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# THE DAILY IBRAT Hyderabad

روزاني

عڪبر

حيدرآباد

66<sup>th</sup>  
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1958-2024

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Daily Ibrat Hyderabad Thursday 11th January 2024





# پروجیکٹ امپلیمینٹیشن یونٹ سنڌ فارینسڪ سائنسز لیبارٹری کراچی ہوم ڈیپارٹمنٹ، گورنمنٹ آف سنڌ

## پری-بڈ میٹنگ نوٹیس واڌارو #1

ٽینڊر نوٹیس گھریل آھی (این آءِ ٽی) جیکو شایع ٿیو مختلف اخبارن ۾ (جنگ، ڊان، ڪاوش) تاریخ 04 جنوری، 2024 تي "سپلائی، انسٽالیشن، ٽیسٽنگ ۽ ڪمیشننگ آف ہیٽنگ، وینٽیلیشن اینڊ ایئر ڪنڊیشننگ (HVAC) ورڪس ایت سنڌ فارینسڪ سائنس لیبارٹری کراچی" جنهن بابت دلچسپی رکندڙ واک ڏیندڙن کي اطلاع ٿو کجي ته هیٺ ڄاڻايل ایڊیشنز کیون ویون آهن ٽینڊر دستاويز ۽ این آءِ ٽی ۾.

پروجیکٹ امپلیمینٹیشن یونٹ، SFSL آفیس ارنج ڪئی آھی پری بڈ میٹنگ مٿی ڄاڻايل ٽینڊر نوٹیس بابت ایت پروجیکٹ سائیتس (لوکیشن جی اسڪین لاءِ). جنهن جا تفصیل هیٺ ڏجن ٿا.

1. دلچسپی رکندڙ واک ڏیندڙن کي گذارش ٿی کجي ته پری بڈ میٹنگ ۾ حاضر ٿین تاریخ 17 جنوری، 2024 اربع ڏینهن منجهند 12:00 وڳي ایت سنڌ فارینسڪ لیبارٹری پراجیکٹ سائیت "دیھ جورجی، لنڪ روڊ (ایسٽرن باءِ پاس) بن قاسم ٿاڻون کراچی (اسڪین QR ڪوڊ سائید لوکیشن لاءِ).
2. لاڳاپیل ٽینڊر دستاويز (والیوم-1 پوسٽ ڪوالیفیکیشن دستاويز، والیوم-II بڊنگ ۽ ڪانٽریڪٽ دستاويز، والیوم-III ٽینڊر ڊرائنگس) موجود آهن سیپرا جی ویب سائیت: <http://www.pprasindh.gov.pk> یا [www.sfs.gov.pk](http://www.sfs.gov.pk) جی ویب سائیت تی. جیکي پڻ [ppms.pprasindh.gov.pk/PPMS](http://ppms.pprasindh.gov.pk/PPMS) یا [www.sfs.gov.pk](http://www.sfs.gov.pk) جی ویب سائیت: [www.sfs.gov.pk](http://www.sfs.gov.pk) جی ویب سائیت تی. جیکي پڻ وصول ڪری سگھجن ٿا آفیس آف پراجیکٹ ڪنسلٽنٽ (میسرز NESPAK جی آفیس مان ایڊریس: پروجیکٹ ڪنسلٽنٽ میسرز NESPAK فورٽ فلور، NICL بلڊنگ عباسی شهید روڊ شاهراه فیصل، کراچی (021-9925430-34)، 20000 روپین جی ادائگی تی جیکي پی آرڊر جی صورت ۾ هئڻ گھرجن. (ٽینڊر فی لازمی طور شامل هئڻ گھرجی).

بیا سمورا شرط ۽ ضابطا این آءِ ٽی ۽ ٽینڊر دستاويز بابت ساڳیا رهندا، وڌیک معلومات لاءِ رابطو ڪریو: فوکل پرسن: محترم راشد حسین 0301-2226694 ۽ مسٽر ابرار احمد 0307-3849942.

### پروجیکٹ ڊائریڪٽر

پروجیکٹ امپلیمینٹیشن یونٹ، سنڌ فارینسڪ سائنس لیبارٹری کراچی

INF-KRY.NO.70/2024

**SAY NO TO CORRUPTION**

پڙھڻي سنڌ ته ..... وڌندي سنڌ



8 NATIONAL

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THE NEWS

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Thursday, January 11, 2024





**PROJECT IMPLEMENTATION UNIT  
SINDH FORENSIC SCIENCE LABORATORY KARACHI  
HOME DEPARTMENT  
GOVERNMENT OF SINDH**



**PRE-BID MEETING NOTICE**

**ADDENDUM # 1**

Kindly refer to the Notice Inviting Tender (NIT) published in National Daily Newspapers (Jang/Dawn/Kawish) on January 4, 2024 for "Supply, Installation, Testing & Commissioning of Heating, Ventilation & Air Conditioning (HVAC) Works at Sindh Forensic Science Laboratory, Karachi". In this regard interested Bidders are requested to further note down the following information in addition to respective NIT & Tender Documents.

Project Implementation Unit, SFSL office has arrange a Pre-Bid Meeting on the subject tender at the Project Site (scan for location) as per below details:

1. Interested bidders are invited to attend Pre-Bid Meeting scheduled at 12 Pm on Wednesday January 17, 2024 at Sindh Forensic Laboratory project site "Deh Joreji, Link Road (Eastern Bye Pass) Bin Qasim Town, Karachi" (Scan the QR Code for Site Location).
2. Relevant Tender Documents (Volume-I Post Qualification Documents, Volume-II Bidding & Contract Documents Volume-III Tender Drawings) are available for downloading at SPPRA website <http://www.pprasindh.gov.pk> or [ppms.pprasindh.gov.pk/PPMS](http://ppms.pprasindh.gov.pk/PPMS) or SFSL website [www.sfsl.gos.pk](http://www.sfsl.gos.pk) and can also be collected from the office of the Project Consultant (M/s NESPAK – Address : Project Consultant M/s NESPAK, 4th Floor, NICL Building, Abbasi Shaheed Road off Shahrah-e-Faisal, Karachi (021-9925430-34) upon Non-Refundable payment in the shape of pay order of Rs. 20,000/- (Submission of Tender Fee is compulsory).

Other Terms & Conditions, specified in NIT & Tender Documents, remains same. For any further query, contact focal persons Mr. Rashid Hussain 0301-2226694 or Mr. Ibrar Ahmed 0307-3849942.



Scan for Location

Project Director  
Project Implementation Unit, Sindh Forensic Science Laboratory Karachi

INF-KRY-70/2024

ہمے گا سندھ تو ..... ہمے گا سندھ



بانی : میر خلیل الرحمن

روزنامہ  
جنت کراچی

جمعہ 29 / جمادی الثانی 1445 ھ 12 / جنوری 2024ء



پروجیکٹ اپیلی میٹیشن یونٹ  
سندھ فارنسک سائنس لیبارٹری کراچی  
محکمہ داخلہ، حکومت سندھ



پری بڈ میٹنگ نوٹس  
اضافہ نمبر 1

ازراہ کرم سندھ فارنسک سائنس لیبارٹری، کراچی میں ہیٹنگ، ویٹی لیشن اینڈ ایئر کنڈیشننگ (HVAC) ورکس کی فراہمی، تنصیب، ٹیسٹنگ اور کیمپنگ کیلئے 4 جنوری 2024 کو ملکی روزنامہ اخبارات (جنگ/ڈان/کاوش) میں شائع شدہ نوٹس پبلی ٹینڈر (NIT) ملاحظہ کریں اس ضمن میں دلچسپی کے حامل پیشکش دہندگان سے التماس ہے کہ وہ متعلقہ NIT اور ٹینڈر دستاویزات کے علاوہ مندرجہ ذیل معلومات مزید نوٹ کر لیں۔ پروجیکٹ اپیلی میٹیشن یونٹ، SFSL آفس نے ذیل کی تفصیلات کے مطابق پروجیکٹ سائٹ (لوکیشن کیلئے اسکین کر لیں) پر موضوع ٹینڈر پر ایک پری بڈ میٹنگ کا انتظام کیا ہے۔

1- دلچسپی کے حامل پیشکش دہندگان کو بدھ، 17 جنوری 2024 کو بوقت دوپہر 12:00 بجے سندھ فارنسک لیبارٹری پروجیکٹ سائٹ ”دیہہ جورجی، لنک روڈ (ایٹرن بانی پاس) بن قاسم ٹاؤن کراچی میں مقرر پری بڈ میٹنگ میں شرکت کیلئے مدعو کیا جاتا ہے۔

(سائٹ لوکیشن کیلئے QR کوڈ اسکین کریں)

2- متعلقہ ٹینڈر دستاویزات (ولیم-1 پوسٹ کو الیکٹکیشن دستاویزات، ولیم-II بڈنگ و کنٹریکٹ دستاویزات ولیم-III ٹینڈر ڈرائنگز) ڈاؤن لوڈنگ کیلئے SPPRA ویب سائٹ <http://www.pprasindh.gov.pk> یا [ppms.pprasindh.gov.pk](http://ppms.pprasindh.gov.pk) SFSL ویب سائٹ [www.sfsl.gos.pk](http://www.sfsl.gos.pk) پر دستیاب ہیں اور -/20,000 روپے کے پے آرڈر کی شکل میں ناقابل واپسی ادائی پر دفتر پروجیکٹ کنسلٹنٹ (میسرز نیپاک - پتا: پروجیکٹ کنسلٹنٹ میسرز نیپاک، 4th فلور NICL بلڈنگ عباسی شہید روڈ آف شاہراہ فیصل کراچی) سے بھی حاصل کی جاسکتی ہیں (ٹینڈر فیس جمع کرانا لازمی ہے) (021-9925430-34)

NIT اور ٹینڈر دستاویزات میں صراحت کردہ دیگر قواعد و ضوابط وہی برقرار ہیں۔



Scan for Location

مزید کسی استفسار کیلئے فوکل پرسن جناب راشد حسین 0301-2226694 یا

جناب ابرار احمد 0307-3849942 پر رابطہ کریں

لوکیشن کیلئے اسکین کریں

پروجیکٹ ڈائریکٹر

پروجیکٹ اپیلی میٹیشن یونٹ، سندھ فارنسک سائنس لیبارٹری کراچی

(INF/KRY-70/2024)

پڑھے گا سندھ تو۔۔۔۔۔ پڑھے گا سندھ



**PRE-BID MEETING (JANUARY 17, 2024)**  
**SUPPLY, INSTALLATION, TESTING & COMMISSIONING OF HEATING,**  
**VENTILATION & AIR CONDITIONING (HVAC) WORKS AT SINDH FORENSIC**  
**SCIENCE LABORATORY, KARACHI**

**ADDENDUM # 2**

As advised in Addendum # 1, project site visit and Pre-bid meeting was held at Project Site of Sindh Forensic Science Laboratory on January 17, 2024.

During the meeting, bidders raised following queries that were responded in the light of provisions of the bidding documents.

Sr. No.	Query by bidders	Response from Project Consultant M/s NESPAK
1.	Please clarify the Period of Bid Validity.	The Period of Bid Validity stated at Clause 16.1 of Instruction to Bidders and Bidding Data may be read as 90 Days.
2.	Payment Conditions are stringent & would slow down progress.	Provisions of the Bidding Documents shall prevail
3	Fix a lump sum amount for Bid Security instead of specified 2% of bid amount	Provisions of the Bidding Documents shall prevail
4	Provide Equipment Schedule as specified in Table of Contents of Technical Provisions on page ix.	Equipment Schedule is attached as Annex-A of this Addendum/Corrigendum No.2 (Total pages 17)
5	Completion time period should be extended to 24 Months as delivery time for imported equipment would impact the timelines	Provisions of the Bidding Documents shall prevail
6	Please clarify whether proof of Tender Fee of Rs. 20,000/- shall be checked before collection of Bidding Documents or Bidding Documents shall be allowed for submission and afterwards proof of Tender Fee Submission shall be checked.	Tender Fee submission is a mandatory requirement which shall be verified prior to submission of Bids. All prospective bidders are instructed to submit Tender Fee in the form of pay order (in original) on or before 31/01/2024 COB at Office of the Project Consultant (M/s NESPAK Pvt Ltd). No Bids shall be accepted whose Tender Fee is not received as per above mentioned deadline
7	Please clarify Mobilization Advance Payment Condition.	The text of sub-clause 33.14 (a) of Part-II Particular Conditions of Contract is deleted and replaced with following text:  <i>“Ten percent (10%) of Contract value as interest free non-recoverable mobilization advance shall be paid after (i) receipt of an acceptable Performance Security by the Employer in accordance with Sub-</i>

		<p>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 in the prescribed format; and (iv) receipt of Contractor's invoice for advance payment by the Engineer. Mobilization advance payment shall only be released once bank guarantee is counter verified / certified by the issuing Bank / Branch as per approved policy of State Bank of Pakistan.</p> <p>Such advance Payment Guarantee shall be valid until the issuance of Taking Over Certificate (TOC) and shall be returned within Fourteen (14) days after issuance of TOC.</p> <p>In case Contractor does not opt for advance payment, the first payment as specified under sub-clause 33.2 A a) shall be paid as 35% instead of 25% and under sub-Clause 33.2 B a) shall be paid as 70% instead of 60%. Said Payment shall be made without the need of Bank Guarantee."</p> <p>Sub-Clause 33.14 (b) of Part-II Particular Conditions of Contract is deleted in its entirety.</p>
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Please note that non participation in the pre-bid meeting does not restrict any of the prospective bidder(s) from submitting Bids. Bidding process is open for all interested bidders who qualify the criteria as specified in the bidding document.

This Addendum # 2 is the part of Bidding Documents and must be stamp/signed and submitted with the Bids by the bidders.

Other Terms & Conditions, specified in NIT & Bidding Documents, remains the same.



**IBRAR AHMED**  
**Procurement & Contract Management officer**  
**Sindh Forensic Science Laboratory, Karachi**

Encl:

- Addendum No.2: Equipment Schedule (Total pages 17)



**MAIN BUILDING - FORENIC SCIENCE LABORATORY, KARACHI**  
**HOME DEPARTMENT, GOVERNMENT OF SINDH**  
**CHILLERS**  
**(AHRI OR EUROVENT CERTIFIED)**

EQUIPMENT SCHEDULE

SHEET 01 of 17

1	CODE	CH-1-1, CH-1-2 & CH-1-3 (STANDBY)
2	TYPE	ELECTRIC WATER COOLED CENTRIFUGAL CHILLERS
3	MAKE & COUNTRY OF ORIGIN	SEE NOTE - 4
4	MODEL	--
5	MINIMUM COOLING CAPACITY (TR)	400
	AT SPECIFIED CONDITIONS (SEE NOTE - 2)	
6	POWER CONSUMPTION	--
7	CHILLED WATER SYSTEM	
	a) WATER FLOW RATE (US GPM)	960
	b) EVAPORATOR'S MAXIMUM PRESSURE DIFFERENCE (FT)	25
	c) ENTERING WATER TEMPERATURE (°F)	54
	d) LEAVING WATER TEMPERATURE (°F)	44
8	CONDENSER WATER	
	a) WATER FLOW RATE (US GPM)	1200
	b) CONDENSER'S MAXIMUM PRESSURE DIFFERENCE (FT)	25
	c) ENTERING WATER TEMPERATURE (°F)	90
	d) LEAVING WATER TEMPERATURE (°F)	100
9	REFRIGERANT	ECO - FRIENDLY
10	POWER SUPPLY	
11	EQUIPMENT POWER RATING	400V/3PHASE/50HERTZ
12	FOULING FACTOR (FT <sup>2</sup> .°F/BTU/HR)	
	a) EVAPORATOR	0.00010
	b) CONDENSER	0.00025
13	TYPE OF CONTROLS	TOUCH SCREEN DIGITAL MICROPROCESSOR CONTROLLER
14	STARTER TYPE	MICROPROCESSOR
15	WATER SIDE RATED WORKING PRESSURE (PSIG)	125
16	INSULATION MATERIAL AND TYPE	AS PER MANUFACTURER RECOMMENDATION
17	MAXIMUM OPERATING WEIGHT (LBS)	--
18	ACCESSORIES	HVAC CONTROL INTERFACE CARD
19	EFFICIENCY	HIGH EFFICIENCY MODEL (LATEST MODEL SERIES)
20	REMARKS	--
21	ACCESSORIES	HVAC CONTROL INTERFACE CARD, VFD & HARMONIC FILTER
22	EFFICIENCY	HIGH EFFICIENCY ( ≤ 0.620 KW/TR) AT SPECIFIED CONDITIONS
23	REMARKS	SINGLE COMPRESSOR UNIT

**NOTES:**

1. CHILLERS SHALL BE PROVIDED WITH VARIABLE FREQUENCY DRIVE (VFD), CONTROLS & HARMONIC FILTER.
2. IF CHILLERS OF EXACT SPECIFIED CAPACITY IS NOT, THEN NEXT LARGER UNIT HAVING CATALOGUED STANDARD COMF SHALL BE PROVIDED.
3. PROJECT CREDENTIALS SHALL BE STATED ON THE SHIPMENT DOCUMENTS OF THE CHILLERS.
4. FOR MAKE & COUNTRY OF MANUFACTURE, SEE APPENDIX - I "LIST OF RECOMMENDED MANUFACTURERS".





**MAIN BUILDING - FORENIC SCIENCE LABORATORY, KARACHI**  
**HOME DEPARTMENT, GOVERNMENT OF SINDH**  
**HOT WATER GENERATORS**

EQUIPMENT SCHEDULE

SHEET 02 of 17

1	CODE	HWG-1-1 & HWG-1-2 (STANDBY)
2	TYPE	FORCED DRAFT WET BACK DUAL FUEL FIRED HOT WATER GENERATORS (COMPLETE IN ALL RESPECT INCLUDING CONTROLS & ACCESSORIES)
3	MAKE & COUNTRY OF ORIGIN	SEE NOTE - 3
4	MODEL	--
5	ALTITUDE (FT)	33
6	BURNER, CONTROLS & ACCESSORIES (MAKE & OF	MANUFACTURER'S RECOMMENDED - USA/EUROPE
7	MINIMUM HEATING CAPACITY OUTPUT (MBH)	1500
	AT SPECIFIED CONDITIONS (SEE NOTE - 1)	
8	FLOW RATE (US GPM)	150
9	WATER SIDE RATED WORKING PRESSURE (PSIG)	125
10	LEAVING WATER TEMPERATURE (°F)	140
11	ENTERING WATER TEMPERATURE (°F)	-
12	HEATING SURFACE AREA	MANUFACTURER'S RECOMMENDED
13	EQUIPMENT POWER RATING	400V/3PHASE/50HERTZ
14	TYPE OF CONTROLS	MANUFACTURER'S RECOMMENDED
15	TYPE OF FUEL	DUAL FUEL (DIESEL OIL & NATURAL GAS)
16	DIESEL OIL - CALORIFIC VALUE (MBTU/LBS)	19.30
17	NATURAL GAS - CALORIFIC VALUE (BTU/CFT)	910
18	ACCESSORIES	AS SPECIFIED
19	CONTROLS	BMS INTEGRATABLE INTERFACE & CONTROLS
20	MAXIMUM OPERATING WEIGHT (LBS)	--
21	REMARKS	--

**NOTE:**

1. IF HOT WATER GENERATOR OF EXACT SPECIFIED CAPACITY IS NOT AVAILABLE, THEN UNIT OF NEXT LARGER CAPACITY CATALOGUED STANDARD COMPONENTS SHALL BE PROVIDED.
2. HOT WATER GENERATOR SHALL BE CERTIFIED WITH RESPECT TO LATEST ASME BOILER & PRESSURE VESSEL CODES.
3. FOR MAKE & COUNTRY OF MANUFACTURE, SEE APPENDIX - I "LIST OF RECOMMENDED MANUFACTURERS".





**COOLING TOWERS**  
(CTI OR JIS CERTIFIED)

EQUIPMENT SCHEDULE

SHEET 03 of 17

1	CODE	CT-1-1, CT-1-2 & CT-1-3 (STANDBY)
2	TYPE	PACKAGED TYPE CROSS FLOW INDUCED DRAFT TOP AIR DISCHARGE COOLING TOWERS
3	MAKE & COUNTRY OF ORIGIN	SEE NOTE - 5
4	MODEL	-
5	WATER FLOW RATE (US GPM)	1200
6	ENTERING WATER TEMPERATURE (°F)	100
7	LEAVING WATER TEMPERATURE (°F)	90
8	AIR ENTERING WET BULB (°F)	82
9	NO. OF CELLS	2
10	MOTOR	
	a) MAKE & COUNTRY OF ORIGIN	SEE NOTE - 5
	a) HP	--
	b) POWER SUPPLY SYSTEM	400V/3PHASE/50HERTZ
	c) EQUIPMENT VOLTAGE RATING	--
	d) RPM	--
11	MAXIMUM OPERATING WEIGHT (LBS)	--
12	ACCESSORIES	SEE NOTE - 1 & 2
13	MAXIMUM NOISE LEVEL	LOW NOISE 72 dB (5 FEET - FAN DISCHARGE)
14	REMARKS	COOLING TOWER MATERIAL/ PARTS; SUITABLE FOR COASTAL ENVIRONMENT OUTDOOR INSTALLATIONS

**NOTES:**

- VIBRATION ISOLATORS SHALL BE PROVIDED ALONG WITH ALL COOLING TOWERS BY THE MANUFACTURER.
- ACCESSORIES & OPTIONAL ITEMS SHALL BE PROVIDED AS SPECIFIED IN TECHNICAL PROVISIONS.
- MAKE, ORIGIN & MODEL OF MOTORS SHALL BE STATED IN THE TECHNICAL SUBMITTAL FOR REVIEW & APPROVAL.
- ALL MOTORS SHALL BE DESIGNED FOR CONTINUOUS OPERATION AT THE AMBIENT TEMPERATURE OF 113°F (45°C) AS SPECIFIED IN TECHNICAL PROVISIONS.
- FOR MAKE & COUNTRY OF MANUFACTURE, SEE APPENDIX - I "LIST OF RECOMMENDED MANUFACTURERS".





## MAIN BUILDING - FORENIC SCIENCE LABORATORY, KARACHI

## HOME DEPARTMENT, GOVERNMENT OF SINDH

## PUMPS

EQUIPMENT SCHEDULE

SHEET 04 of 17

1	CODE	CHP-1-1, CHP-1-2 & CHP-1-3	HWP-1-1 & HWP-1-2	CP-1-1, CP-1-2 & CP-1-3	OLP-1-1 & OLP-1-2)
2	TYPE	END SUCTION CENTRIFUGAL COMMON BASE MOUNTED PUMP MOTOR SET	END SUCTION CENTRIFUGAL COMMON BASE MOUNTED PUMP MOTOR SET	END SUCTION CENTRIFUGAL COMMON BASE MOUNTED PUMP MOTOR SET	END SUCTION CENTRIFUGAL COMMON BASE MOUNTED PUMP MOTOR SET
3	MAKE & COUNTRY OF ORIGIN	SEE NOTE - 2	SEE NOTE - 2	SEE NOTE - 2	SEE NOTE - 2
4	MODEL	-	-	-	-
5	SERVICE	CHILLED WATER	HOT WATER	CONDENSER WATER	DIESEL OIL
6	DISCHARGE (US GPM)	960	150	1200	0.50
7	CIRCULATING HEAD (FT. WG)	145	115	170	30
8	MOTOR				
	a) MAKE & COUNTRY OF ORIGIN	SEE NOTE - 2	SEE NOTE - 2	SEE NOTE - 2	SEE NOTE - 2
	b) RPM	--	--	--	--
	c) HP	--	--	--	--
	d) POWER SUPPLY	400V/3PHASE/50HERTZ	400V/3PHASE/50HERTZ	400V/3PHASE/50HERTZ	220V/1PHASE/50HERTZ
	e) VOLTAGE RATING	--	--	--	--
9	PRESSURE RATING (PSIG)	125	125	125	150
10	ACCESSORIES	AS SPECIFIED	AS SPECIFIED	AS SPECIFIED	AS SPECIFIED
11	MAXIMUM OPERATING WEIGHT (LBS)	--	--	--	--
12	REMARKS	PUMPS SHALL CONSIST MECHANICAL SEAL & STAINLESS STEEL SHAFT.	PUMPS SHALL CONSIST MECHANICAL SEAL & STAINLESS STEEL SHAFT.	PUMPS SHALL CONSIST MECHANICAL SEAL & STAINLESS STEEL SHAFT.  PUMPS SHALL CONSIST VARIABLE FREQUENCY DRIVE (VFD).	PUMPS SHALL CONSIST MECHANICAL SEAL & STAINLESS STEEL SHAFT.

## NOTES:

1. ALL MOTORS SHALL BE OF MINIMUM EFFICIENCY CLASS IE3.
2. FOR MAKE & COUNTRY OF MANUFACTURE, SEE APPENDIX - I "LIST OF RECOMMENDED MANUFACTURERS".
3. PUMPS, PUMP RAME, COUPLING, MOTOR, ETC. SHALL BE SUPPLIED/MANUFACTURED AS COMPLETE SET IN ORIGINAL PUMP MANUFACTURER PREMISES.





MAIN BUILDING - FORENIC SCIENCE LABORATORY, KARACHI  
HOME DEPARTMENT, GOVERNMENT OF SINDH  
AIR HANDLING UNITS (GENERAL)

EQUIPMENT SCHEDULE

SHEET 05 of 17

CODE	TYPE	SECTIONAL CONFIGURATION	SUPPLY FAN			OUTDOOR AIR FLOW RATE (CFM)	FRESH AIR FLOW RATE FROM HRV		RETURN AIR FLOW RATE (CFM)	DISCHARGE ARRANGEMENT	CONNECTION SIDE (FACING SUPPLY END)			REFER TO SCHEDULE	REFER TO SCHEDULE	STEAM HUMIDIFIER			ALL SECTIONS OPERATING WEIGHT	SERVES
			AIR FLOW RATE (CFM)	MINIMUM EXTERNAL STATIC PRESSURE (IN. WG)	MAXIMUM OUTLET VELOCITY (FPM)		AIR FLOW (CFM)	HRV			POWER	COIL	FILTER REMOVAL	OF CCHC	OF MXB	CODE	TYPE	EVAPORATION RATE (LBS/HR)	LBS	
														CCHC NO.	MXB NO.					
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
AHU-01	DOUBLE SKIN SINGLE ZONE HDT FLOOR MOUNTED	MXB-FF-BF-CC-HC- HUM-FAN	11849	1.75	2000	1090	1960	HRV-2	8799	UB	--	--	--	1	1	HUM-01	S	39.18		GROUND FLOOR (LEFT)
AHU-02	DOUBLE SKIN SINGLE ZONE HDT FLOOR MOUNTED	MXB-FF-BF-CC-HC- HUM-FAN	25987	1.75	2000	3348	3039	HRV-1	19600	UB	--	--	--	2	2	HUM-02	S	56.00		GROUND FLOOR (RIGHT)
AHU-03	DOUBLE SKIN SINGLE ZONE HDT FLOOR MOUNTED	MXB-FF-BF-CC-HC- HUM-FAN	15550	1.75	2000	1370	2563	HRV-2	11617	UB	--	--	--	3	3	HUM-03	S	30.85		FIRST FLOOR (LEFT)
AHU-04	DOUBLE SKIN SINGLE ZONE HDT FLOOR MOUNTED	MXB-FF-BF-CC-HC- HUM-FAN	16863	1.75	2000		8624	HRV-3	8239	UB	--	--	--	4	4	HUM-04	S	15.45		FIRST FLOOR (RIGHT)
AHU-05	DOUBLE SKIN SINGLE ZONE HDT FLOOR MOUNTED	MXB-FF-BF-CC-HC- HUM-FAN	22476	1.75	2000		9334	HRV-4	13142	UB	--	--	--	5	5	HUM-05	S	18.53		SECOND FLOOR (LEFT)
AHU-06	DOUBLE SKIN SINGLE ZONE HDT FLOOR MOUNTED	MXB-FF-BF-CC-HC- HUM-FAN	17792	1.75	2000		8523	HRV-5	9269	UB	--	--	--	6	6	HUM-06	S	16.54		SECOND FLOOR (RIGHT)
AHU-07	DOUBLE SKIN SINGLE ZONE HDT FLOOR MOUNTED	MXB-FF-BF-CC-HC- HUM-FAN	9730	1.75	2000	1960	1960	HRV-4	5810	UB	--	--	--	7	7	HUM-07	S	30.36		THIRD FLOOR (LEFT)
AHU-08	DOUBLE SKIN SINGLE ZONE HDT FLOOR MOUNTED	MXB-FF-BF-CC-HC- HUM-FAN	22333	1.75	2000	1400	1960	HRV-5	18973	UB	--	--	--	8	8	HUM-08	S	30.96		THIRD FLOOR (RIGHT)
AHU-09	DOUBLE SKIN SINGLE ZONE HDT FLOOR MOUNTED	MXB-FF-BF-CC-HC-DXC- HUM-FAN	14468	1.50	2000	14468	--	--	--	UB	--	--	--	9	9	HUM-09	S	181.83		BIO SAFETY LABS (LEFT)
AHU-10	DOUBLE SKIN SINGLE ZONE HDT FLOOR MOUNTED	MXB-FF-BF-CC-HC-DXC- HUM-FAN	13201	1.50	2000	13201	--	--	--	UB	--	--	--	10	10	HUM-10	S	163.87		BIO SAFETY LABS (RIGHT)
AHU-11	DOUBLE SKIN SINGLE ZONE HDT FLOOR MOUNTED	MXB-FF-BF-CC-HC-DXC- HUM-FAN	4337	1.50	2000	4437	--	--	--	UB	--	--	--	11	11	HUM-11	S	22.80		AUTOPSY HALL (LEFT)

**LEGENDS:**

CFM = CUBIC FEET PER MINUTE  
HDT = HORIZONTAL DRAW THROUGH  
TH = TOP HORIZONTAL  
UB = UP BLAST  
VDT = VERTICAL DRAW THROUGH  
OV = OUTLET VELOCITY  
CC = COOLING COIL  
HUM = ELECTRIC SELF GENERATING STEAM HUMIDIFIER  
MXB = MIXING BOX  
FF = FLAT FILTER BOX WITH HIGH VELOCITY FILTER  
FPM = FEET PER MINUTE  
BF = BAG FILTER  
HC = HEATING COIL  
S = ELECTRIC STEAM GENERATOR

**NOTES**

- FANS SHALL BE SELECTED FOR TOTAL STATIC PRESSURE = EXTERNAL STATIC PRESSURE + STATIC PRESSURE OF AHU + PRESSURE LOSS AT FILTERS (AVERAGE OF MANUFACTURER'S RECOMMENDED DIRTY & CLEAN FILT
- HORSE POWER OF FAN MOTORS SHALL BE AT LEAST 120% OF REQUIRED BRAKE HORSE POWER.
- FOR MAKE & COUNTRY OF MANUFACTURE, SEE APPENDIX - I "LIST OF RECOMMENDED MANUFACTURERS".
- ALL THE AIR HANDLING UNITS SHALL BE PROVIDED WITH ACCESS PANELS & SILENCERS AS PER EQUIPMENT SELECTION SHEET COMPLYING SPECIFICATIONS OF THE PROJECT.
- AHU-09, AHU-10 & AHU-11 SHALL BE PROVIDED WITH WEATHERPROOF CANOPIES TO BE SUPPLIED BY THE MANUFACTURER.
- COIL SECTION SHALL BE FOUR PIPE SYSTEM. THEREFORE, SEPARATE COOLING AND HEATING COIL IS REQUIRED.





**MAIN BUILDING - FORENIC SCIENCE LABORATORY, KARACHI**  
**HOME DEPARTMENT, GOVERNMENT OF SINDH**  
**AIR HANDLING UNITS (COIL)**

EQUIPMENT SCHEDULES

SHEET 06 of 17

CODE	SECTION	MAXIMUM COIL VELOCITY (FPM)	COOLING COIL (AIR SIDE)				COOLING COIL (WATER SIDE)				HEATING COIL (AIR SIDE)			HEATING (WATER SIDE)			
			TC (MBH)	EDB (°F)	EWB (°F)	SC (MBH)	EWT (°F)	LWT (°F)	MAXIMUM WATER FLOW RATE (US GPM)	MAXIMUM PRESSURE DIFFERENCE (FT. WG)	TH (MBH)	EDB (°F)	LDB (°F)	EWT (°F)	LWT (°F)	MAXIMUM WATER FLOW RATE (US GPM)	MAXIMUM PRESSURE DIFFERENCE (FT. WG)
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
CCHC-01	AHU-01	500	339.6	75.90	64.20	261.4	44	-	67.92	20	67.1	68.00	73.30	140	-	6.7	20
CCHC-02	AHU-02	500	614.0	76.20	66.00	473.9	44	-	122.80	20	140.4	67.00	72.00	140	-	14.0	20
CCHC-03	AHU-03	500	503.3	75.10	63.30	407.9	44	-	100.66	20	97.2	68.20	72.90	140	-	9.7	20
CCHC-04	AHU-04	500	362.2	73.00	63.60	311.2	44	-	72.44	20	65.1	70.00	73.10	140	-	6.5	20
CCHC-05	AHU-05	500	549.9	72.90	62.00	473.3	44	-	109.98	20	92.4	69.80	73.20	140	-	9.2	20
CCHC-06	AHU-06	500	408.6	73.10	63.00	353.8	44	-	81.72	20	61.5	69.60	72.40	140	-	6.2	20
CCHC-07	AHU-07	500	355.5	79.10	65.00	267.5	44	-	71.10	20	116.1	53.50	64.60	140	-	11.6	20
CCHC-08	AHU-08	500	602.2	74.80	62.20	507.8	44	-	120.44	20	260.5	54.10	64.90	140	-	26.1	20
CCHC-09	AHU-09	500	1025.2	104.00	78.40	678.8	44	-	205.04	20	369.7	48.90	72.60	140	-	37.0	20
CCHC-10	AHU-10	500	1029.2	104.00	78.40	657.5	44	-	205.84	20	348.4	48.90	73.30	140	-	34.8	20
CCHC-11	AHU-11	500	326.5	104.00	78.40	211.2	44	-	65.30	20	114.4	48.90	73.30	140	-	11.4	20

**LEGENDS:**

CCHC	COOLING COIL & HEATING COIL
CFM	CUBIC FEET PER MINUTE
FPM	FEET PER MINUTE
SC	COIL SENSIBLE COOLING LOAD
TC	COIL TOTAL COOLING LOAD
US GPM	UNITED STATES GALLON PER MINUTE
TH	COIL TOTAL HEATING LOAD
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
LDB	LEAVING DRY BULB TEMPERATURE

**NOTES:**

1. THERE SHALL BE MAXIMUM 08 ROWS IN A COIL.
2. MAXIMUM FINS PER INCH (FPI) SHALL BE 10.





**MAIN BUILDING - FORENIC SCIENCE LABORATORY, KARACHI**  
**HOME DEPARTMENT, GOVERNMENT OF SINDH**  
**AIR HANDLING UNITS (MIXING BOX)**

EQUIPMENT SCHEDULE

SHEET 07 OF 17

CODE	SECTION	AIR ENTRANCE			RETURN	FRESH	BYPASS	ACCESSORIES	REMARKS
		RETURN AIR	OUTDOOR AIR	BYPASS AIR	AIR	AIR	AIR		
					(RA)	(OA)			
1	2	3	4	5	6	7	8	9	10
MXB-01	AHU-01	TOP	REAR	--	8799	3050	--	AS SPECIFIED	--
MXB-02	AHU-02	TOP	REAR	--	19600	6387	--	AS SPECIFIED	--
MXB-03	AHU-03	TOP	REAR	--	11617	3933	--	AS SPECIFIED	--
MXB-04	AHU-04	TOP	REAR	--	8239	8624	--	AS SPECIFIED	--
MXB-05	AHU-05	TOP	REAR	--	13142	9334	--	AS SPECIFIED	--
MXB-06	AHU-06	TOP	REAR	--	9269	8523	--	AS SPECIFIED	--
MXB-07	AHU-07	TOP	REAR	--	5810	3920	--	AS SPECIFIED	--
MXB-08	AHU-08	TOP	REAR	--	18973	3360	--	AS SPECIFIED	--
MXB-09	AHU-09	TOP	REAR	--	--	14468	--	AS SPECIFIED	--
MXB-10	AHU-10	TOP	REAR	--	--	13201	--	AS SPECIFIED	--
MXB-11	AHU-11	TOP	REAR	--	--	4437	--	AS SPECIFIED	--

**NOTE:** RATINGS ARE FOR SELECTION PURPOSE. SCHEDULE WILL BE UPDATED FOR OPERATING VALUES AT INSTALLATION STAGE





**MAIN BUILDING - FORENIC SCIENCE LABORATORY, KARACHI**  
**HOME DEPARTMENT, GOVERNMENT OF SINDH**  
**AIR HANDLING UNITS (DX- COILS)**  
**(EUROVENT CERTIFIED - MATERIAL & PERFORMANCE)**

EQUIPMENT SCHEDULES

SHEET 08 OF 17

CODE	SECTION	MAXIMUM COIL FACE VELOCITY (FPM)	COOLING COIL				HEATING COIL		
			TC (MBH)	EDB (°F)	EWB (°F)	SC (MBH)	TH (MBH)	EDB (°F)	LDB (°F)
1	2	3	4	5	7	8	13	15	16
DXC-09	AHU-09	500	1025.20	104.0	78.4	678.80	369.70	-	-
DXC-10	AHU-10	500	1029.20	104.0	78.4	657.50	348.40	-	-
DXC-11	AHU-11	500	326.50	104.0	78.4	211.20	114.40	-	-

**LEGENDS:**

DXC	DIRECT EXPANSION COIL	EDB	ENTERING DRY BULB TEMPERATURE
TH	COIL TOTAL HEATING LOAD	EWB	ENTERING WET BULB TEMPERATURE
FPM	FEET PER MINUTE	LDB	LEAVING DRY BULB TEMPERATURE
SC	COIL SENSIBLE COOLING LOAD	LWB	LEAVING WET BULB TEMPERATURE
TC	COIL TOTAL COOLING LOAD		

**NOTES:**

1. THERE SHALL BE MAXIMUM 08 ROWS IN A COIL.



**MAIN BUILDING - FORENIC SCIENCE LABORATORY, KARACHI**  
**HOME DEPARTMENT, GOVERNMENT OF SINDH**  
**CONDENSING UNITS FOR AIR HANDLING UNITS**

EQUIPMENT SCHEDULES

SHEET 09 OF 17

CODE	TYPE	COONECTED COIL	TOTAL COOLING CAPACITY (MBH)	TOTAL HEATING CAPACITY (MBH)	MINIMUM CONDENSER ENTERING AIR TEMPERATURE (°F)	CONDENSER ENTERING AIR TEMPERATURE (°F)	POWER SUPPLY (V/PHASE/HZ)	ACCESSORIE S	REMARKS
1	2	3	4	5	7	8	9	10	11
CU-09	AIR COOLED CONDENSING REVERSIBLE UNIT	DXC-09	1025.20	369.70	48.90	104.00	400/3/50	AS SPECIFIED	FOR DX COILS DATA REFER SCHEDULE OF DX COILS
CU-10	AIR COOLED CONDENSING REVERSIBLE UNIT	DXC-10	1029.20	348.40	48.90	104.00	400/3/50	AS SPECIFIED	FOR DX COILS DATA REFER SCHEDULE OF DX COILS
CU-11	AIR COOLED CONDENSING REVERSIBLE UNIT	DXC-11	326.50	114.40	48.9	104.00	400/3/50	AS SPECIFIED	FOR DX COILS DATA REFER SCHEDULE OF DX COILS

**LEGENDS:**

DXC DIRECT EXPANSION COIL

CU CONDENSING UNIT

**NOTES:**

1. WHEN EQUIPMENT OF EXACT SPECIFIED CAPACITY IS NOT AVAILABLE, THEN NEXT LARGER UNIT SHALL BE PROVIDED.
2. THE CAPACITY OF THE CONDENSING UNITS SHOULD MATCH THE CAPACITY OF THE SELECTED MODELS OF RESPECTIVE DX COILS.
3. THE CONDENSING UNIT SHALL BE CAPABLE OF OPERATING IN AMBIENT TEMPERATURE OF 113°F (45°C).
4. FOR MAKE & COUNTRY OF MANUFACTURE, SEE APPENDIX - I "LIST OF RECOMMENDED MANUFACTURERS".





**MAIN BUILDING - FORENIC SCIENCE LABORATORY, KARACHI**  
**HOME DEPARTMENT, GOVERNMENT OF SINDH**  
**HEAT RECOVERY VENTILATORS**

EQUIPMENT SCHEDULE  
SHEET 10 OF 17

Unit Designation Code		RT-HRV-01	RT-HRV-02	RT-HRV-03	RT-HRV-04	RT-HRV-05
Location		Rooftop	Rooftop	Rooftop	Rooftop	Rooftop
Type of System		High Efficiency Heat Energy Recovery Ventilator	High Efficiency Heat Energy Recovery Ventilator	High Efficiency Heat Energy Recovery Ventilator	High Efficiency Heat Energy Recovery Ventilator	High Efficiency Heat Energy Recovery Ventilator
Type of Heat Exchanger		Cross Flow Plate Type Energy Recovery Core	Cross Flow Plate Type Energy Recovery Core	Cross Flow Plate Type Energy Recovery Core	Cross Flow Plate Type Energy Recovery Core	Cross Flow Plate Type Energy Recovery Core
Quantity	Nos	1	1	1	1	1
Serves		GF-AHU-02	GF-AHU-01 & FF-AHU-03	FF-AHU-04	SF-AHU-05 & TF-AHU-07	SF-AHU-06 & TF-AHU-08
Minimum Efficiency	%	70	70	70	70	70
Fresh Air Flow Rate	CFM	3039	4253	8624	11294	10483
Outdoor Air Temperature (Summer) DB/WB	Deg °F	104.00 / 78.40	104.00 / 78.41	104.00 / 78.42	104.00 / 78.43	104.00 / 78.44
Outdoor Air Temperature (Winter) DB/WB	Deg °F	48.90 / 40.80	48.90 / 40.80	48.90 / 40.80	48.90 / 40.80	48.90 / 40.80
Exhaust Air Flow Rate	CFM	3039	4253	8624	11294	10483
Return Air Temperature (Summer) DB	Deg °F	75.00	75.00	75.00	75.00	75.00
Return Air Temperature (Winter) DB	Deg °F	48.90	48.90	48.90	48.90	48.90
Fresh Air Fan External Static Pressure	in WC	1.50	1.50	1.50	1.50	1.50
Return Air Fan External Static Pressure	in WC	1.50	1.50	1.50	1.50	1.50
Cooling Coil Load	MBH	47.60	70.80	135.00	176.80	164.10
Cooling Coil Entering Air Temperature DB/WB	Deg °F	89.5 / 74.7	89.5 / 74.7	89.5 / 74.7	89.5 / 74.7	89.5 / 74.7
Cooling Coil Leaving Air Temperature DB/WB	Deg °F	75.00 / 70.60	75.00 / 70.60	75.00 / 70.60	75.00 / 70.60	75.00 / 70.60
<b>Unit Construction Data</b>						
Type of Unit		Roof top Floor Mounted (Weatherproof)	Roof top Floor Mounted (Weatherproof)	Roof top Floor Mounted (Weatherproof)	Roof top Floor Mounted (Weatherproof)	Roof top Floor Mounted (Weatherproof)
Configuration		<pre> RA—RF—   FA—F—B—PH—C—SF—SA   EA </pre>	<pre> RA—RF—   FA—F—B—PH—C—SF—SA   EA </pre>	<pre> RA—RF—   FA—F—B—PH—CC—SF—SA   EA </pre>	<pre> RA—RF—   FA—F—BF—PH—CC—SF—SA   EA </pre>	<pre> RA—RF—   FA—F—B—PH—C—SF—SA   EA </pre>
Double Skin		Yes	Yes	Yes	Yes	Yes
Insulation Thickness	mm	50	50	50	50	50
Thermal Barrier		Yes	Yes	Yes	Yes	Yes
Flat Filter Section (Outdoor Air Inlet)	Average Arrestance	Washable Filter (Class G3)	Washable Filter (Class G3)	Washable Filter (Class G3)	Washable Filter (Class G3)	Washable Filter (Class G3)
Bag Filter Section (Return Air Inlet)	Average Arrestance	Synthetic Bag Filter (Class F7)	Synthetic Bag Filter (Class F7)	Synthetic Bag Filter (Class F7)	Synthetic Bag Filter (Class F7)	Synthetic Bag Filter (Class F7)
Drive		Belt Driven + Variable Frequency Drive	Belt Driven + Variable Frequency Drive	Belt Driven + Variable Frequency Drive	Belt Driven + Variable Frequency Drive	Belt Driven + Variable Frequency Drive
<b>Electrical Data</b>						
Motor Protection		Class F, IP 55	Class F, IP 55	Class F, IP 55	Class F, IP 55	Class F, IP 55
Volts	V	380	380	380	380	380
Phase	Ø	3	3	3	3	3
Cycle	HZ	50	50	50	50	50
Accessories		Wall Mounted Wired Thermostat Including Temperature Sensor for Supply Inlet & Outlet	Wall Mounted Wired Thermostat Including Temperature Sensor for Supply Inlet & Outlet	Wall Mounted Wired Thermostat Including Temperature Sensor for Supply Inlet & Outlet	Wall Mounted Wired Thermostat Including Temperature Sensor for Supply Inlet & Outlet	Wall Mounted Wired Thermostat Including Temperature Sensor for Supply Inlet & Outlet
Controls		Manufacturer's Recommended (BACnet Interface - BMS)	Manufacturer's Recommended (BACnet Interface - BMS)	Manufacturer's Recommended (BACnet Interface - BMS)	Manufacturer's Recommended (BACnet Interface - BMS)	Manufacturer's Recommended (BACnet Interface - BMS)

**LEGENDS:**

RA = Return Air  
RF = Return Fan  
FA = Fresh Air  
FF = Flat Filter (Primary)  
BF = Bag Filter (Secondary)

PHE = Cross Flow Plate Heat Exchanger  
EA = Exhaust Air  
CC = Cooling Coil  
SF = Supply Fan  
SA = Supply Air

**NOTES:**

- SUPPLIER SHALL SUBMIT THE DETAILS OF CONTROLS ALONG WITH THE TECHNICAL SUBMITTAL FOR THE CONSULTANT'S REVIEW & APPROVAL.
- TOTAL EXTERNAL STATIC PRESSURE TO BE CONSIDERED WITH PRIMARY FLAT FILTER (CHOKED) AND SECONDARY BAG FILTER (SEMI CHOKED).
- THE UNITS SHALL BE CAPABLE TO OPERATE AT THE AMBIENT TEMPERATURE OF 113°F (45°C).
- FOR MAKE & COUNTRY OF MANUFACTURE, SEE APPENDIX - I "LIST OF RECOMMENDED MANUFACTURERS".
- ALL HRVs SHALL BE PROVIDED WITH WEATHERPROOF CANOPIES TO BE SUPPLIED BY THE MANUFACTURER.



**MAIN BUILDING - FORENIC SCIENCE LABORATORY, KARACHI**  
**HOME DEPARTMENT, GOVERNMENT OF SINDH**  
**FAN COIL UNITS**

EQUIPMENT SCHEDULE  
SHEET 11 of 17

CODE	TYPE	MINIMUM AIR FLOW RATE (CFM)	EXTERNAL STATIC PRESSURE (IN. WG)	COOLING SIDE							HEATING SIDE			TYPE OF FILTERS	REMARKS
				TC (MBH)	SC (MBH)	EDB (°F)	EWB (°F)	WATER FLOW RATE (US)	EWT (°F)	MAXIMUM PRESSURE DIFFERENCE (FT. WG)	TH (MBH)	WATER FLOW RATE (US)	EWT (°F)		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
FCU-1	DECORATIVE CEILING CASSETTE INCLUDING FILTERS	400	-	12.20	11.40	73.1	61.9	3	44	20	4.88	0.61	140	-	
FCU-2	DECORATIVE CEILING CASSETTE INCLUDING FILTERS	675	-	18.40	16.90	73.4	62.4	5	44	20	7.36	0.92	140	-	
FCU-3	DECORATIVE CEILING CASSETTE INCLUDING FILTERS	980	-	36.25	31.70	75.2	63.5	9	44	20	14.50	1.81	140	-	
DFCU-1	CEILING CONEALED DUCTED INCLUDING FILTERS	675	0.75	19.95	18.05	73.4	62.4	5	44	20	7.98	1.00	140	-	
DFCU-2	CEILING CONEALED DUCTED INCLUDING FILTERS	1100	0.75	48.00	18.05	73.4	62.4	12	44	20	19.20	2.40	140	-	

**LEGEND:**

US GPM = UNITED STATES GALLON PER MINUTE  
TC = COIL TOTAL COOLING LOAD  
SC = COIL SENSIBLE COOLING LOAD  
EDB = COIL ENTERING DRY BULB  
EWB = COIL ENTERING WET BULB  
EAT = ENTERING AIR TEMPERATURE  
LAT = LEAVING AIR TEMPERATURE  
EWT = ENTERING WATER TEMPERATURE  
LWT = LEAVING WATER TEMPERATURE  
TH = COIL TOTAL HEATING LOAD

**NOTES:**

1. SAME COIL SHALL BE USED FOR BOTH HEATING & COOLING PURPOSES
2. THE COIL & DRAIN PAN SHALL BE READILY REVERSIBLE AS PER SITE CONDITIONS.
3. THE LEAVING WATER TEMPERATURE SHALL BE TAKEN AROUND 54°F.
4. THE FCU AIR FLOW RATES MAY VARY AS PER SELECTED MODELS AND OR AS APPROVED BY THE ENGINEER.
5. FOR MAKE & COUNTRY OF MANUFACTURE, SEE APPENDIX - I "LIST OF RECOMMENDED MANUFACTURERS".





**MAIN BUILDING - FORENIC SCIENCE LABORATORY, KARACHI**  
**HOME DEPARTMENT, GOVERNMENT OF SINDH**  
**EXPANSION TANK**

EQUIPMENT SCHEDULE

SHEET 12 of 17

1	CODE	ET-1
2	TYPE OF EXPANSION TANK	CLOSED CYLINDRICAL/DIAPHRAM
3	MAKE & COUNTRY OF ORIGIN	SEE NOTE - 1
4	MODEL	--
5	SERVICE	CHILLED & HOT WATER
6	MINIMUM SYSTEM VOLUME (US GPM)	5700
	EXPANSION TANK VOLUME SELECTION	
7	STATIC HEIGHT ABOVE EXPANSION TANK (FT)	60
8	EXPANSION TANK DIAMETER (INCHES)	MANUFACTURER'S RECOMMENDED
9	EXPANSION TANK LENGTH (INCHES)	MANUFACTURER'S RECOMMENDED
10	PRESSURE RATING (PSIG)	125
11	MAXIMUM OPERATING WEIGHT (LBS)	--
12	ACCESSORIES	AIRTROL FITTING & TANK DRAINER
13	REMARKS	

**NOTES:**

- FOR MAKE & COUNTRY OF MANUFACTURE, SEE APPENDIX - I "LIST OF RECOMMENDED MANU



**MAIN BUILDING - FORENIC SCIENCE LABORATORY, KARACHI  
HOME DEPARTMENT, GOVERNMENT OF SINDH  
MAIN STORAGE TANK (MST) & DAY TANK (DT)**

EQUIPMENT SCHEDULE

SHEET 13 of 17

1	CODE	MST	DT
	MAKE & COUNTRY OF ORIGIN	SEE NOTE-1	SEE NOTE-1
2	QUANTITY	ONE	ONE
3	TYPE	HORIZONTAL	HORIZONTAL
4	CAPACITY OF EACH TANK	-	-
5	APPROXIMATE SHEEL DIAMETER (FEET)	8	4
6	APPROXIMATE SHELL LENGTH (FEET)	16	6
7	MINIMUM STEEL SHEET THICKNESS (INCHES)	0.30	0.25
11	PRESSURE RATING (PSIG)	150	150
14	REMARKS	ACCESSORIES REQUIRED TO COMPLETE SYSTEM	ACCESSORIES REQUIRED TO COMPLETE SYSTEM

**NOTES:**

1. FOR MAKE & COUNTRY OF MANUFACTURE, SEE APPENDIX - I "LIST OF RECOMMENDED MANUFACTURERS".





**MAIN BUILDING - FORENIC SCIENCE LABORATORY, KARACHI**  
**HOME DEPARTMENT, GOVERNMENT OF SINDH**  
**FANS**

EQUIPMENT SCHEDULES

SHEET 14 of 17

CODE	TYPE	SERVICE	SERVES	MAKE	MODEL	AIR FLOW RATE (CFM)	EXTERNAL STATIC PRESSURE (IN WC)	MAXIMUM OUTDOOR VELOCITY (FPM)	DRIVE	MAXIMUM FAN MOTOR (RPM)	MOTOR		ACCESSORIES/REMARKS
											PHASE	HP	
1	2	3	4	5	6	7	8	9	10	11	12	13	14
EF-1	INLINE CENTRIFUGAL	EXHAUST AIR	TOILETS, PANTRIES & KITCHEN	SEE NOTE - 3	--	600	0.50	2000	DIRECT	1440	1	--	--
EF-2	CENTRIFUGAL	EXHAUST AIR	BASEMENT	SEE NOTE - 3	--	26000	1.25	2000	BELT	1440	3	--	--
EF-3	PROPELLER	EXHAUST AIR	TOILETS	SEE NOTE - 3	--	150	--	2000	DIRECT	1440	1	--	--
PF-1	AIRFOIL CENTRIFUGAL HIGH PLUME	EXHAUST AIR	BIO HAZARD STORAGE BASEMENT (LEFT WING)	SEE NOTE - 3	--	1520	1.25	2000	BELT + VFD	1440	3	--	--
PF-2	AIRFOIL CENTRIFUGAL HIGH PLUME	EXHAUST AIR	AUTOPSY HALL, DISSECTION, BRAIN & LIFE SECOND FLOOR (LEFT WING)	SEE NOTE - 3	--	4770	1.50	2000	BELT + VFD	1440	3	--	--
PF-3	AIRFOIL CENTRIFUGAL HIGH PLUME	EXHAUST AIR	BIO SAFETY LABS & CABINETS GROUND FLOOR (RIGHT WING)	SEE NOTE - 3	--	5200	1.25	2000	BELT + VFD	1440	3	--	--
PF-4	AIRFOIL CENTRIFUGAL HIGH PLUME	EXHAUST AIR	BIO SAFETY LABS, CABINETS, MICROSCOPY, TOXICOLOGY, EXTRACTION, INSTRUMENTATION FIRST & SECOND FLOOR (RIGHT)	SEE NOTE - 3	--	14520	1.25	2000	BELT + VFD	1440	3	--	--
PF-5	AIRFOIL CENTRIFUGAL HIGH PLUME	EXHAUST AIR	BIO SAFETY LABS & WORK STATIONS FIRST & SECOND FLOOR (LEFT WING)	SEE NOTE - 3	--	15915	1.25	2000	BELT + VFD	1440	3	--	--
SF-1	CENTRIFUGAL	SUPPLY AIR	BASEMENT	SEE NOTE - 3	--	26000	1.25	2000	BELT	1440	3	--	--
SMEF-1	CENTRIFUGAL	REVERSIBLE	CORRIDOR	SEE NOTE - 3	--	9000	1.00	2000	BELT	1440	1	--	SMOKE EXHAUST

**NOTES:**

1. ACTUAL TOTAL STATIC PRESSURE & MOTOR'S ELECTRICAL POWER CONSUMPTION SHALL BE VERIFIED BY THE CONTRACTOR AS PER THE ARRANGEMENT OF DUCTS IN THE SHOP DRAWINGS.
2. SOUND POWER LEVEL OF ALL FANS AT DISCHARGE SHALL NOT EXCEED 85 db.
3. FOR MAKE & COUNTRY OF MANUFACTURE, SEE APPENDIX - I "LIST OF RECOMMENDED MANUFACTURERS".



**MAIN BUILDING - FORENIC SCIENCE LABORATORY, KARACHI**  
**HOME DEPARTMENT, GOVERNMENT OF SINDH**  
**AIR INLETS & OUTLETS**

EQUIPMENT SCHEDULE

SHEET 15 of 17

CODE	TYPE	DESCRIPTION	SERVICE	MATERIAL	MAKE & MODEL	DAMPER	FINISH	COLOUR	ACCESSORIES	REMARKS
A	CEILING DIFFUSER	FOUR WAY CEILING SUPPLY AIR DIFFUSER SQUARE FACE/RECTANGULAR NECK	SUPPLY AIR	ALUMINUM EXTRUDED	--	YES	ANODIZED	AS REQUIRED BY THE ENGINEER	AS SPECIFIED	
B	CEILING DIFFUSER	FOUR WAY CEILING SUPPLY AIR DIFFUSER SQUARE FACE/RECTANGULAR NECK	RETURN/ EXHAUST AIR	ALUMINUM EXTRUDED	--	YES	ANODIZED	AS REQUIRED BY THE ENGINEER	AS SPECIFIED	
C	GRILL	SIDE WALL SUPPLY AIR GRILL DOUBLE DEFLECTION ADJUSTABLE BARS	SUPPLY AIR	ALUMINUM EXTRUDED	--	YES	ANODIZED	AS REQUIRED BY THE ENGINEER	AS SPECIFIED	
D	GRILL	SIDE WALL SUPPLY AIR GRILL DOUBLE DEFLECTION ADJUSTABLE BARS	RETURN/ EXHAUST AIR	ALUMINUM EXTRUDED	--	YES	ANODIZED	AS REQUIRED BY THE ENGINEER	AS SPECIFIED	
E	LOUVER	OUTDOOR AIR LOUVER ANTI VERMIN SAND TRAP ANTI BIRD SCREEN	OUTDOOR AIR	ALUMINUM EXTRUDED	--	NO	ANODIZED	AS REQUIRED BY THE ENGINEER	AS SPECIFIED	
H	LOUVER	EXHAUST AIR LOUVER ANTI VERMIN SAND TRAP ANTI BIRD SCREEN	EXHAUST AIR	ALUMINUM EXTRUDED	--	NO	ANODIZED	AS REQUIRED BY THE ENGINEER	AS SPECIFIED	

**NOTES:**

1. FOR MAKE & COUNTRY OF MANUFACTURE, SEE APPENDIX - I "LIST OF RECOMMENDED MANUFACTURERS".





MAIN BUILDING - FORENIC SCIENCE LABORATORY, KARACHI  
HOME DEPARTMENT, GOVERNMENT OF SINDH  
ANTI CONTAMINATION CHAMBER (ACC) WITH HEPA FILTER

EQUIPMENT SCHEDULE

SHEET 16 of 17

CODE	TYPE	DESCRIPTION	SERVES	SERVICE	AIR FLOW (CFM)	PRESSURE DIFFERENCE (IN. WG.)	MATERIAL	SIZE (FEET X FEET)	MAKE & MODEL	DAMPER	FINISH	COLOUR	ACCESSORIES	REMARKS
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
ACC-1	BIBO FOR BIO SAFETY HAZARDOUS AIR FLOW	POWDER COATED GI SHEET HOUSING WITH ANTIFUNGAL/ANTIBACTERIAL PAINT WITH INJECTION MODULE, FILTER MODULE, DUCTILE IRON EPOXY COATED DAMPER WITH STAINLESS STEEL DISC, TRANSITION PIECE FOR CONNECTION WITH DUCT SYSTEM, COMPLETE WITH HEPA FILTER OF CLASS H-14 (99.995% EFFICIENCY) FOR INSTALLATION FOR BIO HAZARD LABORATORIES	PF-1	EXHAUST AIR	1520	1.8	GI SHEET POWDER COATED	--	SEE NOTE-1	YES	POWDER	GREY	AS SPECIFIED	
ACC-2	BIBO FOR BIO SAFETY HAZARDOUS AIR FLOW	POWDER COATED GI SHEET HOUSING WITH ANTIFUNGAL/ANTIBACTERIAL PAINT WITH INJECTION MODULE, FILTER MODULE, DUCTILE IRON EPOXY COATED DAMPER WITH STAINLESS STEEL DISC, TRANSITION PIECE FOR CONNECTION WITH DUCT SYSTEM, COMPLETE WITH HEPA FILTER OF CLASS H-14 (99.995% EFFICIENCY) FOR INSTALLATION FOR BIO HAZARD LABORATORIES	PF-2	EXHAUST AIR	4770	1.8	GI SHEET POWDER COATED	--	SEE NOTE-1	YES	POWDER	GREY	AS SPECIFIED	
ACC-3	BIBO FOR BIO SAFETY HAZARDOUS AIR FLOW	POWDER COATED GI SHEET HOUSING WITH ANTIFUNGAL/ANTIBACTERIAL PAINT WITH INJECTION MODULE, FILTER MODULE, DUCTILE IRON EPOXY COATED DAMPER WITH STAINLESS STEEL DISC, TRANSITION PIECE FOR CONNECTION WITH DUCT SYSTEM, COMPLETE WITH HEPA FILTER OF CLASS H-14 (99.995% EFFICIENCY) FOR INSTALLATION FOR BIO HAZARD LABORATORIES	PF-3	EXHAUST AIR	5200	1.8	GI SHEET POWDER COATED	--	SEE NOTE-1	YES	POWDER	GREY	AS SPECIFIED	
ACC-4	BIBO FOR BIO SAFETY HAZARDOUS AIR FLOW	POWDER COATED GI SHEET HOUSING WITH ANTIFUNGAL/ANTIBACTERIAL PAINT WITH INJECTION MODULE, FILTER MODULE, DUCTILE IRON EPOXY COATED DAMPER WITH STAINLESS STEEL DISC, TRANSITION PIECE FOR CONNECTION WITH DUCT SYSTEM, COMPLETE WITH HEPA FILTER OF CLASS H-14 (99.995% EFFICIENCY) FOR INSTALLATION FOR BIO HAZARD LABORATORIES	PF-4	EXHAUST AIR	14520	1.8	GI SHEET POWDER COATED	--	SEE NOTE-1	YES	POWDER	GREY	AS SPECIFIED	
ACC-5	BIBO FOR BIO SAFETY HAZARDOUS AIR FLOW	POWDER COATED GI SHEET HOUSING WITH ANTIFUNGAL/ANTIBACTERIAL PAINT WITH INJECTION MODULE, FILTER MODULE, DUCTILE IRON EPOXY COATED DAMPER WITH STAINLESS STEEL DISC, TRANSITION PIECE FOR CONNECTION WITH DUCT SYSTEM, COMPLETE WITH HEPA FILTER OF CLASS H-14 (99.995% EFFICIENCY) FOR INSTALLATION FOR BIO HAZARD LABORATORIES	PF-5	EXHAUST AIR	15915	1.8	GI SHEET POWDER COATED	--	SEE NOTE-1	YES	POWDER	GREY	AS SPECIFIED	

**NOTES:**

1. FOR MAKE &amp; COUNTRY OF MANUFACTURE, SEE APPENDIX - I "LIST OF RECOMMENDED MANUFACTURERS".



**MAIN BUILDING - FORENIC SCIENCE LABORATORY, KARACHI**  
**HOME DEPARTMENT, GOVERNMENT OF SINDH**  
**FILTERS OTHER THAN INSTALLED IN AIR HANDLING UNITS**

EQUIPMENT SCHEDULE

SHEET 17 of 17

1	CODE	F-1 - F-14
2	SERVICE	OUTDOOR AIR
3	TYPE OF FILTER BOX	DUCT MOUNTED
4	THICKNESS (IN)	2
5	AIR FLOW RATE (CFM)	AS PER DRAWINGS
6	MAXIMUM FACE VELOCITY (FPM)	500
7	NO. OF SECTIONS	AS PER DRAWINGS
8	MAXIMUM SIZE OF EACH SECTION (IN x IN)	
	(i) NO. OF FILTER	AS PER DRAWINGS
9	MAKE & MODEL	
	a) FILTER BOX	-
	b) FILTER MEDIA	-
10	COUNTRY OF ORIGIN	
	a) FILTER BOX	-
	b) FILTER MEDIA	-
11	MAXIMUM PRESSURE DIFFERENCE - CLEAN (IN. WG)	0.05
12	TYPE OF FILTER	WASHABLE METALLIC MESH
13	EFFICIENCY	AS PER SPECIFICATION
14	REMARKS	

**NOTES:**

1. FOR MAKE & COUNTRY OF MANUFACTURE, SEE APPENDIX - I "LIST OF RECOMMENDED MANUFACTURERS".

