

รายการอุปกรณ์ระบบปรับอากาศและระบายอากาศ

โครงการออกแบบและปรับปรุงคณะพาณิชยศาสตร์และการบัญชี

มหาวิทยาลัยธรรมศาสตร์ ท่าพระจันทร์

ออกแบบโดย

ศูนย์นวัตกรรมและการออกแบบและวิจัย

คณะสถาปัตยกรรมศาสตร์และการผังเมือง มหาวิทยาลัยธรรมศาสตร์

PROJECT : -

AIR COOLED SPLIT TYPE AIR-CONDITIONING UNIT SCHEDULE

DATE : 29-Jun-21

UNIT NUMBER		A-1FCU-01/CDU-01	A-1FCU-02/CDU-02				
AREA SERVED		MDB-1	MDB-2				
QUANTITY SET (S)		1	1				
TYPE OF INDOOR/OUTDOOR UNIT		CC /PH	CC /PH				
UNIT DATA (EACH)	DESIGN ROOM CONDITION	°CDB/ % RH	24/55	24/55			
	TOTAL CAPACITY	kW	3.5	3.5			
	SENSIBLE CAPACITY	kW	2.45	2.45			
	SUPPLY AIR	L/s	190	190			
	OUTDOOR AIR	L/s	-	-			
	COOLING	ENT. AIR TEMP.	°CDB/°CWB	27/19.6	27/19.6		
		MAX. SUPPLY AIR TEMP.	°CDB/°CWB	12.8/-	12.8/-		
	REFRIG. PIPE	HOT GAS	Ø mm	-	-		
		SUCTION	Ø mm	15	15		
		LIQUID	Ø mm	12	12		
	DRAIN PIPE SIZE		Ø mm	20	20		
	OUTDOOR UNIT	APPROX	kW	2.2	2.2		
		V / Ø / Hz		230/1/50	230/1/50		
	INDOOR UNIT	EXTERNAL ST.PR	Pa	50	50		
		APPROX	kW	0.18	0.18		
		STARTER TYPE		SP-1	SP-1		
		V / Ø / Hz		230/1/50	230/1/50		
	AIR FILTERS	TYPE		BY MANUFACTURE	BY MANUFACTURE		
		MANOMETER	SET (S)	-	-		
		DIFF. PRESS. SWITCH	SET (S)	-	-		
	ELECTRICAL PANEL BOARD NO.						

NOTES :	1.	MAX. SUPPLY AIR TEMPERATURE SHALL BE THE CONDITION OF SUPPLY AIR WHICH IS MEASURED AT AIR TERMINAL OR AIR OUTLET.	7.5	TYPE "MF-1"	:	EXTENDED SURFACE POCKET TYPE MEDIUM FILTER, GLASS FIBER, 550mm., 60% EFF. ASHRAE 52-99
		THE CONTRACTOR SHALL COMPENSATE THE HEAT GENERATED FROM FAN'S MOTOR TO ACHIEVE THAT DISIRED SUPPLY AIR TEMPERATURE.				
	2.	MATCHING CAPACITY OF OUTDOOR UNIT AND INDOOR UNIT SHALL BE BASED ON THE AMBIENT TEMPERATURE OF 35°CDB	7.6	TYPE "MF-2"	:	EXTENDED SURFACE POCKET TYPE MEDIUM FILTER, GLASS FIBER, 550mm., 80% EFF. ASHRAE 52-99
	3.	THICKNESS OF PIPE INSULATION SHALL NOT BE LESS THAN 19 mm. THICK FOR SUCTION AND HOT GAS REFRIGERANT PIPE AND 13 mm. THICK FOR DRAIN PIPE.				
	4.	EXTERNAL STATIC PRESSURE OF BLOWER SHOWN IN SCHEDULE SHALL BE THE SUM OF ALL SYSTEM COMPONENT PRESSURE LOSSES EXCEPT COOLING COIL AND CASING OF AHU OR FCU.	7.7	TYPE "MF-3"	:	EXTENDED SURFACE PLEATED TYPE MEDIUM FILTER, GLASS FIBER WITH SEPARATOR, 300mm., 60% EFF. ASHRAE 52-99
	5.	TYPE OF INDOOR UNITS.	7.8	TYPE "MF-4"	:	EXTENDED SURFACE PLEATED TYPE MEDIUM FILTER, GLASS FIBER WITH SEPARATOR, 300mm., 80% EFF. ASHRAE 52-99
		FC = FLOOR MOUNTED, CONCEALED TYPE				
		VV = VERTICAL MOUNTED, VERTICAL DISCHARGE				
		HH = HORIZONTAL MOUNTED, HORIZONTAL DISCHARGE	7.9	TYPE "FF-1"	:	HEPA FILTER, FIRE RETARDANT GLASS FIBER WITH ALUMINIUM SEPARATOR, 145mm., 290mm., 99.97% DOP EFF.
		FE = FLOOR MOUNTED, EXPOSED TYPE				
		VH = VERTICAL MOUNTED, HORIZONTAL DISCHARGE				
		CC = CEILING MOUNTED, CONCEALED TYPE	7.10	TYPE "FF-2"	:	HEPA FILTER, FIRE RETARDANT GLASS FIBER WITH ALUMINIUM SEPARATOR, 145mm., 290mm., 99.99% DOP EFF.
		CE = CEILING MOUNTED, EXPOSED TYPE				
		WE = WALL MOUNTED, EXPOSED TYPE	7.11	TYPE "FF-3"	:	ULPA FILTER, FIRE RETARDANT GLASS FIBER WITH ALUMINIUM SEPARATOR 145mm., 290mm., 99.999% DOP EFF.
6.	TYPE OF OUTDOOR UNITS.					
	PH = PROPELLER FAN, HORDZONTAL DISCHARGE	PV = PROPELLER FAN, VERTICAL DISCHARGE	7.12	TYPE "X-1"	:	ELECTRONIC AIR CLEANER (INDUSTRIAL GRADE), 90% EFF. ASHRAE 52-99
	CH = CENTRIFUGAL FAN, HORIZONTAL DISCHARGE		7.13	TYPE "X-2"	:	COMBINATION FILTER (ELECTRONIC FILTER + MECHANICAL FILTER)
7.	TYPE OF AIR FILTERS					
	7.1	TYPE "PF-1"	:	PANEL FILTER, POLYESTER SYNTHETIC FIBER, 9mm.		
	7.2	TYPE "PF-2"	:	PANEL FILTER, POLYESTER SYNTHETIC FIBER, 50mm.		
	7.3	TYPE "PF-3"	:	EXTENED SURFACE PLEATED TYPE PANEL FILTER, GLASS FIBER, 100mm.		
	7.4	TYPE "PF-4"	:	AUTOMATIC ROLL MEDIA PANEL FILTER, GLASS FIBER, 50mm.		

PROJECT : -

Sheet No. VRF - 1

AIR COOLED VARIABLE REFRIGERANT FLOWRATE AIR-CONDITIONING UNITS SCHEDULE (INDOOR UNIT)

DATE : 29-Jun-21

UNIT NUMBER		A-1FCU-01,02/1	A-1FCU-03,04/1	A-1FCU-05,06/1	A-1FCU-07/1	A-1FCU-08,09/1	A-1FCU-10,11/1	A-1FCU-12 TO 20/1
AREA SERVED		ห้องเรียน 30 ห้อง	Meeting Room	Meeting Room	Meeting Room	Meeting Room	Meeting Room	ที่ทำงานนักศึกษา
QTY. (SETS)		2	2	2	1	2	2	9
TYPE OF INDOOR UNIT		CCS	CCS	CCS	CCS	CCS	CCS	CCS
DESIGN ROOM CONDITION,*CDB/%RH		24+,-2/55	24+,-2/55	24+,-2/55	24+,-2/55	24+,-2/55	24+,-2/55	24+,-2/55
COOLING	TOTAL CAPACITY, kW.	7.1	5.6	2.8	14.0	2.8	2.8	7.1
	SENSIBLE CAPACITY, kW.	5.4	4.3	2.1	10.6	2.1	2.1	5.4
COOLING COIL ENTERING AIR TEMP., °CDB/°CWB		27.0/19.6	27.0/19.6	27.0/19.6	27.0/19.6	27.0/19.6	27.0/19.6	27.0/19.6
COOLING COIL LEAVING AIR TEMP., °CDB/°CWB		12.8/12.4	12.8/12.4	12.8/12.4	12.8/12.4	12.8/12.4	12.8/12.4	12.8/12.4
SUPPLY AIR, L/S		370	260	160	650	200	160	340
OUTDOOR AIR, L/S		-	-	-	-	-	-	-
REFRIGERANT PIPE	LIQUID, Ømm.	15	15	15	15	15	15	15
	SUCTION, Ømm.	10	10	10	10	10	10	10
DRAIN PIPE SIZE, Ømm.		20	20	20	20	25	20	20
EXTERNAL ST.PR Pa		-	-	-	-	-	-	-
APPROX kW		0.18	0.18	0.18	0.25	0.18	0.18	0.18
STARTER TYPE		SP-4	SP-4	SP-4	SP-4	SP-4	SP-4	SP-4
V / Ø/ Hz		230/1/50	230/1/50	230/1/50	230/1/50	230/1/50	230/1/50	230/1/50
AIR FILTERS	TYPE	PF-1	PF-1	PF-1	PF-1	PF-1	PF-1	PF-1
	MANOMETER,SET(S)	-	-	-	-	-	-	-
	DIFF. PRESS SWITH, SET(S)	-	-	-	-	-	-	-
CONNECTED TO CDU NO.		A-1CDU-01	A-1CDU-01	A-1CDU-01	A-1CDU-01	A-1CDU-01	A-1CDU-01	A-1CDU-01
AC PANEL NO.		A-1AP1	A-1AP1	A-1AP1	A-1AP1	A-1AP1	A-1AP1	A-1AP1
NOTES : - MAX. SUPPLY AIR TEMPERATURE SHALL BE THE CONDITION OF SUPPLY AIR WHICH IS MEASURED AT AIR TERMINAL OR AIR OUTLET. THE CONTRACTOR SHALL COMPENSATE THE HEAT GENERATED FROM FAN'S MOTOR TO ACHIEVE THAT DISIRED SUPPLY AIR TEMPERATURE. - MATCHING CAPACITY OF OUTDOOR UNIT AND INDOOR UNIT SHALL BE BASED ON THE AMBIENT TEMPERATURE OF 35°CDB - THICKNESS OF PIPE INSULATION SHALL NOT BE LESS THAN 19 mm. THICK FOR SUCTION AND HOT GAS REFRIGERANT PIPE AND 13 mm. THICK FOR DRAIN PIPE. - EXTERNAL STATIC PRESSURE OF BLOWER SHOWN IN SCHEDULE SHALL BE THE SUM OF ALL SYSTEM COMPONENT PRESSURE LOSSES EXCEPT COOLING COIL AND CASING OF AHU OR FCU. - TYPE OF INDOOR UNITS. FC = FLOOR MOUNTED, CONCEALED TYPE FE = FLOOR MOUNTED, EXPOSED TYPE CE = CEILING MOUNTED, EXPOSED TYPE - TYPE OF OUTDOOR UNITS. PH = PROPELLER FAN, HORIZONTAL DISCHARGE - TYPE OF AIR FILTERS 7.1 TYPE "PF-1" 7.2 TYPE "PF-2" 7.3 TYPE "PF-3" 7.4 TYPE "PF-4" - TYPE "MF-1" : 7.6 TYPE "MF-2" : 7.7 TYPE "MF-3" : 7.8 TYPE "MF-4" : VV = VERTICAL MOUNTED, VERTICAL DISCHARGE VH = VERTICAL MOUNTED, HORIZONTAL DISCHARGE CCS = CEILING MOUNTED, CASSETTE TYPE CC = CEILING MOUNTED, CONCEALED TYPE WE = WALL MOUNTED, EXPOSED TYPE PV = PROPELLER FAN, VERTICAL DISCHARGE CH = CENTRIFUGAL FAN, HORIZONTAL DISCHARGE PANEL FILTER, POLYESTER SYNTHETIC FIBER, 9mm. PANEL FILTER, POLYESTER SYNTHETIC FIBER, 50mm. EXTENDED SURFACE PLEATED TYPE PANEL FILTER, GLASS FIBER, 100mm. AUTOMATIC ROLL MEDIA PANEL FILTER, GLASS FIBER, 50mm. EXTENDED SURFACE POCKET TYPE MEDIUM FILTER, GLASS FIBER, 550mm., 60% EFF. ASHRAE 52-99 EXTENDED SURFACE POCKET TYPE MEDIUM FILTER, GLASS FIBER, 550mm., 80% EFF. ASHRAE 52-99 EXTENDED SURFACE PLEATED TYPE MEDIUM FILTER, GLASS FIBER WITH SEPARATOR, 300mm., 60% EFF. ASHRAE 52-99 EXTENDED SURFACE PLEATED TYPE MEDIUM FILTER, GLASS FIBER WITH SEPARATOR, 300mm., 80% EFF. ASHRAE 52-99								

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Sheet No. VRF - 2

AIR COOLED VARIABLE REFRIGERANT FLOWRATE AIR-CONDITIONING UNITS SCHEDULE (INDOOR UNIT)

DATE : 29-Jun-21

UNIT NUMBER		A-1FCU-01/2	A-1FCU-02/2	A-1FCU-03/2	A-1FCU-04/2	A-1FCU-05,06/2	A-1FCU-07,16/2	A-1FCU-08 TO 15/2
AREA SERVED		Meeting Room	CRRIDOR	Meeting Room	คณบดี	เลขาคณบดี	LOBBY	ที่ทำงานนักศึกษา
QTY. (SETS)		1	1	1	1	2	2	8
TYPE OF INDOOR UNIT		CCS-1WAY	CCS	CCS	CC	CC	CC	CCS
DESIGN ROOM CONDITION,*CDB/%RH		24+,-2/55	24+,-2/55	24+,-2/55	24+,-2/55	24+,-2/55	24+,-2/55	24+,-2/55
COOLING	TOTAL CAPACITY, kW.	2.8	11.2	2.8	14.0	9.0	11.2	7.1
	SENSIBLE CAPACITY, kW.	2.1	8.5	2.1	10.6	6.8	8.5	5.4
COOLING COIL ENTERING AIR TEMP., °CDB/°CWB		27.0/19.6	27.0/19.6	27.0/19.6	27.0/19.6	27.0/19.6	27.0/19.6	27.0/19.6
COOLING COIL LEAVING AIR TEMP., °CDB/°CWB		12.8/12.4	12.8/12.4	12.8/12.4	12.8/12.4	12.8/12.4	12.8/12.4	12.8/12.4
SUPPLY AIR, L/S		120	470	180	780	485	530	340
OUTDOOR AIR, L/S		-	-	-	-	-	-	-
REFRIGERANT PIPE	LIQUID, Ømm.	15	15	15	15	15	15	15
	SUCTION, Ømm.	10	10	10	10	10	10	10
DRAIN PIPE SIZE, Ømm.		20	20	20	25	25	25	25
EXTERNAL ST.PR Pa		-	-	-	100	75	75	-
APPROX kW		0.18	0.18	0.18	0.37	0.18	0.18	0.18
STARTER TYPE		SP-4	SP-4	SP-4	SP-4	SP-4	SP-4	SP-4
V / Ø/ Hz		230/1/50	230/1/50	230/1/50	230/1/50	230/1/50	230/1/50	230/1/50
AIR FILTERS	TYPE	PF-1	PF-1	PF-1	PF-1	PF-1	PF-1	PF-1
	MANOMETER,SET(S)	-	-	-	-	-	-	-
	DIFF. PRESS SWITH, SET(S)	-	-	-	-	-	-	-
CONNECTED TO CDU NO.		A-1CDU-02	A-1CDU-02	A-1CDU-02	A-1CDU-02	A-1CDU-02	A-1CDU-02	A-1CDU-02
AC PANEL NO.		A-1AP1	A-1AP1	A-1AP1	A-1AP1	A-1AP1	A-1AP1	A-1AP1
NOTES : - MAX. SUPPLY AIR TEMPERATURE SHALL BE THE CONDITION OF SUPPLY AIR WHICH IS MEASURED AT AIR TERMINAL OR AIR OUTLET. THE CONTRACTOR SHALL COMPENSATE THE HEAT GENERATED FROM FAN'S MOTOR TO ACHIEVE THAT DISIRED SUPPLY AIR TEMPERATURE. - MATCHING CAPACITY OF OUTDOOR UNIT AND INDOOR UNIT SHALL BE BASED ON THE AMBIENT TEMPERATURE OF 35°CDB - THICKNESS OF PIPE INSULATION SHALL NOT BE LESS THAN 19 mm. THICK FOR SUCTION AND HOT GAS REFRIGERANT PIPE AND 13 mm. THICK FOR DRAIN PIPE. - EXTERNAL STATIC PRESSURE OF BLOWER SHOWN IN SCHEDULE SHALL BE THE SUM OF ALL SYSTEM COMPONENT PRESSURE LOSSES EXCEPT COOLING COIL AND CASING OF AHU OR FCU. - TYPE OF INDOOR UNITS. FC = FLOOR MOUNTED, CONCEALED TYPE FE = FLOOR MOUNTED, EXPOSED TYPE CE = CEILING MOUNTED, EXPOSED TYPE - TYPE OF OUTDOOR UNITS. PH = PROPELLER FAN, HORIZONTAL DISCHARGE - TYPE OF AIR FILTERS 7.1 TYPE "PF-1" 7.2 TYPE "PF-2" 7.3 TYPE "PF-3" 7.4 TYPE "PF-4" - TYPE "MF-1" : 7.6 TYPE "MF-2" : 7.7 TYPE "MF-3" : 7.8 TYPE "MF-4" : VV = VERTICAL MOUNTED, VERTICAL DISCHARGE VH = VERTICAL MOUNTED, HORIZONTAL DISCHARGE CCS = CEILING MOUNTED, CASSETTE TYPE CC = CEILING MOUNTED, CONCEALED TYPE WE = WALL MOUNTED, EXPOSED TYPE PV = PROPELLER FAN, VERTICAL DISCHARGE CH = CENTRIFUGAL FAN, HORIZONTAL DISCHARGE PANEL FILTER, POLYESTER SYNTHETIC FIBER, 9mm. PANEL FILTER, POLYESTER SYNTHETIC FIBER, 50mm. EXTENDED SURFACE PLEATED TYPE PANEL FILTER, GLASS FIBER, 100mm. AUTOMATIC ROLL MEDIA PANEL FILTER, GLASS FIBER, 50mm. EXTENDED SURFACE POCKET TYPE MEDIUM FILTER, GLASS FIBER, 550mm., 60% EFF. ASHRAE 52-99 EXTENDED SURFACE POCKET TYPE MEDIUM FILTER, GLASS FIBER, 550mm., 80% EFF. ASHRAE 52-99 EXTENDED SURFACE PLEATED TYPE MEDIUM FILTER, GLASS FIBER WITH SEPARATOR, 300mm., 60% EFF. ASHRAE 52-99 EXTENDED SURFACE PLEATED TYPE MEDIUM FILTER, GLASS FIBER WITH SEPARATOR, 300mm., 80% EFF. ASHRAE 52-99								

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Sheet No. VRF - 3

AIR COOLED VARIABLE REFRIGERANT FLOWRATE AIR-CONDITIONING UNITS SCHEDULE (INDOOR UNIT)

DATE : 29-Jun-21

UNIT NUMBER		A-1FCU-01/3	A-1FCU-02/3	A-1FCU-03/3	A-1FCU-04 TO 08/3	A-1FCU-09/3		
AREA SERVED		Meeting Room	Meeting Room	ห้องเลขาคณะ	ที่ทำงานนักศึกษา	ที่ทำงานนักศึกษา		
QTY. (SETS)		1	1	1	5	1		
TYPE OF INDOOR UNIT		CC	CC	CCS	CCS	CCS		
DESIGN ROOM CONDITION,*CDB/%RH		24+,-2/55	24+,-2/55	24+,-2/55	24+,-2/55	24+,-2/55		
COOLING	TOTAL CAPACITY, kW.	11.2	4.5	2.8	11.2	7.1		
	SENSIBLE CAPACITY, kW.	8.5	3.4	2.1	8.5	5.4		
COOLING COIL ENTERING AIR TEMP., °CDB/°CWB		27.0/19.6	27.0/19.6	27.0/19.6	27.0/19.6	27.0/19.6		
COOLING COIL LEAVING AIR TEMP., °CDB/°CWB		12.8/12.4	12.8/12.4	12.8/12.4	12.8/12.4	12.8/12.4		
SUPPLY AIR, L/S		470	240	120	530	340		
OUTDOOR AIR, L/S		-	-	-	-	-		
REFRIGERANT PIPE	LIQUID, Ømm.	15	15	15	15	15		
	SUCTION, Ømm.	10	10	10	10	10		
DRAIN PIPE SIZE, Ømm.		20	20	20	20	20		
EXTERNAL ST.PR Pa		100	100	-	-	-		
APPROX kW		0.25	0.25	0.18	0.18	0.18		
STARTER TYPE		SP-4	SP-4	SP-4	SP-4	SP-4		
V / Ø/ Hz		230/1/50	230/1/50	230/1/50	230/1/50	230/1/50		
AIR FILTERS	TYPE	PF-1	PF-1	PF-1	PF-1	PF-1		
	MANOMETER,SET(S)	-	-	-	-	-		
	DIFF. PRESS SWITH, SET(S)	-	-	-	-	-		
CONNECTED TO CDU NO.		A-1CDU-03	A-1CDU-03	A-1CDU-03	A-1CDU-03	A-1CDU-03		
AC PANEL NO.		A-1AP2	A-1AP2	A-1AP2	A-1AP2	A-1AP2		
NOTES : 1. MAX. SUPPLY AIR TEMPERATURE SHALL BE THE CONDITION OF SUPPLY AIR WHICH IS MEASURED AT AIR TERMINAL OR AIR OUTLET. THE CONTRACTOR SHALL COMPENSATE THE HEAT GENERATED FROM FAN'S MOTOR TO ACHIEVE THAT DISIRED SUPPLY AIR TEMPERATURE. 2. MATCHING CAPACITY OF OUTDOOR UNIT AND INDOOR UNIT SHALL BE BASED ON THE AMBIENT TEMPERATURE OF 35°CDB 3. THICKNESS OF PIPE INSULATION SHALL NOT BE LESS THAN 19 mm. THICK FOR SUCTION AND HOT GAS REFRIGERANT PIPE AND 13 mm. THICK FOR DRAIN PIPE. 4. EXTERNAL STATIC PRESSURE OF BLOWER SHOWN IN SCHEDULE SHALL BE THE SUM OF ALL SYSTEM COMPONENT PRESSURE LOSSES EXCEPT COOLING COIL AND CASING OF AHU OR FCU. 5. TYPE OF INDOOR UNITS. FC = FLOOR MOUNTED, CONCEALED TYPE FE = FLOOR MOUNTED, EXPOSED TYPE CE = CEILING MOUNTED, EXPOSED TYPE 6. TYPE OF OUTDOOR UNITS. PH = PROPELLER FAN, HORIZONTAL DISCHARGE 7. TYPE OF AIR FILTERS 7.1 TYPE "PF-1" 7.2 TYPE "PF-2" 7.3 TYPE "PF-3" 7.4 TYPE "PF-4" VV = VERTICAL MOUNTED, VERTICAL DISCHARGE VH = VERTICAL MOUNTED, HORIZONTAL DISCHARGE CCS = CEILING MOUNTED, CASSETTE TYPE HV = HORIZONTAL MOUNTED, VERTICAL DISCHARGE HH = HORIZONTAL MOUNTED, HORIZONTAL DISCHARGE CC = CEILING MOUNTED, CONCEALED TYPE WE = WALL MOUNTED, EXPOSED TYPE PV = PROPELLER FAN, VERTICAL DISCHARGE CH = CENTRIFUGAL FAN, HORIZONTAL DISCHARGE PANEL FILTER, POLYESTER SYNTHETIC FIBER, 9mm. PANEL FILTER, POLYESTER SYNTHETIC FIBER, 50mm. EXTENDED SURFACE PLEATED TYPE PANEL FILTER, GLASS FIBER, 100mm. AUTOMATIC ROLL MEDIA PANEL FILTER, GLASS FIBER, 50mm. 7.5 TYPE "MF-1" : EXTENDED SURFACE POCKET TYPE MEDIUM FILTER, GLASS FIBER, 550mm., 60% EFF. ASHRAE 52-99 7.6 TYPE "MF-2" : EXTENDED SURFACE POCKET TYPE MEDIUM FILTER, GLASS FIBER, 550mm., 80% EFF. ASHRAE 52-99 7.7 TYPE "MF-3" : EXTENDED SURFACE PLEATED TYPE MEDIUM FILTER, GLASS FIBER WITH SEPARATOR, 300mm., 60% EFF. ASHRAE 52-99 7.8 TYPE "MF-4" : EXTENDED SURFACE PLEATED TYPE MEDIUM FILTER, GLASS FIBER WITH SEPARATOR, 300mm., 80% EFF. ASHRAE 52-99								

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Sheet No. VRF - 4

AIR COOLED VARIABLE REFRIGERANT FLOWRATE AIR-CONDITIONING UNITS SCHEDULE (INDOOR UNIT)

DATE : 29-Jun-21

UNIT NUMBER		A-1FCU-01,02,03/4	A-1FCU-06,07,08/4	A-1FCU-01,04,05,09,10/4	A-1FCU-11 TO 14/4	A-1FCU-15,16/4	A-1FCU-17,18,19/4	A-1FCU-20,21/4
AREA SERVED		ที่ทำงานนักศึกษา	Meeting Room	ที่ทำงานนักศึกษา	ที่ทำงานนักศึกษา	ที่ทำงานนักศึกษา	ที่ทำงานนักศึกษา	Meeting Room
QTY. (SETS)		2	3	5	4	2	3	2
TYPE OF INDOOR UNIT		CCS	CCS	CCS	CCS	CCS	CCS	CCS
DESIGN ROOM CONDITION, °CDB/%RH		24+,-2/55	24+,-2/55	24+,-2/55	24+,-2/55	24+,-2/55	24+,-2/55	24+,-2/55
COOLING	TOTAL CAPACITY, kW.	11.2	2.8	7.1	11.2	7.1	7.1	4.5
	SENSIBLE CAPACITY, kW.	8.5	2.1	5.4	8.5	5.4	5.4	3.4
COOLING COIL ENTERING AIR TEMP., °CDB/°CWB		27.0/19.6	27.0/19.6	27.0/19.6	27.0/19.6	27.0/19.6	27.0/19.6	27.0/19.6
COOLING COIL LEAVING AIR TEMP., °CDB/°CWB		12.8/12.4	12.8/12.4	12.8/12.4	12.8/12.4	12.8/12.4	12.8/12.4	12.8/12.4
SUPPLY AIR, L/S		530	180	330	530	350	350	230
OUTDOOR AIR, L/S		-	-	-	-	-	-	-
REFRIGERANT PIPE	LIQUID, Ømm.	15	15	15	15	15	15	15
	SUCTION, Ømm.	10	10	10	10	10	10	10
DRAIN PIPE SIZE, Ømm.		20	20	20	20	20	20	20
EXTERNAL ST.PR Pa		-	-	-	-	-	-	-
APPROX kW		0.18	0.18	0.18	0.18	0.18	0.18	0.18
STARTER TYPE		SP-4	SP-4	SP-4	SP-4	SP-4	SP-4	SP-4
V / Ø / Hz		230/1/50	230/1/50	230/1/50	230/1/50	230/1/50	230/1/50	230/1/50
AIR FILTERS	TYPE	PF-1	PF-1	PF-1	PF-1	PF-1	PF-1	PF-1
	MANOMETER,SET(S)	-	-	-	-	-	-	-
	DIFF. PRESS SWITH, SET(S)	-	-	-	-	-	-	-
CONNECTED TO CDU NO.		A-1CDU-04	A-1CDU-04	A-1CDU-04	A-1CDU-04	A-1CDU-04	A-1CDU-04	A-1CDU-04
AC PANEL NO.		A-1AP2	A-1AP2	A-1AP2	A-1AP2	A-1AP2	A-1AP2	A-1AP2
NOTES : 1. MAX. SUPPLY AIR TEMPERATURE SHALL BE THE CONDITION OF SUPPLY AIR WHICH IS MEASURED AT AIR TERMINAL OR AIR OUTLET. THE CONTRACTOR SHALL COMPENSATE THE HEAT GENERATED FROM FAN'S MOTOR TO ACHIEVE THAT DISIRED SUPPLY AIR TEMPERATURE. 2. MATCHING CAPACITY OF OUTDOOR UNIT AND INDOOR UNIT SHALL BE BASED ON THE AMBIENT TEMPERATURE OF 35°CDB 3. THICKNESS OF PIPE INSULATION SHALL NOT BE LESS THAN 19 mm. THICK FOR SUCTION AND HOT GAS REFRIGERANT PIPE AND 13 mm. THICK FOR DRAIN PIPE. 4. EXTERNAL STATIC PRESSURE OF BLOWER SHOWN IN SCHEDULE SHALL BE THE SUM OF ALL SYSTEM COMPONENT PRESSURE LOSSES EXCEPT COOLING COIL AND CASING OF AHU OR FCU. 5. TYPE OF INDOOR UNITS. FC = FLOOR MOUNTED, CONCEALED TYPE FE = FLOOR MOUNTED, EXPOSED TYPE CE = CEILING MOUNTED, EXPOSED TYPE 6. TYPE OF OUTDOOR UNITS. PH = PROPELLER FAN, HORIZONTAL DISCHARGE 7. TYPE OF AIR FILTERS 7.1 TYPE "PF-1" 7.2 TYPE "PF-2" 7.3 TYPE "PF-3" 7.4 TYPE "PF-4" VV = VERTICAL MOUNTED, VERTICAL DISCHARGE VH = VERTICAL MOUNTED, HORIZONTAL DISCHARGE CCS = CEILING MOUNTED, CASSETTE TYPE PV = PROPELLER FAN, VERTICAL DISCHARGE HV = HORIZONTAL MOUNTED, VERTICAL DISCHARGE HH = HORIZONTAL MOUNTED, HORIZONTAL DISCHARGE CC = CEILING MOUNTED, CDNCEALED TYPE WE = WALL MOUNTED, EXPOSED TYPE CH = CENTRIFUGAL FAN, HORIZONTAL DISCHARGE 7.5 TYPE "MF-1" : EXTENDED SURFACE POCKET TYPE MEDIUM FILTER, GLASS FIBER, 550mm., 60% EFF. ASHRAE 52-99 7.6 TYPE "MF-2" : EXTENDED SURFACE POCKET TYPE MEDIUM FILTER, GLASS FIBER, 550mm., 80% EFF. ASHRAE 52-99 7.7 TYPE "MF-3" : EXTENDED SURFACE PLEATED TYPE MEDIUM FILTER, GLASS FIBER WITH SEPARATOR, 300mm., 60% EFF. ASHRAE 52-99 7.8 TYPE "MF-4" : EXTENDED SURFACE PLEATED TYPE MEDIUM FILTER, GLASS FIBER WITH SEPARATOR, 300mm., 80% EFF. ASHRAE 52-99 REV. : - REV. DATE : -								

REV. : -

REV. DATE : -

PROJECT : -

AIR COOLED VARIABLE REFRIGERANT FLOWRATE AIR-CONDITIONING UNITS SCHEDULE (OUTDOOR UNIT)

DATE : 29-Jun-21 Sheet No. VRF - 1

UNIT NUMBER		A-1CDU-01	A-1CDU-02	A-1CDU-03	A-1CDU-04			
COMPRESSOR	COOLING CAPACITY, KW _R	120(409,439 BTU)	128(436,735 BTU)	81.66(278,419 BTU)	155.6(530,907 BTU)			
	APPROX.,kW _C	30	30	22	55			
	V/ØHz	400/3/50	400/3/50	400/3/50	400/3/50			
REFRIGERANT PIPE	LIQUID, Ømm.	42	42	42	42			
	SUCTION, Ømm.	22	22	22	22			
ELECTRICAL PANEL BOARD NO.		A-1AP1	A-1AP1	A-1AP2	A-1AP2			
COMBINATION RATIO		85-100 %	85-100 %	85-100 %	85-100 %			

NOTES :	1.	MAX. SUPPLY AIR TEMPERATURE SHALL BE THE CONDITION OF SUPPLY AIR WHICH IS MEASURED AT AIR TERMINAL OR AIR OUTLET. THE CONTRACTOR SHALL COMPENSATE THE HEAT GENERATED FROM FAN'S MOTOR TO ACHIEVE THAT DISIRED SUPPLY AIR TEMPERATURE.			7.5	TYPE "MF-1"	:	EXTENDED SURFACE POCKET TYPE MEDIUM FILTER, GLASS FIBER, 550mm., 60% EFF. ASHRAE 52-99
	2.	MATCHING CAPACITY OF OUTDOOR UNIT AND INDOOR UNIT SHALL BE BASED ON THE AMBIENT TEMPERATURE OF 35 °CDB			7.6	TYPE "MF-2"	:	EXTENDED SURFACE POCKET TYPE MEDIUM FILTER, GLASS FIBER, 550mm., 80% EFF. ASHRAE 52-99
	3.	THICKNESS OF PIPE INSULATION SHALL NOT BE LESS THAN 19 mm. THICK FOR SUCTION AND HOT GAS REFRIGERANT PIPE AND 13 mm. THICK FOR DRAIN PIPE.			7.7	TYPE "MF-3"	:	EXTENDED SURFACE PLEATED TYPE MEDIUM FILTER, GLASS FIBER WITH SEPARATOR, 300mm., 60% EFF. ASHRAE 52-99
	4.	EXTERNAL STATIC PRESSURE OF BLOWER SHOWN IN SCHEDULE SHALL BE THE SUM OF ALL SYSTEM COMPONENT PRESSURE LOSSES EXCEPT COOLING COIL AND CASING OF AHU OR FCU.			7.8	TYPE "MF-4"	:	EXTENDED SURFACE PLEATED TYPE MEDIUM FILTER, GLASS FIBER WITH SEPARATOR, 300mm., 80% EFF. ASHRAE 52-99
	5.	TYPE OF INDOOR UNITS. FC = FLOOR MOUNTED, CONCEALED TYPE FE = FLOOR MOUNTED, EXPOSED TYPE CE = CEILING MOUNTED, EXPOSED TYPE			7.9	TYPE "FF-1"	:	HEPA FILTER, FIRE RETARDANT GLASS FIBER WITH ALUMINIUM SEPARATOR, 145mm., 290mm., 99.97% DOP EFF.
			VV = VERTICAL MOUNTED, VERTICAL DISCHARGE	HV = HORIZONTAL MOUNTED, VERTICAL DISCHARGE	7.10	TYPE "FF-2"	:	HEPA FILTER, FIRE RETARDANT GLASS FIBER WITH ALUMINIUM SEPARATOR, 145mm., 290mm., 99.99% DOP EFF.
			VH = VERTICAL MOUNTED, HORIZONTAL DISCHARGE	HH = HORIZONTAL MOUNTED, HORIZONTAL DISCHARGE	7.11	TYPE "FF-3"	:	ULPA FILTER, FIRE RETARDANT GLASS FIBER WITH ALUMINIUM SEPARATOR 145mm., 290mm., 99.999% DOP EFF.
			CCS = CEILING MOUNTED, CASSETTE TYPE	CC = CEILING MOUNTED, CDNCEALED TYPE	7.12	TYPE "X-1"	:	ELECTRONIC AIR CLEANER (INDUSTRIAL GRADE), 90% EFF. ASHRAE 52-99
				WE = WALL MOUNTED, EXPOSED TYPE	7.13	TYPE "X-2"	:	COMBINATION FILTER (ELECTRONIC FILTER + MECHANICAL FILTER)
	6.	TYPE OF OUTDOOR UNITS. PH = PROPELLER FAN, HORDZONTAL DISCHARGE						
			PV = PROPELLER FAN, VERTICAL DISCHARGE	CH = CENTRIFUGAL FAN, HORIZONTAL DISCHARGE				
	7.	TYPE OF AIR FILTERS						
	7.1	TYPE "PF-1"	PANEL FILTER, POLYESTER SYNTHETIC FIBER, 9mm.					
	7.2	TYPE "PF-2"	PANEL FILTER, POLYESTER SYNTHETIC FIBER, 50mm.					
	7.3	TYPE "PF-3"	EXTENED SURFACE PLEATED TYPE PANEL FILTER, GLASS FIBER, 100mm.					
	7.4	TYPE "PF-4"	AUTOMATIC ROLL MEDIA PANEL FILTER, GLASS FIBER, 50mm.					

REV. : -

REV. DATE : -

PROJECT : -

AIR HANDLING AND FAN COIL UNITS SCHEDULE

UNIT NUMBER			B-3F-01	B-3F-02,03,05,06	B-3F-04	B-3F-07,08,09	B-3F-10	B-3F-11	B-3F-12,13,14	
AREA SERVED			Meeting	SEAT ROOM	PANTRY	SEAT ROOM	SEAT ROOM	SEAT ROOM	SEAT ROOM	
QUANTITY	SET (S)		1	4	1	3	1	1	3	
AHU./FCU. TYPE			CCS W/Pump Drain	CCS W/Pump Drain	CCS W/Pump Drain	CCS W/Pump Drain	CCS W/Pump Drain	CCS W/Pump Drain	CCS W/Pump Drain	
DESIGN ROOM CONDITION		°CDB/ % RH	24/55+/-5	24/55+/-5	24/55+/-5	24/55+/-5	24/55+/-5	24/55+/-5	24/55+/-5	
UNIT DATA (EACH)	TOTAL CAPACITY		kW	7.7	7.9	3.5	5.2	5.2	5.5	10.7
	SENSIBLE CAPACITY		kW	5	6	3	4	4	4	8
	SUPPLY AIR		L/s	470	470	220	275	275	320	650
	OUTDOOR AIR		L/s	-	-	-	-	-	-	-
	DRAIN PIPE SIZE		Ø mm	25	25	20	20	20	20	25
	COOLING	ENT. WATER TEMPT	°C	7.2	7.2	7.2	7.2	7.2	7.2	7.2
		COIL	LEAV. WATER TEMPT	°C	12.8	12.8	12.8	12.8	12.8	12.8
	COND.	ENT. AIR TEMPT	°CDB/°CWB	24.0/ 17.1	24.0/ 17.1	24.0/ 17.1	24.0/ 17.1	24.8 / 17.5	24.8 / 16.9	24.8 / 16.9
			MAX. SUPPLY AIR TEM	°CDB/°CWB	12.7 / 12.0	12.7 / 12.0	12.7 / 12.0	12.7 / 12.0	12.9 / 12.3	12.8 / 12.0
	CHILLED	FLOW RATE	L/s	0.49	0.50	0.22	0.33	0.33	0.35	0.67
		WATER	PIPE SIZE	Ø mm	32	32	25	25	25	32
	PIPE	TYPE OF CONTROL VALVE		2W-O/F	2W-O/F	2W-O/F	2W-O/F	2W-O/F	2W-O/F	2W-P
		CLOSE-OFF PRESS. RATING kPa		-	-	-	-	-	-	-
	BLOWER	EXTERNAL ST. PR.	Pa	-	-	-	-	-	-	-
		APPROX.	kW	0.25	0.25	0.18	0.18	0.18	0.18	0.37
		STARTER TYPE		-	-	-	-	-	-	-
		V / Ø / Hz		220/1/50	220/1/50	220/1/50	220/1/50	220/1/50	220/1/50	220/1/50
	AIR FILTER	TYPE		BY MANUFACTURE	BY MANUFACTURE	BY MANUFACTURE	BY MANUFACTURE	BY MANUFACTURE	BY MANUFACTURE	BY MANUFACTURE
		MANOMETER	SET (S)	-	-	-	-	-	-	-
		DIFF. PRESS. SWITCH SET (S)		-	-	-	-	-	-	-
ELECTRICAL PANEL BOARD NO.			-	-	-	-	-	-	-	
NOTES : 1. MAX. SUPPLY AIR TEMPERATURE SHALL BE THE CONDITION OF SUPPLY AIR WHICH IS MEASURED AT AIR TERMINAL OR AIR OUTLET. THE CONTRACTOR SHALL COMPENSATE THE HEAT GENERATED FROM FAN'S MOTOR TO ACHIEVE THAT DESIRED SUPPLY AIR TEMPERATURE. 2. COOLING COIL FACE VELOCITY SHALL NOT EXCEED 2.5 m/s FOR AHU AND 2.25 m/s FOR FCU. 3. PRESSURE DROP OF COOLING COIL SHALL NOT EXCEED 45 kPa 4. EXTERNAL STATIC PRESSURE OF BLOWER SHOWN IN SCHEDULE SHALL BE THE SUM OF ALL SYSTEM COMPONENT PRESSURE LOSSES EXCEPT COOLING COIL AND CASING OF AHU OR FCU. 7. TYPE OF AIR FILTERS 7.1 TYPE "P-1" PANEL FILTER, POLYESTER SYNTHETIC FIBER, 9mm. 7.2 TYPE "P-2" PANEL FILTER, POLYESTER SYNTHETIC FIBER, 50mm. 7.3 TYPE "P-3" EXTENDED SURFACE PLEATED TYPE PANEL FILTER, GLASS FIBER, 100mm. 7.4 TYPE "P-4" AUTOMATIC ROLL MEDIA PANEL FILTER, GLASS FIBER, 50mm. 7.5 TYPE "M-1" EXTENDED SURFACE POCKET TYPE MEDIUM FILTER, GLASS FIBER, 550mm., 60% EFF. ASHRAE 52-99										

5. TYPE OF AHU & FCU

5.1 FOR AHU :

V V = VERTICAL MOUNTED, VERTICAL DISCHARGE

V H = VERTICAL MOUNTED, HORIZONTAL DISCHARGE

H V = HORIZONTAL MOUNTED, VERTICAL DISCHARGE

H H = HORIZONTAL MOUNTED, HORIZONTAL DISCHARGE

6. TYPE OF CONTROL VALVE

2W-Q-F = 2-WAY MOTORIZED VALVE INDEPENDENT PICV ; ON-OFF TYPE

2W-P = 2-WAY MOTORIZED VALVE INDEPENDENT PICV ; PROPORTIONAL TYPE

5.2 FOR FCU :

FC = FLOOR MOUNTED, CONCEALED TYPE

FE = FLOOR MOUNTED, EXPOSED TYPE

CC = CEILING MOUNTED, CONCEALED TYPE

CE = CEILING MOUNTED, EXPOSED TYPE

CCS = CEILING MOUNTED, CASSETTE TYPE

7.6 TYPE "M-2"

: EXTENDED SURFACE POCKET TYPE MEDIUM FILTER, GLASS FIBER, 550mm., 80% EFF. ASHRAE 52-99

7.7 TYPE "M-3"

: EXTENDED SURFACE PLEATED TYPE MEDIUM FILTER, GLASS FIBER WITH SEPARATOR, 300mm.,

60% EFF. ASHRAE 52-99

7.8 TYPE "M-4"

: EXTENDED SURFACE PLEATED TYPE MEDIUM FILTER, GLASS FIBER WITH SEPARATOR, 300mm.,

80% EFF. ASHRAE 52-99

REV. : - REV. DATE : -

PROJECT : -

VENTILATING FAN SCHEDULE

DATE : 29-Jun-21

UNIT NO.	AREA SERVED	QTY SET(S)	FAN TYPE	UNIT DATA (EACH)					
				CAPACITY L/s	ST.PR. Pa	FAN MOTOR			ELECTRICAL PANELBOARD NO.
						APPROX. kW	STARTER TYPE	V / Ø / Hz	
A BUILDING									
A-1V-01	WC	1	CL/D/C	50	50	0.18	-	230/1/50	-
A-1V-02	WC	1	CL/D/C	50	50	0.18	-	230/1/50	-
A-1V-03	XROX	1	CL/D/C	50	50	0.18	-	230/1/50	-
A-1V-04	WC	1	CF-FS/D/C/-	100	150	0.25	-	230/1/50	-
A-1V-05	WC	1	IL-FS/D/C/-	100	150	0.25	-	230/1/50	-
A-1V-06	WC	1	CL/D/C	50	50	0.18	-	230/1/50	-
A-1V-07	XROX	1	CL/D/C	50	75	0.18	-	230/1/50	-
A-1V-08	XROX	1	CL/D/C	50	75	0.18	-	230/1/50	-
A-1V-09	STO	1	CL/D/C	50	50	0.18	-	230/1/50	-
A-1V-10	STO	1	CL/D/C	80	60	0.18	-	230/1/50	-
A-1V-11	PUMP ROOM	1	CF-FS/D/C/-	70	100	0.18	-	230/1/50	-
A-1V-12	WC	1	CF-FS/D/C/-	150	150	0.25	-	230/1/50	-
A-1V-13	WC	1	CF-FS/D/C/-	70	100	0.18	-	230/1/50	-
A-1V-14	WC	1	CL/D/C	50	50	0.18	-	230/1/50	-
A-1V-15	XROX	1	CL/D/C	50	75	0.18	-	230/1/50	-
A-1V-16	XROX	1	CL/D/C	50	50	0.18	-	230/1/50	-
A-1V-17	STO	1	CL/D/C	70	60	0.18	-	230/1/50	-
B BUILDING									
B-3V-01	PANTRY	1	CL/D/C	70	70	0.18	-	230/1/50	-
B-3V-02	DOCUMENT	1	CL/D/C	100	50	0.18	-	230/1/50	-
NOTE : 1. FOR ALL VENTILATING FANS WITHOUT STARTERS, THE ELECTRICAL CONTRACTOR SHALL PROVIDE ELECTRICAL POWER SUPPLY TO THE LOCATIONS NEAR THE VENTILATING FANS COMPLETED WITH ELECTRICAL OUTLET OR CONNECTION BOX AND ON-OFF SWITCH. 2. TYPE OF VENTILATING FANS : CF-BD / B / F / (C) - CENTRIFUGAL FAN, BACKWARD CURVE, DOUBLE INLET, BELT DRIVE, FLOOR MOUNTING, CHEMICAL PROOF 1 2 3 4 1) TYPE OF FAN AX-AP - AXIAL FAN, ADJUSTABLE PITCH CL - CEILING FAN AX-FP - AXIAL FAN, FIXED PITCH CN - CABINET FAN PP-AS - PROPELLER FAN, AUTOMATIC SHUTTER CF-FS - CENTRIFUGAL FAN, FORWARD CURVE, SINGLE INLET PP-IN - PROPELLER FAN, INDUSTRIAL TYPE CF-FD - CENTRIFUGAL FAN, FORWARD CURVE, DOUBLE INLET RV-G - ROOF VENTILATOR, GENERAL TYPE CF-BS - CENTRIFUGAL FAN, BACKWARD CURVE, SINGLE INLET RV-I - ROOF VENTILATOR, INTAKE TYPE CF-BD - CENTRIFUGAL FAN, BACKWARD CURVE, DOUBLE INLET RV-U - ROOF VENTILATOR, UPBLAST TYPE IL - INLINE, CENTRIFUGAL FAN 2) DRIVE TYPE B - BELT DRIVE D - DIRECT DRIVE 3) MOUNTED TYPE F - FLOOR MOUNTED R - ROOF MOUNTED C - CEILING MOUNTED G - GLASS MOUNTED W - WALL MOUNTED 4) SPECIAL FEATURE H - HEAT RESISTANT O - OVERHUNG C - CHEMICAL PROOF E - EXPLOSION PROOF REV. : - REV. DATE : -									

REV. : -

REV. DATE : -

[illegible]

☒ **Cu. BUSBARS** 200 **A 3Ø 4W 50 Hz.** 100 **% NEUTRAL AND** 50 **% GROUND BUSBARS.**
☐ **A/5A CT**
☒ **DIGITAL METER**
- MEASURE : VOLT , AMP, kW, kWh, kVAR, kVAh, kVA, PF, Hz, HARMONIC

REV. :- REV. DATE :-

1

PROJECT	: Bussiness TU
TYPE	: Wall Mount
ALL CIRCUIT BREAKER IC >=	14 KA

PANEL BOARD NO.	:	A-1AP2
LOCATION	:	MDB ROOM
TERMINAL BOX NO.	:	-

[illegible]

CONNECTED TO : ☒ MAIN CB 3P,200A

ACCESSORIES : ☒ 3 x 5A FUSE

☒ 3 x PILOT LAMP

☒ SELECTOR SWITCH

☒ Cu. BUSBARS 200 A 3Ø 4W 50 Hz. 100 % NEUTRAL AND 50 % GROUND BUSBARS.
☐ _____ A/5A CT
☒ DIGITAL METER
 - MEASURE : VOLT , AMP, kW, kWh, kVAR, kVARh, kVA, PF, Hz, HARMONIC

REV. :- **REV. DATE :-**