-03.2.3 Acoustic liner Material

Acoustic liner shall be 1.5 lbs/cu.ft. Density fiber-glass with neoprene scrim on inside surface and thermal conductivity value shall not exceeding 0.27 Btu/hr.sft oF /inch at 75 Deg F. Material shall conform to TIMA Standard AHC-101-1975 with latest revisions

6-03.2.4 Canvas

4 Oz or 8 Oz per square yard as specified in Insulation Schedule.

6-03.2.5 Jacket

24 gauge (US) galvanized steel sheet or aluminum sheet.

6-03.2.6 Water & Rat Proof Paint

As approved by the Engineer.

6-03.2.7 Wire Netting

1" hexagonal mesh, 20 gauge (US), galvanized.

6-03.2.8 Banding

1/2" x 1/48" galvanized steel or aluminum bands.

6-03.2.9 Insulation Tape

Insulation tape for joints shall be of aluminum foil type, 2 inch wide, equivalent to Scotch No.473.

6-03.2.10 Adhesive

Adhesive for thermal insulation shall comply with ASTM Standard C 916-79 or equivalent. Adhesive for acoustic liner shall comply TIMA Standard AHC-101-1975 or equivalent.

6-03.2.11 Duct Sealer

Sealer for duct joints shall be butyl rubber caulking, weather proof and water resistant, conforming to U.S. Federal Specification TT-S-001657 Type 1, as manufactured by Woodmont Products, INC, USA, or approved equal.

6-03.2.12 Duct Sealing Tape

Duct sealing tape shall be 3 inch wide self-adhesive vinyl cloth tape.

6-04 INSULATION APPLICATION

6-04.1 General

All Thermal and acoustic insulating materials shall be installed as specified hereinafter.

Insulation shall be installed in a smooth, clean, workmanlike manner and joints shall be tight and finished smooth.

All surfaces to be insulated shall be dry and free from loose scale, dirt, oil or water when insulation is applied. Insulation shall be applied in such a manner that there will be no air circulation within the insulation or between the insulation and the surface to which it is applied.

Surface imperfections in the insulation such as clipped edges, small joints or cracks and small voids, or holes not over 1 inch square shall be filled with like insulating material.

Where a vapour barrier is fixed on site it shall be fixed in such a manner as to

obviate the possibility of moisture penetration. It shall be fixed where required by means of an approved type bituminous compound or approved equal for tightness.

Insulation for all services shall only be applied until after testing and approval for tightness obtained from the Engineer, unless otherwise instructed in writing by the Engineer.

Insulation for all services shall be continued through sleeves. The insulation on exposed risers shall extend through the floor. Where insulated pipes are indicated on drawings as embedded in the thickness of walls, the insulation thickness may be reduced to 1 inch only.

Insulation is to be applied where indicated on the drawings or called for in these specifications.

SECTION 7-INSPECTION TESTING AND COMMISSIONING

7-01 GENERAL

- 7-01.1** The whole of the works supplied under this Contract shall be subject to inspection and tests by the Employer and/or Engineer should he so require, during manufacturing erection and after completion. The inspection and tests shall include, but not be limited to, the requirements of this Section of the Specifications.
- 7-01.2** For this purpose the Engineer shall, at all reasonable times, be allowed free and ready access to the Contractor's shop and the shops of his suppliers for the purpose of inspecting the specified equipment components, or any other parts, and obtaining information as to the progress of the work. Failure on the part of the Engineer at this or any other time, to discover or reject materials or work which do not meet specified requirements shall not be deemed an acceptance thereof nor a waiver of defects therein.
- 7-01.3** Specific tests required by the various items of the Plant, Parts, materials and equipment shall be treated in accordance with the specifications of the corresponding clauses of the Specifications.
- 7-01.4** The Contractor shall submit to the Engineer, one month prior to the date of commencement of the balancing and performance tests, six (6) copies of the complete test procedure. The procedure, method and points of measurement as well as the method of calculation shall be approved by the Engineer before any test is carried. Six (6) copies of the test results shall be furnished to the Engineer for his approval.
- 7-01.5** The Contractor shall supply all necessary testing and balancing instruments, which shall include the instruments to carry out any test of any kind on a piece of equipment, apparatus part of system or on a complete system if the Engineer requests such a test for determining specified or guaranteed data, as given in the Specifications or in the Schedule of Equipment. Necessary skilled staff shall be provided by Contractor.
- 7-01.6** Any damage resulting from the test shall be repaired and/or damaged material replaced with intimation to the Engineer, all to the satisfaction of the Engineer, and at no extra cost to the Employer. Skilled staff shall again be provided by the Contractor.
- 7-01.7** In the event of any repair or any adjustment having to be made, other than normal running adjustment, the tests shall be void and shall be recommenced after the adjustment or repairs have been completed.
- 7-01.8** All testing, balancing and final adjustment shall be in accordance with the provision of the applicable ASHRAE Standards, or other approved relevant standards.
- 7-01.9** The Contractor shall test a piece of equipment, apparatus, parts of system or a

complete system in accordance with method and Schedule of Tests provided by the Engineer to determine Specified or Guaranteed data, given in the Specifications, Schedule of Equipment and Contractor's Data Sheets.

7-01.10 The contractor shall be responsible for carrying out tests on the material/equipment/installation furnished by him.

7-02 PRELIMINARY INSPECTION & TESTS

7-02.1 General

All equipment shall be inspected and tested to determine the completeness and general conformance to specified requirements, when operated independent of overall HVAC System, for noise, vibration and electrical data.

7-02.2 Equipment

All HVAC equipment shall be inspected for visible damage, operation of moving parts, noise and vibration. Tests shall be carried out with readings of RPM, ampere, voltage, etc. to verify the name plate data.

7-03 BALANCING AND COMMISSIONING

7-03.1 Commissioning

Upon completion of air balancing and when the whole or part of HVAC System is substantially complete and ready for operation as specified, the Contractor shall carry out Commissioning. Appropriate Seasons are not necessary and the purpose of the commissioning is to start-up the whole or part of HVAC System with manual and/or automatic controls and to put the whole or part of HVAC system in operation to make it ready to provide cooling and/or heating.

7-04 PERFORMANCE TESTS

Each equipment of HVAC system shall be tested for performance after successful completion of Commissioning of that equipment to determine the Specified and Guaranteed Data at Specified Operating Conditions as shown in Equipment Schedule and Specifications. These tests shall be carried out in appropriate seasons.

The test data shall not deviate by more than five percent (5%) from the guaranteed capacity data.

Should any part of the apparatus or system fail to meet the specification requirements, it shall be adjusted, repaired or replaced to the satisfaction of the Engineer by the Contractor at his own cost. The complete Performance Test shall than be repeated.

7-05**RELIABILITY TRIAL TEST**

After completing the above Preliminary Tests, adjustments, Commissioning and Performance Tests, the Contractor shall carry out Reliability Trial Tests for the whole or part of system.

The trial tests, both for summer and winter, shall last for a period of 5 consecutive days during which time the whole or part of the system, as the case may be, shall operate continuously without major adjustment or repair to the satisfaction of the Engineer.

Should any part of the apparatus or system fail to operate continuously as specified, it shall be adjusted, repaired or replaced to the satisfaction of the Engineer and the Reliability Trial Tests shall be repeated for another 5 consecutive days for continuous operation without major adjustment or repair.

EQUIPMENT SCHEDULE

REPLACEMENT, SUPPLY, INSTALLATION, TESTING & COMMISSIONING OF FIFTEEN (15) Nos. AIR HANDLING UNITS AT NESPAK HOUSE, LAHORE

AIR HANDLING UNITS (GENERAL)

EQUIPMENT SCHEDULE
SHEET 01 OF 02

CODE	TYPE	SECTION CONFIGURATION	SUPPLY FAN			OUTDOOR AIR (OA) (CFM)	RETURN AIR (RA) (CFM)	DISC ARR.	CONNECTION SIDE (FACING SUPPLY END) SEE NOTE 3			REFER TO SCHEDULE OF CCHC.	REF TO SCH. MXB.
			CFM	EXT SP (IN)	MAX OV. (FPM)				POWER	COIL	FILTER REMOVAL		
												4	5
AHU-1 (G-1)	DOUBLE SKIN SINGLE ZONE, HDT, FLOOR MOUNTED,	MXB-FF-CCHC-FAN	12035	1.5	2000	1805	10230	TD	-	-	-	1	1
AHU-2 (G-3)	DOUBLE SKIN SINGLE ZONE, HDT, FLOOR MOUNTED,	MXB-FF-CCHC-FAN	9520	1.5	2000	1428	8092	TD	-	-	-	2	2
AHU-3 (F-1)	DOUBLE SKIN SINGLE ZONE, HDT, FLOOR MOUNTED,	MXB-FF-CCHC-FAN	11008	1.5	2000	1431	9577	TD	-	-	-	3	3
AHU-4 (S-2)	DOUBLE SKIN SINGLE ZONE, HDT, FLOOR MOUNTED,	MXB-FF-CCHC-FAN	7830	1.5	2000	861	6969	TD	-	-	-	4	4
AHU-5 (S-4)	DOUBLE SKIN SINGLE ZONE, HDT, FLOOR MOUNTED,	MXB-FF-CCHC-FAN	7723	1.5	2000	695	7028	TD	-	-	-	5	5
AHU-6 (T-1)	DOUBLE SKIN SINGLE ZONE, HDT, FLOOR MOUNTED,	MXB-FF-CCHC-FAN	2352	1.5	2000	212	2140	TD	-	-	-	6	6
AHU-7 (T-2)	DOUBLE SKIN SINGLE ZONE, HDT, FLOOR MOUNTED,	MXB-FF-CCHC-FAN	2060	1.5	2000	268	1792	TD	-	-	-	7	7

AHU-8 (T-3)	DOUBLE SKIN SINGLE ZONE, HDT, FLOOR MOUNTED,	MXB-FF-CCHC-FAN	2200	1.5	2000	330	1870	TD	-	-	-	8	8
AHU-9 (T-4)	DOUBLE SKIN SINGLE ZONE, HDT, FLOOR MOUNTED,	MXB-FF-CCHC-FAN	2200	1.5	2000	286	1914	TD	-	-	-	9	9
AHU-10 (GL-1)	DOUBLE SKIN SINGLE ZONE, HDT, FLOOR MOUNTED,	MXB-FF-CCHC-FAN	2680	1.5	2000	295	2385	TD	-	-	-	10	10
AHU-11 (PH-1)	DOUBLE SKIN SINGLE ZONE, VDT, FLOOR MOUNTED,	MXB-FF-CCHC-FAN	1847	1.5	2000	277	1570	TD	-	-	-	11	11
AHU-12 (PH-2)	DOUBLE SKIN SINGLE ZONE, VDT, FLOOR MOUNTED,	MXB-FF-CCHC-FAN	1847	1.5	2000	240	1607	TD	-	-	-	12	12
AHU-13 (TC-1)	DOUBLE SKIN SINGLE ZONE, VDT, FLOOR MOUNTED,	MXB-FF-CCHC-FAN	3670	1.5	2000	404	3266	TD	-	-	-	13	13
AHU-14 (MC-1)	DOUBLE SKIN SINGLE ZONE, HDT, FLOOR MOUNTED,	MXB-FF-CCHC-FAN	3000	1.5	2000	390	2610	TD	-	-	-	14	14
AHU-15 (MC-2)	DOUBLE SKIN SINGLE ZONE, HDT, FLOOR MOUNTED,	MXB-FF-CCHC-FAN	3000	1.5	2000	330	2670	TD	-	-	-	15	15

LEGEND:

CFM = CUBIC FEET/MINUTE
HDT = HORIZONTAL DRAW THRU
TH = TOP HORIZONTAL
UB = UP BLAST
VDT = VERTICAL DRAW THRU
OV = OUTLET VELOCITY
FD = FRONT DISCHARGE
TD = TOP DISCHARGE

CC = COOLING- COIL
HUM = HUMIDIFIER
MXB = MIXING BOX
EC = ELECTRIC HEATING COIL
F.F = FLAT FILTER BOX WITH HIGH VELOCITY FILTER
FPM = FEET PER MINUTE
WS = WATER SPRAY (NOZZLE) WITH REVERSE OSMOSIS SYSTEM
S = STEAM HUMIDIFIER

NOTES:

1. FAN SHOULD BE SELECTED FOR TOTAL SP= ESP+AHU SP + FILTER PRESSURE LOSS (AVG. OF MFR RECOMMENDED DIRTY & CLEAN FILTER)
2. MOTOR HP SHALL BE AT LEAST 120% OF REQUIRED BHP.

REPLACEMENT, SUPPLY, INSTALLATION, TESTING & COMMISSIONING OF FIFTEEN (15) Nos. AIR HANDLING UNITS AT NESPAK HOUSE, LAHORE

AIR HANDLING UNITS (COILS)

EQUIPMENT SCHEDULES
SHEET 02 OF 02

CODE	INSTALLED IN	MAX. COIL FV FPM	COOLING (AIR SIDE)				COOLING (WATER SIDE)				HEATING (AIR SIDE)		HEATING (WATER SIDE)			
			TH (MBH)	EDB deg F	EWB deg F	SH (MBH)	EWT deg F	LWT deg F	MAX.FLOW RATE USGPM	MAX. PD FT.WG	TH (MBH)	EWT deg F	LWT deg F	MAX.FLOW RATE USGPM	MAX. PD FT.WG	
1	2	3	4	5	7	8	9	10	11	12	13	14	15	16	17	
CCHC-1	AHU-1	500	333.0	76.9	65.0	283.1	44.0	54	67	20	149.9	140	-	15	20	
CCHC-2	AHU-2	500	257.0	76.9	65.0	218.5	44.0	54	51	20	115.7	140	-	12	20	
CCHC-3	AHU-3	500	278.0	76.9	65.0	236.3	44.0	54	56	20	125.1	140	-	13	20	
CCHC-4	AHU-4	500	253.0	76.9	65.0	215.1	44.0	54	51	20	113.9	140	-	11	20	
CCHC-5	AHU-5	500	226.0	76.9	65.0	192.1	44.0	54	45	20	101.7	140	-	10	20	
CCHC-6	AHU-6	500	94.0	76.9	65.0	79.9	44.0	54	19	20	42.3	140	-	4	20	
CCHC-7	AHU-7	500	78.0	76.9	65.0	66.3	44.0	54	16	20	35.1	140	-	4	20	
CCHC-8	AHU-8	500	88.0	76.9	65.0	74.8	44.0	54	18	20	39.6	140	-	4	20	
CCHC-9	AHU-9	500	84.0	76.9	65.0	71.4	44.0	54	17	20	37.8	140	-	4	20	
CCHC-10	AHU-10	500	100.0	76.9	65.0	85.0	44.0	54	20	20	45.0	140	-	5	20	
CCHC-11	AHU-11	500	74.0	76.9	65.0	62.9	44.0	54	15	20	33.3	140	-	3	20	
CCHC-12	AHU-12	500	74.0	76.9	65.0	62.9	44.0	54	15	20	33.3	140	-	3	20	
CCHC-13	AHU-13	500	144.0	76.9	65.0	122.4	44.0	54	29	20	64.8	140	-	6	20	
CCHC-14	AHU-14	500	85.0	76.9	65.0	72.3	44.0	54	17	20	38.3	140	-	4	20	
CCHC-15	AHU-15	500	85.0	76.9	65.0	72.3	44.0	54	17	20	38.3	140	-	4	20	

LEGEND:

CCHC COMBINATION COOLING-HEATING COIL
CFM CUBIC FEET PER MINUTE
FPM FEET PER MINUTE
SH COIL SENSIBLE HEAT
TH COIL TOTAL HEAT
USGPM UNITED STATES GALLON PER MINUTE

EAT ENTERING AIR TEMPERATURE
EDB ENTERING DRY BULB TEMPERATURE
EWB ENTERING WET BULB TEMPERATURE
EWT ENTERING WATER TEMPERATURE
LAT LEAVING AIR TEMPERATURE
LWT LEAVING WATER TEMPERATURE

NOTES:

1. THE COIL ROWS SHALL BE MAXIMUM 8 NOS.

BILL OF QUANTITIES
ANNEXURE-I
(10 NO. PAGES)

**REPLACEMENT, SUPPLY, INSTALLATION, TESTING & COMMISSIONING OF
FIFTEEN (15) Nos. AIR HANDLING UNITS AT NESPAK HOUSE, LAHORE
HVAC WORKS**

SUMMARY

Item no.	Item Description	Total Amount
1	BILL OF QUANTITIES (1) (BOQ-1)	
2	BILL OF QUANTITIES (2) (BOQ-2)	
3	TOTAL ((BOQ-1)-(BOQ-2))	
4	DISCOUNT (IF ANY)	
5	BID PRICE (3-4)	
6	SALES TAX	
7	TOTAL BID PRICE (5+6)	

IN WORDS : RUPEES _____

Signature of Signatory to Bid _____

**REPLACEMENT, SUPPLY, INSTALLATION, TESTING & COMMISSIONING OF FIFTEEN (15) Nos. AIR HANDLING UNITS AT NESPAK HOUSE, LAHORE
HVAC WORKS
BILL OF QUANTITIES (1)**

ITEM NO.	DESCRIPTION OR CODE	UNIT	QTY	UNIT RATES (PKR)	TOTAL AMOUNT (PKR) COL 4 x COL 5
1	2	3	4	5	6
1	SUPPLY, INSTALLATION & ELECTRICAL CONNECTIONS OF AIR HANDLING UNITS AS PER SCHEDULE ,SPECIFICATIONS COMPLETE IN ALL RESPECT. SAFE HANDLING & SHIFTING TO DESIGNATED AHU ROOM.				
	a) AHU-1	EACH	1		
	b) AHU-2	EACH	1		
	c) AHU-3	EACH	1		
	d) AHU-4	EACH	1		
	e) AHU-5	EACH	1		
	f) AHU-6	EACH	1		
	g) AHU-7	EACH	1		
	h) AHU-8	EACH	1		
	i) AHU-9	EACH	1		
	j) AHU-10	EACH	1		
	k) AHU-11	EACH	1		
	l) AHU-12	EACH	1		
	m) AHU-13	EACH	1		
	n) AHU-14	EACH	1		
	o) AHU-15	EACH	1		
2	SUPPLY & INSTALLATION OF SHEET METAL DUCT WORK, ACCESSORIES, HANGERS SUPPORTS AND FITTING AS PER SEPCIFICATIONS.				
	b) U.S GUAGE 22	SFT	9000		

**HVAC WORKS
BILL OF QUANTITIES (1)**

ITEM NO.	DESCRIPTION OR CODE	UNIT	QTY	UNIT RATES (PKR)	TOTAL AMOUNT (PKR) COL 4 x COL 5
1	2	3	4	5	6
3	SUPPLY & INSTALLATION OF FLEXIBLE RECTANGULAR DUCT CONNECTORS FOR COMPLETE SYSTEM WITH ACCESSORIES & FITTINGS AS PER SPECIFICATION (COMPLETE IN ALL RESPECTS).				
	a) FLEXIBLE DUCT CONNECTION (RECTANGULAR)	SFT	600		
4	SUPPLY & INSTALLATION OF INSULATION FOR INDOOR SUPPLY/FRESH/RETURN AIR DUCT EXPOSED TO VISION WITH ACCESSORIES & FITTINGS AS PER SPECIFICATION (COMPLETE IN ALL RESPECTS).	SFT	9000		
5	SUPPLY & INSTALLATION OF ACOUSTIC SOUND LINER INSULATION FOR INDOOR SUPPLY/RETURN AIR DUCT PLENUMS WITH ACCESSORIES & FITTINGS AS PER SPECIFICATION (COMPLETE IN ALL RESPECTS).	SFT	4500		
6	SUPPLY & INSTALLATION OF INSULATION FOR CHILLED/HOT WATER PIPING FITTING INCLUDING FITTING & ACCESSORIES.				
	a-1) DIA 40	RFT	405		
	a-2) DIA 50	RFT	90		
	a-3) DIA 65	RFT	180		
7	SUPPLY & INSTALLATION OF DAMPERS FOR COMPLETE SYSTEM WITH ACCESSORIES & FITTINGS AS PER SPECIFICATION (COMPLETE IN ALL RESPECTS).				
	a) Volume Control Damper	SFT	50		
8	SUPPLY AND INSTALLATION OF PIPE, FITTINGS INCLUDING HANGERS, ANCHOR BOLTS, RUBBER VIBRATION MOUNTS ETC. COMPLETE IN ALL RESPECT.				
	PIPPING, FITTING AND ACCESSORIES SEAMLESS STEEL (SCHEDULE 40)				
	a-1) DIA 40	RFT	405		
	a-2) DIA 50	RFT	90		
	a-3) DIA 65	RFT	180		
	b) GALVANISED STEEL (DRAIN)				
	DIA 25	RFT	180		

**HVAC WORKS
BILL OF QUANTITIES (1)**

ITEM NO.	DESCRIPTION OR CODE	UNIT	QTY	UNIT RATES (PKR)	TOTAL AMOUNT (PKR) COL 4 x COL 5
1	2	3	4	5	6
9	SUPPLY & INSTALLATION OF VALVES AND SPECIALTIES AS PER SPECIFICATION COMPLETE IN ALL RESPECT.				
	GATE VALVES				
	a-1) DIA 40	Each	18		
	a-2) DIA 50	Each	4		
	a-3) DIA 65	Each	8		
	BALANCING VALVES				
	b-1) DIA 40	Each	9		
	b-2) DIA 50	Each	2		
	b-3) DIA 65	Each	4		
	DRAIN COCKS				
	c) DIA 32	Each	15		
	STRAINER				
	d-1) DIA 40	Each	9		
	d-2) DIA 50	Each	2		
	d-3) DIA 65	Each	4		
10	SUPPLY & INSTALLATION OF INSTRUMENTS AND GAUGES AS PER SPECIFICATIONS COMPLETE IN ALL RESPECT.				
	a) Temperature Guage	Each	30		
	b) Pressure Guage	Each	30		
11	ADJUSTMENT IN EXISTING CIVIL WORKS OF FOUNDATION OF AHU's AS PER MANUFACTURER DRAWINGS. ALL RELATED CIVIL WORKS / ADDITIONAL SUPPORT ARE INCLUSIVE.	LOT	1		
12	FACTORY INSPECTION TEST AS PER CLAUSE NO.2-02.1.1 (TESTING) GIVEN IN TECHNICAL PROVISION	LOT	1		
13	STARTUP, ADJUSTMENT, BALANCING, TESTING AND COMMISSIONING OF OVERALL SYSTEM	LOT	1		

TOTAL (BOQ-1) RS = -

IN WORDS : RUPEES _____

**REPLACEMENT, SUPPLY, INSTALLATION, TESTING & COMMISSIONING OF FIFTEEN (15) Nos. AIR HANDLING UNITS AT NESPAK HOUSE, LAHORE
HVAC WORKS
BILL OF QUANTITIES (2)**

ITEM NO.	DESCRIPTION OR CODE	UNIT	QTY	UNIT RATES (PKR)	TOTAL AMOUNT (PKR) COL 4 x COL 5
1	2	3	4	5	6
1	DISMENTALLING, REMOVAL & BUY BACK OF EXISTING AIR HANDLING UNITS				
	a) AHU-1 (10465 CFM) (G-1)	EACH	1		
	b) AHU-2 (8061 CFM) (G-3)	EACH	1		
	c) AHU-3 (9572 CFM) (F-1)	EACH	1		
	d) AHU-4 (6800 CFM) (S-2)	EACH	1		
	e) AHU-5 (6564 CFM) (S-4)	EACH	1		
	f) AHU-6 (2045 CFM) (T-1)	EACH	1		
	g) AHU-7 (1790 CFM) (T-2)	EACH	1		
	h) AHU-8 (1914 CFM) (T-3)	EACH	1		
	i) AHU-9 (1914 CFM) (T-4)	EACH	1		
	j) AHU-10 (2401 CFM) (GL-1)	EACH	1		

**HVAC WORKS
BILL OF QUANTITIES (2)**

ITEM NO.	DESCRIPTION OR CODE	UNIT	QTY	UNIT RATES (PKR)	TOTAL AMOUNT (PKR) COL 4 x COL 5
1	2	3	4	5	6
	k) AHU-11 (1608 CFM) (PH-1)	EACH	1		
	l) AHU-12 (1608 CFM) (PH-2)	EACH	1		
	m) AHU-13 (3192 CFM) (TC-1)	EACH	1		
	n) AHU-14 (2607 CFM) (MC-1)	EACH	1		
	o) AHU-15 (2607 CFM) (MC-2)	EACH	1		
2	DISMANTLING, REMOVAL & BUY BACK OF EXISTING ALL GI DUCTING & ACCESSORIES. ASSOCIATED WITH ABOVE MENTIONED AHU'S IN AIR HANDLING UNIT ROOMS ONLY.	LOT			
3	DISMANTLING, REMOVAL & BUY BACK OF EXISTING DAMPERS FOR COMPLETE SYSTEM WITH ACCESSORIES & FITTINGS. ASSOCIATED WITH ABOVE MENTIONED AHU'S IN AIR HANDLING UNIT ROOMS ONLY.	LOT			
4	DISMANTLING, REMOVAL & BUY BACK OF EXISTING MS PIPE (SCHEDULE 40). ASSOCIATED WITH ABOVE MENTIONED AHU'S IN AIR HANDLING UNIT ROOMS ONLY.	LOT			
5	DISMANTLING, REMOVAL & BUY BACK OF EXISTING PIPING, FITTING AND ACCESSORIES SEAMLESS STEEL (SCHEDULE 40). ASSOCIATED WITH ABOVE MENTIONED AHU'S IN AIR HANDLING UNIT ROOMS ONLY.	LOT			
6	DISMANTLING, REMOVAL & BUY BACK OF EXISTING VALVES AND SPECIALTIES AS PER SPECIFICATION COMPLETE IN ALL RESPECT. ASSOCIATED WITH ABOVE MENTIONED AHU'S IN AIR HANDLING UNIT ROOMS ONLY.	LOT			
7	DISMANTLING, REMOVAL & BUY BACK OF EXISTING INSTRUMENTS AND GAUGES AS PER SPECIFICATIONS COMPLETE IN ALL RESPECT. ASSOCIATED WITH ABOVE MENTIONED AHU'S IN AIR HANDLING UNIT ROOMS ONLY.	LOT			

TOTAL (BOQ-2) RS = -

IN WORDS : RUPEES _____