

CKM.SD.FF/GP/13/7

GARIS PANDUAN ANGGARAN HARGA SISTEM MEKANIKAL DALAM BANGUNAN TAHUN 2013

- **SISTEM PENYAMAN UDARA**
- **SISTEM PENCEGAH KEBAKARAN**
- **SISTEM LIF**
- **SISTEM BEKALAN AIR SEJUK DAN SANITARI
DALAMAN**



“UNTUK EDARAN PENGGUNAAN JKR SAHAJA”



CAWANGAN KEJURUTERAAN MEKANIKAL

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- **SISTEM PENCEGAH KEBAKARAN**
- **SISTEM LIF**
- **SISTEM BEKALAN AIR SEJUK DAN
SANITARI DALAMAN**

Sila kemukakan pertanyaan/komen kepada:

Pengarah Kanan, Cawangan Kejuruteraan Mekanikal, Ibu Pejabat JKR Malaysia.

Tarikh kuatkuasa: Mei 2013

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1.0 OBJEKTIF

- 1.1 Menyediakan garis panduan anggaran kadar harga bagi pemasangan sistem mekanikal dalam bangunan selaras dengan keperluan dan spesifikasi semasa.
- 1.2 Menjadikannya sebagai dokumen rujukan kepada pegawai CKM menyediakan anggaran harga di peringkat pelaksanaan projek.
- 1.3 Memudahkan kerja-kerja membuat anggaran harga sistem dan peralatan mekanikal dengan cepat dan tepat.
- 1.4 Menyeragamkan anggaran harga Jabatan dan mengurangkan jurang perbezaan harga tender/sebutharga yang ketara.
- 1.5 Menjadi dokumen rujukan untuk anggaran harga sistem dan peralatan mekanikal untuk lain-lain tujuan yang berkaitan selain daripada perubahan kerja.

2.0 PANDUAN PENGGUNAAN

- 2.1 Penggunaan dokumen ini adalah sebagai rujukan menyediakan **anggaran harga** sistem mekanikal bagi projek baru, kerja-kerja penggantian dan kerja-kerja naiktaraf sistem mekanikal dalam bangunan untuk Semenanjung Malaysia, Sabah dan Sarawak. Kadar harga ini **tidak boleh digunakan** bagi Kerja-kerja Perubahan atau Pindaan di dalam mana-mana kontrak Sebutharga dan Tender yang berasaskan Senarai Kuantiti atau Pelan dan Spesifikasi.
 - 2.2 Kadar Harga ini adalah mengikut kategori kawasan yang telah ditetapkan tertakluk kepada tambahan peratusan mengikut zon.
 - 2.3 Kadar Harga ini hanya digunakan bagi kerja-kerja sistem mekanikal di dalam bangunan secara konvensional.
 - 2.4 Kadar harga yang dinyatakan di dalam garis panduan ini adalah mengambilkira harga peralatan yang berkualiti, upah, pengangkutan, keuntungan, tempoh jaminan, pengujian dan pentauliahan serta senggaraan dalam tempoh kecacatan.
- 3 Garispanduan ini turut menyediakan panduan pengiraan secara pukal bagi tujuan mendapatkan anggaran awalan kos projek mekanikal.

3.0 TAMBAHAN PERATUSAN

Dibawah ini adalah Jadual kadar harga tambahan peratusan bagi kerja-kerja mengikut zon.

3.1 KATEGORI KAWASAN DAN FAKTOR LOKALITI

Kategori-kategori kawasan adalah seperti berikut:

BIL	NEGERI	KATEGORI KAWASAN
i.	Perlis	A
	Kedah	
	Pulau Pinang	
ii.	Perak	B
iii.	Selangor	C
	Wilayah Persekutuan	
	Kuala Lumpur	
	Putrajaya	
	Negeri Sembilan	
	Melaka	
iv.	Johor	D
v.	Pahang	E
vi.	Terengganu	F
	Kelantan	
vii.	Sabah	G
	Sarawak	
	Wilayah Persekutuan Labuan	

Faktor Lokaliti adalah satu Faktor Pendarab (*Multiplying Factor*) yang digunakan untuk pelarasan kos bangunan bagi mengambilkira perbezaan lokaliti.

Berikut adalah jadual faktor lokaliti kategori kawasan yang telah ditetapkan

Kawasan	A	B	C	D	E	F	G
Faktor Lokaliti	1.0818	1.0255	1.0000	1.0545	1.0441	1.0502	1.3000

Nota:

Faktor-faktor tersebut telah diperolehi melalui kaedah-kaedah statistik dengan menggunakan kawasan C sebagai lokaliti asas. Pengemaskinian faktor tersebut akan dibuat dari masa ke semasa.

3.2 PRELIMINARIES

Kadar harga tambahan peratusan untuk preliminaries dalam lingkungan 5% daripada kos keseluruhan projek.

4.0

KADAR HARGA SISTEM PENYAMAN UDARA

4.1 KADAR HARGA BAGI SISTEM

Kaedah pemilihan sistem mestilah di ambil kira unit yang lebih besar.

Contoh: Kapasiti reka bentuk penyaman udara wall mounted 17,000 Btu/hr perlu memilih kadar harga peralatan berkapasiti 18,000 Btu/hr.

4.1.1. AIR COOLED SPLIT UNIT SYSTEM

Nota : 1. Kadar harga pemasangan paip gas penyejuk sehingga 15 kaki sahaja.

"Tambahan paip gas penyejuk, pendawaian dan *drain pipe* rujuk anggaran kadar harga jadual peralatan".

2. Harga adalah termasuk harga peralatan yang berkualiti, upah, pengangkutan, keuntungan, tempoh jaminan, pengujian dan pentauliahan serta senggaraan dalam tempoh kecacatan.

No.	Description	Type	Capacity	Quantity	Unit	Price (RM)
Wall Mounted System						
1	Air-cooled Split Unit air-conditioners c/w indoor and outdoor units, wiring, starter, remote controller, brackets, refrigerant, insulation, drain pipes, switchboard, vibration isolator, coring, hacking, punching of holes in walls/floors, making good, painting, Galvanized Steel trunking and conduit.	25mm Rubber compound insulation pipe	9,000	1	set	1,800
			13,000	1	set	2,000
			18,000	1	set	2,800
			24,000	1	set	3,500
			27,000	1	set	4,000
		Pre-insulate/jacketing pipe	9,000	1	set	2,800
			13,000	1	set	3,300
			18,000	1	set	3,800
			24,000	1	set	4,500
			27,000	1	set	4,800
Ceiling Mounted/Suspended						
2	Air-cooled Split Unit air-conditioners c/w indoor and outdoor units, wiring, starter, remote controller, brackets, refrigerant, insulation, drain pipes, switchboard, vibration isolator, coring, hacking, punching of holes in walls/floors, making good, painting, Galvanized Steel trunking and conduit.	25mm Rubber compound insulation pipe	9,000	1	set	2,600
			13,000	1	set	3,100
			18,000	1	set	3,800
			24,000	1	set	4,400
			27,000	1	set	5,100
			30,000	1	set	6,000
			40,000	1	set	7,000
			50,000	1	set	7,600
		Pre-insulate/jacketing pipe	60,000	1	set	8,700
			9,000	1	set	3,600
			13,000	1	set	4,100
			18,000	1	set	4,800
			24,000	1	set	5,400
			27,000	1	set	6,100
			30,000	1	set	7,000
			40,000	1	set	8,000
3	Air-cooled Split Unit air-conditioners c/w indoor and outdoor units, wiring, starter, remote controller, brackets, refrigerant, insulation, drain pipes, switchboard, vibration isolator, coring, hacking, punching of holes in walls/floors, making good, painting, Galvanized Steel trunking and conduit.	25mm Rubber compound insulation pipe	9,000	1	set	3,700
			13,000	1	set	3,800
			18,000	1	set	4,800
			24,000	1	set	5,200
			27,000	1	set	6,100
			35,000	1	set	7,500
			40,000	1	set	7,800
			50,000	1	set	8,300
		Pre-insulate/jacketing pipe	9,000	1	set	4,700
			13,000	1	set	4,800
Cassette 4 Way Blow						
3	Air-cooled Split Unit air-conditioners c/w indoor and outdoor units, wiring, starter, remote controller, brackets, refrigerant, insulation, drain pipes, switchboard, vibration isolator, coring, hacking, punching of holes in walls/floors, making good, painting, Galvanized Steel trunking and conduit.	25mm Rubber compound insulation pipe	9,000	1	set	3,700
			13,000	1	set	3,800
			18,000	1	set	4,800
			24,000	1	set	5,200
			27,000	1	set	6,100
			35,000	1	set	7,500
			40,000	1	set	7,800
			50,000	1	set	8,300
		Pre-insulate/jacketing pipe	9,000	1	set	4,700
			13,000	1	set	4,800
Cassette 4 Way Blow						
3	Air-cooled Split Unit air-conditioners c/w indoor and outdoor units, wiring, starter, remote controller, brackets, refrigerant, insulation, drain pipes, switchboard, vibration isolator, coring, hacking, punching of holes in walls/floors, making good, painting, Galvanized Steel trunking and conduit.	25mm Rubber compound insulation pipe	9,000	1	set	3,700
			13,000	1	set	3,800
			18,000	1	set	4,800
			24,000	1	set	5,200
			27,000	1	set	6,100
			35,000	1	set	7,500
			40,000	1	set	7,800
			50,000	1	set	8,300
		Pre-insulate/jacketing pipe	9,000	1	set	4,700
			13,000	1	set	4,800

Cassette 2 Way Blow						
4	Air-cooled Split Unit air-conditioners c/w indoor and outdoor units, wiring, starter, remote controller, brackets, refrigerant, insulation, drain pipes, switchboard, vibration isolator, coring, hacking, punching of holes in walls/floors, making good, painting, Galvanized Steel trunking and conduit.	25mm Rubber compound insulation pipe	9,000	1	set	3,700
			13,000	1	set	3,800
			18,000	1	set	4,800
			24,000	1	set	5,200
			27,000	1	set	6,100
		Pre-insulate/jacketing pipe	9,000	1	set	4,700
			13,000	1	set	4,800
			18,000	1	set	5,800
			24,000	1	set	6,200
			27,000	1	set	7,100
Cassette 1 Way Blow						
5	Air-cooled Split Unit air-conditioners c/w indoor and outdoor units, wiring, starter, remote controller, brackets, refrigerant, insulation, drain pipes, switchboard, vibration isolator, coring, hacking, punching of holes in walls/floors, making good, painting, Galvanized Steel trunking and conduit.	25mm Rubber compound insulation pipe	9,000	1	set	3,700
			13,000	1	set	3,800
			18,000	1	set	4,800
			24,000	1	set	5,200
			27,000	1	set	6,100
		Pre-insulate/jacketing pipe	9,000	1	set	4,700
			13,000	1	set	4,800
			18,000	1	set	5,800
			24,000	1	set	6,200
			27,000	1	set	7,100
Floor Standing						
6	Air-cooled Split Unit air-conditioners c/w indoor and outdoor units, wiring, starter, remote controller, brackets, refrigerant, insulation, drain pipes, switchboard, vibration isolator, coring, hacking, punching of holes in walls/floors, making good, painting, Galvanized Steel trunking and conduit.	Floor standing (25mm rubber compound insulation pipe)	30,000	1	set	8,000
			40,000	1	set	10,000
			50,000	1	set	12,000
			60,000	1	set	13,500
			80,000	1	set	17,000
		Floor standing (pre-insulate/jacketing pipe)	100,000	1	set	20,000
			125,000	1	set	25,000
			150,000	1	set	30,000
			30,000	1	set	10,000
			40,000	1	set	12,000
			50,000	1	set	14,000
			60,000	1	set	15,500
			80,000	1	set	19,000
			100,000	1	set	22,000
			125,000	1	set	27,000
150,000	1	set	32,000			

4.1.2 AIR COOLED SPLIT DUCTED SYSTEM

- Nota : 1. Kadar harga pemasangan paip gas penyejuk sehingga 30 kaki sahaja
 Tambahan paip gas penyejuk, pendawaian dan *drain pipe* rujuk anggaran harga jadual komponen.
2. Harga adalah termasuk harga peralatan yang berkualiti, upah, pengangkutan, keuntungan, tempoh jaminan, pengujian dan pentauliahan serta senggaraan dalam tempoh kecacatan.

No.	Description	Type	Capacity	Quantity	Unit	Price (RM)
Air Cooled Split Ducted (Air Handling Units)			Btu/hr			
1	Air Cooled Split Ducted Units double skin type each c/w indoor (AHU) and outdoor units, remote controller, brackets, refrigerant, insulation, vibration control equipment, drain pipes, coring, hacking, punching of holes in walls & floors, making good, painting, Galvanized Steel trunking, conduit.	Rubber compound insulation pipe	30,000	1	set	5,000
			40,000	1	set	6,700
			50,000	1	set	8,400
			60,000	1	set	10,000
			80,000	1	set	13,500
			100,000	1	set	17,000
			125,000	1	set	21,000
			150,000	1	set	25,000
			200,000	1	set	33,500
			250,000	1	set	42,000
	300,000	1	set	50,000		
	400,000	1	set	67,000		
	500,000	1	set	83,500		
	Main switchboard c/w test certificate, control wiring, Auto change over control panel c/w interlocking, timer, relay, pushbutton, incoming supply indicating light, starter and cable tray.	Pre insulate/ jacketing pipe	100,000	1	set	20,000
			125,000	1	set	25,000
			150,000	1	set	30,000
			200,000	1	set	40,000
			250,000	1	set	50,000
			300,000	1	set	60,000
			400,000	1	set	80,000
500,000			1	set	100,000	
600,000			1	set	120,000	
700,000			1	set	140,000	
750,000	1	set	150,000			
800,000	1	set	160,000			
Air Cooled Split Ducted (Fan Coil Unit)			Btu/hr			
2	Air Cooled Split Ducted Units double skin type each c/w indoor (FCU) and outdoor units, remote controller, brackets, refrigerant, insulation, vibration control equipment, drain pipes, secondary pan, coring, hacking, punching of holes in walls & floors, making good, painting, Galvanized Steel trunking, conduit. Main switchboard c/w test certificate, control wiring, Auto change over control panel c/w interlocking, timer, relay, pushbutton, incoming supply indicating light, starter and cable tray.	Rubber compound insulation pipe	20,000	1	set	5,000
			25,000	1	set	6,250
			30,000	1	set	7,500
			40,000	1	set	10,000
			50,000	1	set	12,500
			60,000	1	set	15,000
			70,000	1	set	17,500
			80,000	1	set	20,000
			100,000	1	set	25,000
			125,000	1	set	31,250
			150,000	1	set	37,500
			200,000	1	set	50,000
			250,000	1	set	62,500
			300,000	1	set	75,000
			400,000	1	set	100,000
		Pre insulate / jacketing pipe	15,000	1	set	4,700
			20,000	1	set	6,200
			25,000	1	set	7,700
			30,000	1	set	9,300
			40,000	1	set	12,500
			50,000	1	set	15,500
			60,000	1	set	18,500
			65,000	1	set	20,000
			80,000	1	set	25,000
			100,000	1	set	31,000
125,000	1	set	39,000			

4.1.3 AIR COOLED CHILLER SYSTEM

No.	Description	Type	Capacity	Quantity	Unit	Price (RM)		
Air Cooled Chiller Unit			TR					
1	Air cooled chillers units c/w refrigeration circuit, compressor, condenser coil, fan motor, cooler, electronic expansion valve, built in control panel base plate , starters, vibration control equipment and other accessories .	Scroll compressor	10	1	set	19,000		
			15	1	set	28,500		
			20	1	set	38,000		
			30	1	set	54,000		
			40	1	set	72,000		
			50	1	set	90,000		
			60	1	set	114,000		
			70	1	set	133,000		
			80	1	set	136,000		
			90	1	set	153,000		
			100	1	set	170,000		
			110	1	set	187,000		
			120	1	set	204,000		
			125	1	set	213,000		
			130	1	set	221,000		
		140	1	set	238,000			
		150	1	set	255,000			
				Screw compressor	50	1	set	110,000
					60	1	set	132,000
					70	1	set	154,000
					80	1	set	168,000
					90	1	set	189,000
					100	1	set	195,000
					105	1	set	200,000
					110	1	set	209,000
					120	1	set	228,000
					130	1	set	247,000
				140	1	set	266,000	
				150	1	set	285,000	
				Reciprocating compressor	10	1	set	21,000
					15	1	set	32,000
					20	1	set	42,000
					30	1	set	63,000
					40	1	set	80,000
					50	1	set	100,000
					60	1	set	120,000
					70	1	set	133,000
					80	1	set	152,000
					90	1	set	171,000
					100	1	set	180,000
					110	1	set	198,000
					120	1	set	216,000
					130	1	set	221,000
					140	1	set	238,000
				150	1	set	255,000	

Air Handling Units (AHU) / Fan Coil Units(FCU)		Btu/hr				
2	Chilled water AHU/FCU double skin type c/w cooling coils, evaporator fans, motor, filters, soft starter, drain pipe, Automatic balancing valve, 3 way valves/2 way modulating valve c/w actuator, thermostat, pressure gauge, gate valves, strainers, pipe manifold, flexible connection, base plate, plinth, switchboard for all AHU/FCU c/w soft starter, relays, control wiring, PF devices, under voltage protection and necessary wiring, cabling, trunking and conduit.	20,000	1	set	2,400	
		30,000	1	set	3,500	
		40,000	1	set	4,70	
		50,000	1	set	5,900	
		60,000	1	set	7,000	
		80,000	1	set	9,500	
		100,000	1	set	11,700	
		125,000	1	set	14,600	
		150,000	1	set	17,500	
		200,000	1	set	23,500	
		250,000	1	set	30,000	
		300,000	1	set	35,000	
		400,000	1	set	47,000	
		500,000	1	set	58,500	
		600,000	1	set	70,000	
		800,000	1	set	93,500	
1,000,000	1	set	117,000			
1,250,000	1	set	146,000			
1,500,000	1	set	175,000			
1,800,000	1	set	210,000			
2,000,000	1	set	233,500			
<u>Chilled Water Pump</u>						
3	RUJUK 4.1.6					
<u>Main Switchboard For Air Cooled Chiller</u>		TR				
4	Air conditioning main switchboard c/w test certificate, distribution board for AHU and chiller complete with wiring, starter board for chiller, water pumps c/w motorized isolating valve and remote starter board for all AHU complete with necessary wiring trunking, cable tray, conduit and other necessary accessories.	100	1	set	41,000	
		105	1	set	43,050	
		110	1	set	45,100	
		120	1	set	49,200	
		130	1	set	53,300	
		140	1	set	57,400	
		150	1	set	61,500	
<u>AHU/FCU Switchboard</u>		Btu/hr	KW			
5	Switchboard for all AHU or FCU c/w soft starter, relays, control wiring, PF devices, fire alarm trip from fire alarm panel to individual AHUs, under voltage protection and necessary wiring, cabling, trunking, conduit and other necessary accessories.	20,000	1.7	1	set	700
		30,000	2.5	1	set	1,100
		40,000	3.3	1	set	1,400
		50,000	4.1	1	set	1,700
		60,000	5.0	1	set	2,100
		80,000	6.6	1	set	2,800
		100,000	8.3	1	set	3,500
		125,000	10.4	1	set	4,300
		150,000	12.4	1	set	5,200
		200,000	16.6	1	set	6,900
		250,000	20.7	1	set	8,600
		300,000	24.9	1	set	10,300
		350,000	29.0	1	set	12,000
		400,000	33.2	1	set	14,000
		500,000	41.4	1	set	17,000
		600,000	49.7	1	set	21,000
750,000	62.2	1	set	26,000		
800,000	66.3	1	set	28,000		
1,000,000	82.9	1	set	35,000		
1,250,000	103.6	1	set	43,000		

4.1.4 WATER COOLED CHILLER SYSTEM

No.	Description	Type	Capacity	Quantity	Unit	Price (RM)		
<u>Water Cooled Chiller</u>			TR					
1	Water cooled chillers unit c/w compressors, motor, starter, condenser tube, cooler tube, display control microprocessor based diagnostic system, water pipe (within plant room), refrigerant circuit & pipe, valves, insulation, oil, base plate, vibration control equipment, hanger and support, and other necessary accessories.	Centrifugal compressor	300	1	set	420,000		
			350	1	set	455,000		
			400	1	set	520,000		
			450	1	set	562,500		
			500	1	set	600,000		
			550	1	set	660,000		
			600	1	set	720,000		
			650	1	set	780,000		
			700	1	set	840,000		
			750	1	set	900,000		
		800	1	set	960,000			
		900	1	set	1,080,000			
		1000	1	set	1,200,000			
					TR			
				Screw compressor	100	1	set	170,000
					120	1	set	204,000
					130	1	set	221,000
					135	1	set	229,500
					150	1	set	255,000
					170	1	set	289,000
		190	1		set	323,000		
		205	1		set	348,500		
		220	1		set	374,000		
		250	1		set	425,000		
		275	1	set	467,500			
		300	1	set	510,000			
<u>Chilled Water Pumps</u>								
2	RUJUK 4.1.6							
<u>Condenser Water Pumps</u>								
3	RUJUK 4.1.7							
<u>Cooling Tower</u>								
4	RUJUK 4.1.8							

Main Switchboard for Chiller System		TR	KW			
5	Air conditioning main switchboard c/w test certificate, distribution board for AHU and chiller complete with wiring, starter board for chiller, water pumps c/w motorized isolating valve and remote starter board for all AHU complete with necessary wiring trunking, cable tray, conduit and other accessories.	100	100	1	set	31,000
		110	110	1	set	34,100
		120	120	1	set	37,200
		130	130	1	set	40,300
		140	140	1	set	43,400
		150	150	1	set	46,500
		160	160	1	set	49,600
		170	170	1	set	52,700
		180	180	1	set	55,800
		190	190	1	set	58,900
		200	200	1	set	62,000
		210	210	1	set	65,100
		220	220	1	set	68,200
		250	250	1	set	77,500
		300	300	1	set	93,000
		350	350	1	set	108,500
		380	380	1	set	117,800
		400	400	1	set	124,000
		450	450	1	set	139,500
500	500	1	set	155,000		
550	550	1	set	170,500		
600	600	1	set	186,000		
650	650	1	set	201,500		
700	700	1	set	217,000		
750	750	1	set	232,500		
800	800	1	set	248,000		
<u>Air Handling Unit (AHU) & Fan Coil Units (FCUs)</u>			Btu/hr			
6	Double Skin Chilled water AHU/ FCU c/w cooling coils, evaporator fans, motor, filters, soft starter, drain pipe, Automatic balancing valve, 3 way valves/2 way modulating valve c/w actuator, thermostat, pressure gauge, gate valves, strainers, flexible connection, base plate, plinth and all other accessories. Switchboard for all AHU/ FCU c/w soft starter, relays, control wiring, PF devices, under voltage protection, Fire alarm trip from fire alarm panel to individual AHUs and necessary wiring, cabling, trunking, and conduit.		9,000	1	set	1,000
			13,000	1	set	1,200
			15,000	1	set	1,500
			18,000	1	set	1,700
			20,000	1	set	1,900
			24,000	1	set	2,200
			30,000	1	set	2,800
			40,000	1	set	3,700
			50,000	1	set	4,600
			60,000	1	set	5,500
			75,000	1	set	6,900
			80,000	1	set	7,400
			90,000	1	set	8,300
			100,000	1	set	9,200
			125,000	1	set	11,500
			150,000	1	set	13,800
			180,000	1	set	16,500
			200,000	1	set	18,500
			250,000	1	set	23,000
	300,000	1	set	27,500		
	350,000	1	set	32,100		
	400,000	1	set	37,000		
	500,000	1	set	46,000		
	600,000	1	set	55,000		
	750,000	1	set	69,000		
	800,000	1	set	74,000		

7	Chilled water FCU c/w cooling coils, evaporator fans, motors, filters, soft starter, control panel board, drain pipe, Automatic balancing valve, 3 way valves/2 way modulating, valve c/w actuator, thermostat, pressure gauge, gate valves, strainers, flexible connection, base plate, plinth and all other accessories.	Wall mounted (pre-insulate/jacketing pipe)	9,000	1	set	900
			13,000	1	set	1,300
			18,000	1	set	1,700
			24,000	1	set	2,200
			27,000	1	set	2,500
		Ceiling mounted (pre-insulate/jacketing pipe)	9,000	1	set	1,000
			13,000	1	set	1,300
			18,000	1	set	1,700
			24,000	1	set	2,200
			27,000	1	set	2,500
			40,000	1	set	3,700
			50,000	1	set	4,700
			60000	1	set	5,500
		Cassette 4 way blow (pre-insulate/jacketing pipe)	13,000	1	set	2,100
			18,000	1	set	2,700
			24,000	1	set	3,200
			27,000	1	set	3,500
			30,000	1	set	3,800
			40,000	1	set	4,500
			50,000	1	set	4,800
		Cassette 2 way (pre-insulate/jacketing pipe)	13,000	1	set	2,100
			18,000	1	set	2,700
			20,000	1	set	2,900
			24,000	1	set	3,200
			27,000	1	set	3,500
		Floor standing (pre-insulate/jacketing pipe)	30,000	1	set	3,000
			40,000	1	set	3,800
			50,000	1	set	4,800
	60,000	1	set	5,500		
	80,000	1	set	7,500		
	100,000	1	set	9,300		
	125,000	1	set	11,500		
	150,000	1	set	13,800		

4.1.5 WATER COOLED PACKAGE SYSTEM

No.	Description	Type	Capacity	Quantity	Unit	Price (RM)
<u>Water Cooled Package Units</u>			TR			
1	Water cooled package units each c/w condensers, cooling coil, blower fan motors, compressors, filter driers, sight glass, isolation valves, crankcase heaters, header refrigerant pipes, controller cards, base plate, vibration isolator and other accessories. Main switchboard c/w test certificate, distribution board for WCP complete with wiring, cooling tower, water pumps c/w motorized isolating valve and remote starter board for all AHU complete with necessary wiring trunking, fire alarm trip from fire alarm panel to Main switchboard cable tray, conduit and other accessories.	Double skin	10	1	set	19,000
			15	1	set	28,500
			20	1	set	38,000
			25	1	set	47,500
			30	1	set	57,000
			40	1	set	76,000
			50	1	set	95,000
			100	1	set	190,000
<u>Condenser Water Pump</u>						
2	RUJUK 4.1.7					
<u>Cooling Tower</u>						
3	RUJUK 4.1.8					

4.1.6 CHILLED WATER PUMP

No.	Description	Type	Capacity	Quantity	Unit	Price (RM)
<u>Chilled Water Pump</u>			HP			
1	Chilled water pump sets complete with high efficiency (EFF2) motor, couplings, jacketing, gate valve, strainer, flexible coupling, check valve, pressure gauge, pressure switch, thermometer, test pipe, base plate, inertia block, starters, vibration control equipment and other accessories.	Split casing	5	1	set	9,400
			7.5	1	set	11,600
			10	1	set	13,000
			15	1	set	14,600
			20	1	set	23,000
			25	1	set	20,300
			30	1	set	30,600
			40	1	set	35,000
			50	1	set	40,500
		150	1	set	121,500	
		End suction	3	1	set	4,500
			4	1	set	5,100
			5	1	set	7,400
			7.5	1	set	8,100
			10	1	set	10,200
			15	1	set	16,200
			20	1	set	20,300
			30	1	set	24,300
			50	1	set	35,400
75	1		set	63,800		

4.1.7 CONDENSER WATER PUMP

No.	Description	Type	Capacity	Quantity	Unit	Price (RM)
			HP			
1	Condenser water pump sets complete with high efficiency (EFF2) motor , couplings, jacketing, gate valve, strainer, flexible coupling, check valve, pressure gauge, pressure switch, thermometer, test pipe, baseplate, inertia block, starters, vibration control equipment and other accessories.	Split casing	5	1	set	9,000
			7.5	1	set	11,000
			10	1	set	12,000
			12.5	1	set	13,500
			15	1	set	14,000
			20	1	set	22,000
			25	1	set	25,000
			30	1	set	29,000
			35	1	set	33,800
			40	1	set	40,500
		50	1	set	47,500	
		60	1	set	54,000	
		100	1	set	90,000	
		End suction	3	1	set	5,300
			4	1	set	6,000
			5	1	set	6,800
			7.5	1	set	9,200
			10	1	set	11,200
			15	1	set	13,500
			20	1	set	17,000
30	1		set	27,500		
50	1	set	40,500			
75	1	set	67,000			

4.1.8 COOLING TOWER

No.	Description	Type	Capacity	Quantity	Unit	Price (RM)	
			TR				
	Cooling tower c/w fan, fan motor , hot water, basin, drain sump, infill, float valve, cat ladder, door access, motorized valves, water pipe supply & return, overflow pipe, valves, chemical dosage metering pump c/w chemical, water treatment system, base plate, conduit, trunking, wiring, control panel, and all other necessary accessories.	Counter flow	20	1	set	2,300	
			30	1	set	3,500	
			50	1	set	5,800	
			80	1	set	9,200	
			100	1	set	11,500	
			125	1	set	14,500	
			150	1	set	19,500	
			180	1	set	23,400	
			200	1	set	26,000	
			225	1	set	29,300	
			250	1	set	32,500	
			300	1	set	39,000	
			350	1	set	45,500	
			400	1	set	52,000	
			450	1	set	58,500	
			500	1	set	65,000	
			600	1	set	78,000	
		700	1	set	91,000		
		800	1	set	104,000		
				TR			
			Cross flow single cell	50	1	set	8,000
		80		1	set	12,800	
		100		1	set	14,000	
		125		1	set	16,000	
		150		1	set	18,000	
		180		1	set	21,600	
		200		1	set	24,000	
	225	1		set	27,000		
	250	1		set	30,000		
	300	1		set	36,000		
	350	1		set	42,000		
	375	1		set	45,000		
	400	1		set	48,000		
	450	1		set	54,000		
	500	1		set	60,000		
	600	1	set	72,000			
	700	1	set	84,000			
	750	1	set	90,000			
	800	1	set	96,000			

4.1.9 DIGITAL SCROLL MULTI SPLIT UNIT SYSTEM

No.	Description	Type	Capacity	Quantity	Unit	Price (RM)
Condenser Units (Outdoor)			Btu/hr			
1	Inverter Multi Split Complete Condensing Units c/w condensers coils, condenser fan motors, compressors, inverter(s), filter driers, slight glass, crankcase heaters, accumulators ,header, refrigerant & refrigerant pipe, controller cards, base plate, starters, vibration control equipment, dries, accumulator, oil separator, Installation inclusive of coring, hacking, punching of holes in walls & floors, making good, painting and other accessories.		108,000	1	set	13,500
			126,000	1	set	15,750
			144,000	1	set	18,000
			162,000	1	set	20,250
			180,000	1	set	22,500
			198,000	1	set	24,750
			216,000	1	set	27,000
			234,000	1	set	29,250
			252,000	1	set	31,500
			270,000	1	set	33,750
			288,000	1	set	36,000
			306,000	1	set	38,250
			324,000	1	set	40,500
	342,000	1	set	42,750		
	360,000	1	set	45,000		
Switchboard for Digital Scroll Multi Split			Btu/hr			
2	Air conditioning main switchboard c/w test certificate, soft starter control wiring, starter, trunking, cable tray, conduit and other accessories.		45,000	1	lot	2,350
			90,000	1	lot	4,700
			126,000	1	lot	6,580
			162,000	1	lot	8,460
			180,000	1	lot	9,400
			216,000	1	lot	11,280
			252,000	1	lot	13,160
			270,000	1	lot	14,100
			306,000	1	lot	15,980
			324,000	1	lot	16,920
			360,000	1	lot	18,800
			396,000	1	lot	20,680
			432,000	1	lot	22,560
	540,000	1	lot	28,200		

Evaporators (Indoor Units)		Btu/hr				
3	Digital scroll multi split Indoor Units including wired remote control for each indoor unit, power wiring to indoor unit, insulated drain pipes, interlock wiring, starter, Galvanized Steel trunking, conduit, wireless controller for temperature & fan speed settings, brackets, refrigerant, insulation, drain piping, motors compressors, fans, valves, Installation inclusive of coring, hacking, punching of holes in walls/floors, making good and painting.	Wall mounted	9,000	1	set	1,400
			13,000	1	set	1,700
			16,000	1	set	1,800
			18,000	1	set	2,000
			20,000	1	set	2,300
			24,000	1	set	2,900
			27,000	1	set	3,300
		Ceiling mounted / suspended	9,000	1	set	1,300
			13,000	1	set	1,800
			18,000	1	set	2,100
			20,000	1	set	2,300
			24,000	1	set	2,500
			27,000	1	set	2,800
			30,000	1	set	3,200
			40,000	1	set	4,100
			50,000	1	set	5,000
		Cassette 4 way blow	9,000	1	set	1,400
			13,000	1	set	1,700
			18,000	1	set	2,200
			20,000	1	set	2,600
			24,000	1	set	2,900
			27,000	1	set	3,500
			30,000	1	set	3,800
			35,000	1	set	4,000
			40,000	1	set	4,200
			50,000	1	set	5,500
		Cassette 1 & 2 way blow	9,000	1	set	1,400
			13,000	1	set	1,700
			18,000	1	set	2,200
			21,000	1	set	2,600
			24,000	1	set	2,900
			27,000	1	set	3,500
		Floor standing	30,000	1	set	3,800
			40,000	1	set	4,000
			50,000	1	set	4,300
			60,000	1	set	4,600
			80,000	1	set	10,000
			100,000	1	set	12,000
		Ducted cassette	125,000	1	set	15,000
			150,000	1	set	18,000
			9,000	1	set	3,300
			13,000	1	set	4,300
			15,000	1	set	4,500
			18,000	1	set	4,700
			24,000	1	set	5,300
			27,000	1	set	5,500
			30,000	1	set	5,700
		AHU/FCU ducted type	40,000	1	set	6,000
			50,000	1	set	6,300
			9,000	1	set	2,100
			13,000	1	set	2,500
18,000	1		set	2,900		
24,000	1		set	3,500		
27,000	1		set	3,800		
30,000	1		set	4,000		
35,000	1		set	4,250		
40,000	1		set	4,500		
50,000	1		set	7,500		
60,000	1		set	8,500		
75,000	1	set	10,000			
100,000	1	set	10,500			
125,000	1	set	15,000			
150,000	1	set	18,000			

4.1.10 INVERTER MULTI SPLIT UNIT SYSTEM

No.	Description	Type	Capacity	Quantity	Unit	Price (RM)
Condenser Units (Outdoor)			Btu/hr			
1	Inverter Multi Split Complete Condensing Units c/w condensers coils, condenser fan motors, compressors, inverter(s), filter driers, slight glass, crankcase heaters, accumulators ,header, refrigerant & refrigerant pipe, controller cards, base plate , starters, vibration control equipment, dries, accumulator, oil separator, Installation inclusive of coring, hacking, punching of holes in walls & floors, making good, painting and other accessories.		45,000	1	set	18,000
			54,000	1	set	20,000
			72,000	1	set	20,500
			90,000	1	set	21,000
			108,000	1	set	21,500
			126,000	1	set	22,000
			144,000	1	set	23,000
			162,000	1	set	24,300
			180,000	1	set	27,000
			198,000	1	set	29,700
			216,000	1	set	32,400
			234,000	1	set	35,100
			252,000	1	set	37,800
			270,000	1	set	40,500
			288,000	1	set	43,200
			306,000	1	set	45,900
			324,000	1	set	48,600
	342,000	1	set	51,300		
	360,000	1	set	54,000		
	378,000	1	set	56,700		
	396,000	1	set	59,400		
	414,000	1	set	62,100		
	432,000	1	set	64,800		
	540,000	1	set	81,000		
Switchboard for VRV/VRF System			Btu/hr			
2	Air Conditioning main switchboard c/w test certificate, soft starter control wiring, starter, trunking, cable tray, conduit and other accessories.		45,000	1	lot	8,500
			90,000	1	lot	17,000
			126,000	1	lot	23,800
			162,000	1	lot	30,600
			180,000	1	lot	34,000
			216,000	1	lot	40,800
			252,000	1	lot	47,600
			270,000	1	lot	51,000.
			306,000	1	lot	57,800
			324,000	1	lot	61,200
			360,000	1	lot	68,000
	396,000	1	lot	74,800		
	432,000	1	lot	81,600		
	540,000	1	lot	102,000		

Evaporators (Indoor Units)		Btu/hr				
3	Inverter Multi Split Complete Indoor Units including wired remote control for each indoor unit, power wiring to indoor unit, insulated drain pipes, interlock wiring, starter, Galvanised Steel trunking, conduit, wireless controller for temperature & fan speed settings, brackets, refrigerant, insulation, drain piping, motors compressors, fans, valves, Installation inclusive of coring, hacking, punching of holes in walls/floors, making good and painting.					
		Wall mounted	9,000	1	set	1,800
			10,000	1	set	2,000
			12,000	1	set	2,200
			13,000	1	set	2,300
			15,000	1	set	2,400
			18,000	1	set	2,700
			21,000	1	set	2,900
			24,000	1	set	3,100
			27,000	1	set	3,300
			30,000	1	set	3,500
		Ceiling mounted / suspended	18,000	1	set	2,700
			20,000	1	set	2,900
			24,000	1	set	3,100
			27,000	1	set	3,300
			30,000	1	set	3,500
			35,000	1	set	3,700
			40,000	1	set	4,000
			50,000	1	set	4,300
		60,000	1	set	4,500	
		Cassette 4 way blow	9,000	1	set	2,000
			10,000	1	set	2,200
			12,000	1	set	2,500
			13,000	1	set	2,700
			15,000	1	set	2,800
			18,000	1	set	3,000
			20,000	1	set	3,200
			24,000	1	set	3,400
			27,000	1	set	3,800
			30,000	1	set	4,000
			35,000	1	set	4,500
			40,000	1	set	5,000
		50,000	1	set	6,000	
		60,000	1	set	7,000	
		Cassette 1 & 2 way blow	9,000	1	set	2,000
			10,000	1	set	2,200
			12,000	1	set	2,500
			13,000	1	set	2,700
			18,000	1	set	3,000
		Floor standing	40,000	1	set	4,000
			50,000	1	set	4,300
			60,000	1	set	4,600
			80,000	1	set	10,000
			100,000	1	set	12,000
			125,000	1	set	15,000
		150,000	1	set	18,000	
		Ducted cassette	9,000	1	set	3,300
			13,000	1	set	4,300
			15,000	1	set	4,500
			18,000	1	set	4,700
			20,000	1	set	5,000
			24,000	1	set	5,300
			27,000	1	set	5,500
			30,000	1	set	5,700
			35,000	1	set	5,900
			40,000	1	set	6,000
		50,000	1	set	6,300	
		FCU ducted type	9,000	1	set	3,500
			12,000	1	set	4,500
			13,000	1	set	4,700
			20,000	1	set	5,500
			24,000	1	set	6,500
			27,000	1	set	6,800
			30,000	1	set	7,500
			40,000	1	set	8,500
			50,000	1	set	9,000
			60,000	1	set	10,000
			75,000	1	set	11,000
			100,000	1	set	12,000

4.1.11 MECHANICAL VENTILATION FAN SYSTEM

Nota : 1. *Static head* dalam lingkungan 1.0 – 2.0 in.w.g.

No.	Description	Type	Capacity	Quantity	Unit	Price (RM)
Mechanical Ventilation Fan System			CFM			
1	Exhaust Fan c/w bracket, support bracket, control wiring, , conduit, starter, control panel, installation inclusive of coring, hacking, punching of holes in walls & floors, making good, painting and other necessary accessories.	Wall mounted (propeller type)	<150	1	set	550
			150	1	set	600
			180	1	set	630
			200	1	set	650
			250	1	set	680
			300	1	set	730
			400	1	set	750
			500	1	set	780
			600	1	set	810
			700	1	set	840
			800	1	set	870
			900	1	set	900
			1,000	1	set	930
		Wall (axial in line type)	200	1	set	650
			250	1	set	680
			300	1	set	730
			400	1	set	750
			600	1	set	780
		Ceiling mounted (propeller type)	200	1	set	650
			250	1	set	680
			300	1	set	730
			400	1	set	750
			600	1	set	780
		Ceiling mounted (axial -in line type)	200	1	set	650
			250	1	set	680
			300	1	set	730
			400	1	set	750
			600	1	set	780
		Direct box / Centrifugal fan	<150	1	set	650
			150	1	set	715
			180	1	set	730
			200	1	set	750
			250	1	set	800
			300	1	set	900
			350	1	set	1,000
			400	1	set	1,100
			600	1	set	1,400
			700	1	set	1,500
		800	1	set	1,600	
		Heavy duty / Industrial (propeller type)	800	1	set	1,700
900	1		set	2,000		
1,000	1		set	2,700		
1,200	1		set	3,500		
1,500	1		set	4,700		
2,000	1		set	4,900		
2,500	1		set	5,200		
3,000	1		set	5,400		
3,500	1		set	5,700		
4,000	1	set	6,000			

<u>Air Curtain System</u>			L x Throw (ft)			
2	Air curtain c/w blower fan, motor, starter, controller ,wiring, conduit, , installation inclusive of coring, hacking, punching of holes in walls & floors, making good, painting, G. steel trunking, conduit and other necessary accessories.		3x8	1	set	950
			4x8	1	set	1,100
			3x10	1	set	1,100
			4x10	1	set	1,300
			3x12	1	set	1,200
			4x12	1	set	1,350
<u>Smoke Spill System</u>			CFM			
3	Smoke Spill High capacity c/w adjustable Impeller Fan, enclosure, vibration isolators, motor, shutters, withstand temperature, duct, acoustic treatment, support bracket, hanger, wiring, conduit, starter, control panel, installation inclusive of coring, hacking, punching of holes in walls & floors, making good, painting and other necessary accessories.		4,000	1	set	6,800
			10,000	1	set	12,500
			15,000	1	set	13,500
			24,000	1	set	16,500
			35,000	1	set	21,000
			41,200	1	set	20,600
			48,000	1	set	28,800
			60,000	1	set	30,000
			70,000	1	set	35,000
95,000	1	set	47,500			
<u>Pressurisation Fan System</u>			CFM			
4	Pressurisation Fan System c/w Fan, enclosure, vibration isolators, motor, shutters, withstand temperature, duct, acoustic treatment, support bracket, hanger, wiring, conduit, starter, control panel, installation inclusive of coring, hacking, punching of holes in walls & floors, making good, painting and other necessary accessories.		18,000	1	set	15,000
			24,000	1	set	16,500
			25,500	1	set	17,000
			30,000	1	set	18,000
			32,000	1	set	19,200
			35,000	1	set	21,000
			48,000	1	set	24,000
			60,000	1	set	30,000
70,000	1	set	35,000			
<u>Jet Fan System</u>			CFM			
5	Jet Fan System c/w motor, blower, fan, withstand temperature, support bracket, vibration isolators, wiring, conduit, starter, control panel, installation inclusive of coring, hacking, punching of holes in walls & floors, making good, painting and other necessary accessories.		24,000	1	set	22,000
			30,000	1	set	23,600
			35,000	1	set	24,000
			43,000	1	set	25,800
			45,000	1	set	27,000
60,000	1	set	30,000			

4.1.12 OTHERS

No.	Description	Type	Capacity	Quantity	Unit	Price (RM)
<u>Precision Air Conditioning System</u>			Btu/hr			
1	Precision Units each c/w indoor and outdoor units, interlock wiring, monitoring & controlling system, controller for temperature & fan speed settings, brackets, refrigerant, insulation & drain piping, motors compressors, fans, vibration control equipment, drain pipes, switchboard, Installation inclusive of coring, hacking, punching of holes in walls & floors, making good, painting. Main switchboard c/w test certificate, control wiring, Auto change over control panel c/w interlocking, timer, relay, pushbutton, incoming supply indicating light, starter, wiring, trunking, cable tray and conduit.		100,000	1	set	52,500
			103,000	1	set	54,500
			117,000	1	set	62,000
			150,000	1	set	79,000
			200,000	1	set	105,000
			250,000	1	set	132,000
			265,000	1	set	140,000
<u>Dehumidifier System</u>			Kg/hr			
2	Dehumidifier c/w rotary honeycomb desiccant wheel, drying rotor, drive motor, reactivation air fans, electric heaters, filters, valves, refrigerant, pipe, drain pipe, starter, control panel, wiring, conduit, trunking, installation inclusive coring, hacking, painting to wall & floors and other necessary accessories.		1	1	set	7,000
			1.8	1	set	9,300
			2.5	1	set	11,500
			4	1	set	15,000
			5	1	set	17,000
			6	1	set	19,000
<u>Building Automation System</u>						
3	Building automation system c/w software, digital circuit & diagram programme & schedule of system, programme logic control.			1	lot	20,000
	Network controller & Direct DC.			1	lot	25,000
	Terminal unit controller.			1	lot	3,000
	Control processing units.			1	lot	12,000
	Sensors.			1	unit	120
<u>Cold Room System</u>			Btu/hr			
4	Indoor and outdoor units, Acoustic insulation for room, interlock wiring, starter, wireless controller for temperature & fan speed settings, brackets, refrigerant, insulation, drain piping, motors compressors, fans, valves, drain pipes, switchboard, coring, hacking, punching of holes in walls/floors, making good, painting, Galvanized .Steel trunking, conduit.	Chiller	30,000	1	set	55,000
			32,000	1	set	60,000
			35,000	1	set	65,000
			40,000	1	set	75,000
			50,000	1	set	92,000
		Freezer	50,000	1	set	50,000
			60,000	1	set	60,000
			75,000	1	set	75,000
			100,000	1	set	100,000
			125,000	1	set	125,000
			150,000	1	set	150,000

4.2 KADAR HARGA BAGI PERALATAN

4.2.1 AIR CONDITIONING ITEMS & PARTS

No.	Description	Type	Capacity	Quantity	Unit	Price (RM)
1	Refrigerant Gas.		R12	1	kg	20
			R22	1	kg	30
			R134A	1	kg	55
			R407C	1	kg	110
			R410A	1	kg	150
2	<u>Filter.</u>	Washable	Standard	1	set	25
2.1	Plastic air Filter c/w frame & media filter.		1x1	1	set	35
			2x2	1	set	45
			2.2	Steel frame air Filter c/w frame & media filter.	1'x1'	1
1'x2'	1				set	80
2'x2'	1				set	100
2.3	Paper air filter c/w frame & media filter.		1'x1'	1	set	40
			1'x2'	1	set	50
			2'x2'	1	set	60
2.4	HEPA filter c/w frame & media filter.		1'x1'	1	set	150
		1'x2'	1	set	200	
		2'x2'	1	set	250	
3	Filter Drier.		<u>Inch</u>			
			1/4	1	m	60
			3/8	1	m	60
			1/2	1	m	85
			5/8	1	m	105
			7/8	1	m	135
1	1	m	150			
4	Sight Glass.		<u>Inch</u>			
			1/4	1	m	35
			3/8	1	m	45
			1/2	1	m	60
			5/8	1	m	75
			7/8	1	m	90
1	1	m	120			
5	<u>Drain Pan for Fan Coil Units</u> Drain Pan fabricated in galvanised steel, powder painted, withstand corrosion, rubber insulation, outlet pipe and other accessories.			1	m ²	500
6	<u>Drain Pump for Air Cooled Split</u> Drain Pump c/w motor, drain pipe, tank wiring and other accessories.		<u>Head (m)</u>			
			2	1	set	300
			2.5	1	set	350
			3	1	set	400
			5	1	set	600

7	<u>Ultra Violet Germicidal Irradiation (UVGI) lights.</u> Ultra Violet Germicidal Irradiation c/w water resistant shielded lamp, high efficiency ballast, bracket, cable, power controller, conduit, wiring, air treatment & filter purifier components, ultra violet lights and other accessories.			1	set	3,500
8	<u>Expansion Tank.</u> Hot Dipped Galvanised Press Steel Expansion tank c/w insulation, overflow & scour pipe, valves, access cover, plinth, bracket, float valves and all other accessories.		<u>Gallon</u> 400	1	set	6,000
9	<u>Make-up water tank.</u> Hot Dipped Galvanised Press Steel tank c/w overflow & scour pipe, valves, access cover, plinth, bracket, float valves and all other accessories.		<u>Gallon</u> 400	1	set	1,600
10	<u>Chemical Automatic Dosing.</u> Chemical dosage metering pump c/w chemical, dosage pump, wiring, conduit, liquid hose, tank and all other necessary accessories.		<u>Litre</u> 50	1	lot	4,000
11	<u>Variable Air Volume Unit.</u> Variable air volume box unit c/w thermostat, temperature sensor, blower, fan, motor, coil, inlet & outlet duct, mixing box, air damper, control, pipe, actuator wiring, filter, hanger, and other necessary equipment.		<u>CFM</u> 50 100 200 300 450 600 900 1,200 1,500 2,100 2,400 2,700 3,000 4,000 5,000 6,000 7,000	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	set set set set set set set set set set set set set set set set set set	800 1,000 1,200 1,500 2,000 2,500 3,000 3,800 4,500 5,500 6,500 7,500 8,500 10,000 11,500 13,000 15,000

4.2.2 AIR CONDITIONING PIPES

No.	Description	Type	Capacity	Quantity	Unit	Price (RM)
1	Copper Tube Refrigerant pipe c/w fittings.	Bare pipe	<u>Dia.(inch)</u>			
			1/4	1	m	15
			3/8	1	m	20
			1/2	1	m	52
			5/8	1	m	68
			7/8	1	m	76
			1	1	m	84
			1 1/8	1	m	96
			1 3/8	1	m	110
			1 5/8	1	m	124
			2 1/8	1	m	150
2	Copper Tube Refrigerant piping c/w fittings, gauges, valves & trunking.	With 25mm rubber compound insulation	<u>Size pipe (inch)</u>			
			1/4 & 3/8	1	m	50
			1/4 & 1/2	1	m	97
			1/4 & 5/8	1	m	115
			3/8 & 5/8	1	m	125
			1/2 & 7/8	1	m	160
			1/2 & 1 1/8	1	m	220
			1/2 & 1 3/8	1	m	250
			5/8 & 1 3/8	1	m	450
			1/2 & 1 1/8	1	m	550
3	Copper Tube Refrigerant piping c/w fittings, gauges, valves & trunking.	With 50mm rubber compound insulation	<u>Size pipe (inch)</u>			
			1/4 & 3/8	1	m	60
			1/4 & 1/2	1	m	107
			1/4 & 5/8	1	m	125
			3/8 & 5/8	1	m	135
			1/2 & 7/8	1	m	230
			1/2 & 1 1/8	1	m	250
			1/2 & 1 3/8	1	m	280
			5/8 & 1 3/8	1	m	480
			1/2 & 1 1/8	1	m	600

4	Copper Tube Refrigerant piping c/w fittings, valves & gauges.	With 50mm pre-insulated/ Jacketing	<u>Size pipe (inch)</u>			
			1/4 & 3/8	1	m	100
			1/4 & 1/2	1	m	170
			1/4 & 5/8	1	m	200
			3/8 & 5/8	1	m	230
			3/8 & 3/4	1	M	150
			1/2 & 7/8	1	m	290
			1/2 & 1 1/8	1	m	380
			1/2 & 1 3/8	1	m	480
			5/8 & 1 3/8	1	m	860
			1/2 & 1 1/8	1	m	1,100
5	Pipe PVC Class 'C' c/w fittings.	Bare pipe	<u>Dia.(inch)</u>			
			1/2	1	m	15
			3/4	1	m	18
			1	1	m	35
			1 1/4	1	m	37
			1 1/2	1	m	38
			2	1	m	60
			2 1/2	1	m	63
			3	1	m	68
			4	1	m	71
6	Pipes PVC Class 'C' c/w fittings & trunking.	25 mm Rubber compound insulation	<u>Dia.(inch)</u>			
			1/2	1	m	25
			3/4	1	m	28
			1	1	m	45
			1 1/4	1	m	47
			1 1/2	1	m	48
			2	1	m	70
			2 1/2	1	m	73
			3	1	m	78
						4
			5	1	m	115
			6	1	m	165
7	Pipes PVC Class 'C' c/w fittings & trunking.	50 mm Rubber compound insulation	<u>Dia.(inch)</u>			
			1/2	1	m	35
			3/4	1	m	38
			1	1	m	55
			1 1/4	1	m	57
			1 1/2	1	m	58
			2	1	m	80
			2 1/2	1	m	83
			3	1	m	88
						4
			5	1	m	125
			6	1	m	175

8	Pipe ABS c/w fittings.	Bare pipe	<u>Dia.(inch)</u>			
			1/2	1	m	27
			3/4	1	m	38
			1	1	m	43
			1 1/4	1	m	49
			1 1/2	1	m	58
			2	1	m	87
9	Galvanized Steel Class 'C' c/w fittings.	Above ground	<u>Dia.(inch)</u>			
			1/2	1	m	28
			3/4	1	m	35
			1	1	m	40
			1 1/4	1	m	48
			1 1/2	1	m	55
			2	1	m	65
			2 1/2	1	m	80
			3	1	m	95
			4	1	m	145
			5	1	m	165
			6	1	m	185
8	1	m	260			
10	1	m	450			
12	1	m	550			
14	1	m	600			
10	Galvanized Steel Class 'C' c/w fittings.	Underground - factory wrapped bituminous	<u>Dia.(inch)</u>			
			1 1/2	1	m	130
			2	1	m	150
			2 1/2	1	m	170
			3	1	m	190
			4	1	m	260
			5	1	m	290
6	1	m	340			
8	1	m	370			
11	Galvanized Steel Class 'C' c/w fitting & trunking.	25 mm Rubber compound insulation	<u>Dia.(inch)</u>			
			1/2	1	m	70
			3/4	1	m	90
			1	1	m	110
			1 1/4	1	m	120
			1 1/2	1	m	140
			2	1	m	160
			2 1/2	1	m	180
			3	1	m	200
			4	1	m	270
			5	1	m	300
			6	1	m	350
8	1	m	380			
10	1	m	430			
12	1	m	560			

12	Galvanized Steel Class 'C' c/w fitting & trunking.	50 mm Rubber compound insulation	<u>Dia.(inch)</u>			
			1/2	1	m	80
			3/4	1	m	100
			1	1	m	120
			1 1/4	1	m	130
			1 1/2	1	m	150
			2	1	m	170
			2 1/2	1	m	190
			3	1	m	210
			4	1	m	280
			5	1	m	310
			6	1	m	360
8	1	m	390			
10	1	m	440			
12	1	m	570			
13	Galvanized Steel Class 'C' c/w fitting.	50 mm pre-insulate/jacketing	<u>Dia.(inch)</u>			
			1/2	1	m	220
			3/4	1	m	240
			1	1	m	260
			1 1/4	1	m	270
			1 1/2	1	m	290
			2	1	m	310
			2 1/2	1	m	330
			3	1	m	350
			4	1	m	420
			5	1	m	450
			6	1	m	500
8	1	m	530			
10	1	m	580			
12	1	m	710			
14	Unplasticized Polyvinyl Chloride (UPVC) c/w fittings.	Bare pipe	<u>Dia.(inch)</u>			
			1/2	1	m	30.80
			3/4	1	m	35.00
			1	1	m	38.30
			1 1/4	1	m	49.30
			1 1/2	1	m	57.50
2	1	m	71.50			
15	Polyethylene (PE) c/w fittings.	Bare pipe	<u>Dia.(inch)</u>			
			3/4	1	m	26.00
			1	1	m	26.50
			1 1/4	1	m	31.80
			1 1/2	1	m	35.50
2	1	m	46.30			

4.2.3 DUCTING & PLANT ROOM INSULATION

No.	Description	Type	Capacity	Quantity	Unit	Price (RM)
1	<u>Ducting Works (Galvanised Steel Sheet Metal Ducts).</u>					
	Supply air ductwork c/w fire damper, guide vanes, splitter, fittings, connections, insulations, hangers and other necessary accessories.		Thickness sheet (mm)			
1.1	External insulation: FG/PE/NR.		0.5	1	m ²	95
			0.6	1	m ²	133
			0.8	1	m ²	135
			1	1	m ²	150
			1.2	1	m ²	172
			1.6	1	m ²	165
1.2	Internal insulation: FG/PU/NR.		0.5	1	m ²	90
			0.6	1	m ²	93
			0.8	1	m ²	97
			1	1	m ²	101
			1.2	1	m ²	135
			1.6	1	m ²	150
1.3	Internal & External Insulation.		0.5	1	m ²	110
			0.6	1	m ²	123
			0.8	1	m ²	125
			1	1	m ²	135
			1.2	1	m ²	150
			1.6	1	m ²	175
1.4	Bare Duct.		0.5	1	m ²	75
			0.6	1	m ²	80
			0.8	1	m ²	85
			1	1	m ²	90
			1.2	1	m ²	95
			1.6	1	m ²	100
2	Return air ductwork c/w fire damper, guide vanes, splitter, fittings, connections, insulations, hangers and other necessary accessories.					
	External insulation: FG/PE/NR.		0.5	1	m ²	75
2.1	External insulation: FG/PE/NR.		0.6	1	m ²	80
			0.8	1	m ²	85
			1	1	m ²	90
			1.2	1	m ²	95
			1.6	1	m ²	100
		3	<u>Ducting Works (Pre Fabricated Ducts)</u>			
Supply air ductwork c/w fire damper, guide vanes, splitter, fittings, connections, insulations, hangers silencers (if applicable) and other necessary accessories.						
3.1	Insulation: PU rigid foam.			1	m ²	70

4	Return air ductwork c/w fire damper, guide vanes, splitter, fittings, connections, insulations, hangers and other necessary accessories.					
4.1	Insulation: PU rigid foam.			1	m ²	70
5	Supply Air Diffusers. Supply air diffusers c/w control dampers, hangers and other necessary accessories.					
5.1	Diffuser hanger system: Adjustable 4.0 mm dia. suspension rod c/w clip.		1' x 1' 2' x 1' 2' x 2' 4' x 2' linear 2 slot linear 3 slot linear 4 slot round 12" dia jet diffuser	1 1 1 1 1 1 1 1 1	set set set set m ² m ² m ² m ² set	270 300 350 380 400 500 600 250 350
6	Return Air Diffusers. <u>Return air diffusers c/w control dampers, hangers and other necessary accessories.</u>					
6.1	Diffuser hanger system: Adjustable 4.0mm dia. suspension rod c/w clip.		1' x 1' 2' x 1' 2' x 2' 4' x 2' linear 2 slot linear 3 slot linear 4 slot round 4" dia	1 1 1 1 1 1 1 1	set set set set m ² m ² m ² m ²	250 280 330 400 170 330 480 380
7	Damper <u>Damper for supply air duct opening at wall passing through the non-fire zone area.</u>					
7.1	Fire Damper. (Fusible link)			1	m ²	250
7.2	Fire Damper. (Motorized)			1	m ²	650
7.3	Volume Control Damper.			1	m ²	170
7.4	Black off panels damper.			1	m ²	230
7.5	Non Return Damper.			1	m ²	550
7.6	Splitter Damper.			1	m ²	230
7.7	Pressure Stabiliser Damper.			1	m ²	600
7.8	Mixing Box c/w adjustable damper.			1	m ²	350
8	<u>Steel support hanger ('C' channel mild steel to fixed at beam) for the purpose to hang:</u>					
8.1	Fan Coil Unit (FCU).			1	lot	120
8.2	Ducting and other necessary accessories.			1	lot	30
9	Plant Room. To supply and install all AHU room insulation c/w rock wool and perforated G.I sheet and all accessories to complete operation of the system.			1	ft ²	65

4.2.4 VALVES

No.	Description	Type	Capacity	Quantity	Unit	Price (RM)
1	Gate Valve.		inch			
			1/2	1	unit	53
			3/4	1	unit	62
			1	1	unit	83
			1 1/4	1	unit	90
			1 1/2	1	unit	125
			2	1	unit	156
			2 1/2	1	unit	250
			3	1	unit	450
			4	1	unit	850
			5	1	unit	1,200
			6	1	unit	1,600
			8	1	unit	2,400
			10	1	unit	3,500
12	1	unit	4,600			
14	1	unit	4,700			
2	Butterfly Valve.	Conventional	1	1	unit	500
			1 1/4	1	unit	600
			1 1/2	1	unit	700
			2	1	unit	250
			2 1/2	1	unit	280
			3	1	unit	350
			4	1	unit	400
			5	1	unit	600
			6	1	unit	1,100
			8	1	unit	1,400
			10	1	unit	2,700
			12	1	unit	4,800
		Motorized	1	1	unit	800
			1 1/4	1	unit	900
			1 1/2	1	unit	1,100
			2	1	unit	1,300
			2 1/2	1	unit	1,400
			3	1	unit	1,600
			4	1	unit	1,800
			5	1	unit	2,300
6	1	unit	2,800			
8	1	unit	3,200			
10	1	unit	3,500			
12	1	unit	4,000			
3	Globe Valve.		1/2	1	unit	90
			3/4	1	unit	111
			1	1	unit	117
			1 1/4	1	unit	139
			1 1/2	1	unit	167
			2	1	unit	204
			2 1/2	1	unit	371
			3	1	unit	490
			4	1	unit	663
			5	1	unit	810
			6	1	unit	1,040
			8	1	unit	1,410
			10	1	unit	1,930
			12	1	unit	2,700
14	1	unit	2,900			

4	Ball Valve.		<u>Inch</u>			
			1/2	1	unit	70
			3/4	1	unit	80
			1	1	unit	90
			1 1/4	1	unit	110
			1 1/2	1	unit	130
5	Strainer.		2	1	unit	150
			3/4	1	unit	153
			1	1	unit	158
			1 1/4	1	unit	163
			1 1/2	1	unit	186
			2	1	unit	262
			2 1/2	1	unit	288
			3	1	unit	484
			4	1	unit	546
			5	1	unit	655
			6	1	unit	797
			8	1	unit	1,150
6	Check Valve.		10	1	unit	1,682
			12	1	unit	3,932
			14	1	unit	4,100
			1/2	1	unit	95
			3/4	1	unit	117
			1	1	unit	139
			1 1/4	1	unit	150
			1 1/2	1	unit	157
			2	1	unit	160
			2 1/2	1	unit	200
			3	1	unit	260
			4	1	unit	350
7	Flexible Coupling.		5	1	unit	479
			6	1	unit	490
			8	1	unit	725
			10	1	unit	961
			12	1	unit	1,166
			14	1	unit	1,700
			1/2	1	unit	70
			3/4	1	unit	100
			1	1	unit	120
			1 1/4	1	unit	135
			1 1/2	1	unit	150
			2	1	unit	180
	2 1/2	1	unit	200		
	3	1	unit	210		
	4	1	unit	250		
	5	1	unit	300		
	6	1	unit	400		
	8	1	unit	550		
	10	1	unit	800		
	12	1	unit	1,100		
8	Pressure / Air Relief Valve.		1/2	1	unit	80
			3/4	1	unit	90
			1	1	unit	100
			1 1/4	1	unit	130
			1 1/2	1	unit	170
			2	1	unit	210
			2 1/2	1	unit	250
	3	1	unit	350		

9	Modulating / Balancing Valve.		Inch			
			3/4	1	unit	400
			1	1	unit	450
			1 1/4	1	unit	600
			1 1/2	1	unit	850
			2	1	unit	1,050
			2 1/2	1	unit	1,500
			3	1	unit	2,100
			4	1	unit	2,800
			5	1	unit	4,500
10	3 Way Motorized Valve.		3/4	1	unit	460
			1	1	unit	475
			1 1/4	1	unit	675
			1 1/2	1	unit	1,744
			2	1	unit	2,240
			2 1/2	1	unit	4,454
			3	1	unit	5,774
			4	1	unit	5,855
			5	1	unit	7,309
			6	1	unit	7,890
11	2 Way Motorized Valve.		3/4	1	unit	444
			1	1	unit	460
			1 1/4	1	unit	620
			1 1/2	1	unit	1,084
			2	1	unit	1,153
			2 1/2	1	unit	2,835
			3	1	unit	3,770
			4	1	unit	4,821
			5	1	unit	6,120
			6	1	unit	7,196
12	Hand Valve. (Refrigerant Pipe)		1/2	1	unit	80
			3/4	1	unit	100
			1	1	unit	150
			1 1/4	1	unit	180
			1 1/2	1	unit	210
			2	1	unit	250
13	Temperature Gauge.			1	unit	280
14	Temperature Sensor c/w cable.			1	unit	400
15	Room Thermostat c/w acc.			1	unit	250
16	Pressure Gauge c/w acc.			1	unit	300
17	Hi-Lo Pressure Gauge.			1	unit	350
18	Oil Pressure Gauge.			1	unit	350
19	Pressure Switch.			1	unit	250
20	Flow Sensor / Gauge.			1	unit	800
21	Automatic Air Vent.			1	unit	310
22	Pipeline flow indicator.			1	unit	2,000

4.2.5 PIPE FITTINGS

A) POLYVINYL CHLORIDE (PVC)

No.	Description	Type	Capacity	Quantity	Unit	Price (RM)
1	Tee.	Polyvinyl chloride (PVC)	<u>Inch</u>			
			1/2	1	unit	5.75
			3/4	1	unit	8.25
			1	1	unit	11.20
			1 1/4	1	unit	13.75
			1 1/2	1	unit	17.60
2	Bend.		2	1	unit	24.50
			1/2	1	unit	4.40
			3/4	1	unit	5.25
			1	1	unit	6.75
			1 1/4	1	unit	9.50
			1 1/2	1	unit	13.10
3	Elbow.		2	1	unit	17.10
			1/2	1	unit	4.60
			3/4	1	unit	6.00
			1	1	unit	8.50
			1 1/4	1	unit	11.25
			1 1/2	1	unit	13.75
4	Reducer Tee.		2	1	unit	20.25
			3/4	1	unit	8.25
			1	1	unit	11.10
			1 1/4	1	unit	12.00
			1 1/2	1	unit	18.50
5	Equal Tee.		2	1	unit	25.75
		1/2	1	unit	5.75	
		3/4	1	unit	8.25	
		1	1	unit	11.10	
		1 1/4	1	unit	13.75	
		1 1/2	1	unit	17.60	
6	Reducing Socket.	2	1	unit	24.50	
		3/4	1	unit	7.50	
		1	1	unit	10.10	
		1 1/4	1	unit	12.25	
		1 1/2	1	unit	16.75	
7	End Cap.	2	1	unit	21.90	
		1/2	1	unit	5.25	
		3/4	1	unit	8.10	
		1	1	unit	10.90	
		1 1/4	1	unit	12.25	
8	Connecter.	1 1/2	1	unit	21.10	
		1/2	1	unit	5.40	
		3/4	1	unit	7.90	
		1	1	unit	10.40	
		1 1/4	1	unit	12.00	
		1 1/2	1	unit	16.25	
		2	1	unit	22.00	

**B) ACRYLONITRILE BUTADIENE
STYRENE (ABS)**

No.	Description	Type	Capacity	Quantity	Unit	Price (RM)
1	Tee.	Acrylonitrile butadiene styrene (ABS)	Inch			
			1/2	1	unit	19.10
			3/4	1	unit	20.25
			1	1	unit	36.50
			1 1/4	1	unit	48.75
1 1/2	1		unit	57.00		
2	Bend.		1/2	1	unit	9.90
			3/4	1	unit	15.25
			1	1	unit	22.38
			1 1/4	1	unit	26.25
			1 1/2	1	unit	28.10
3	Elbow.		2	1	unit	73.00
			1/2	1	unit	10.75
			3/4	1	unit	16.40
			1	1	unit	24.63
			1 1/4	1	unit	28.40
4	Reducer Tee.		1 1/2	1	unit	29.50
			2	1	unit	76.40
			1/2	1	unit	19.10
			3/4	1	unit	20.25
			1	1	unit	36.50
5	Equal Tee.		1 1/4	1	unit	46.25
			1 1/2	1	unit	57.00
			1/2	1	unit	12.50
			3/4	1	unit	18.60
		1	1	unit	25.60	
6	Reducing Socket.	1 1/4	1	unit	28.90	
		1 1/2	1	unit	34.50	
		2	1	unit	54.50	
		1/2	1	unit	10.40	
		3/4	1	unit	14.50	
7	End Cap.	1	1	unit	22.75	
		1 1/4	1	unit	26.40	
		1 1/2	1	unit	32.25	
		2	1	unit	163.25	
		1/2	1	unit	9.60	
8	Connecter.	3/4	1	unit	12.90	
		1	1	unit	15.60	
		1 1/4	1	unit	21.50	
		1 1/2	1	unit	27.40	
		2	1	unit	36.75	
		1/2	1	unit	11.25	
		3/4	1	unit	14.90	
		1	1	unit	19.10	
		1 1/4	1	unit	24.00	
		1 1/2	1	unit	25.40	
		2	1	unit	36.60	

C) GALVANISED IRON/STEEL CLASS 'C'

No.	Description	Type	Capacity	Quantity	Unit	Price (RM)	
1	Tee.	Galvanised iron/steel class 'C'	Inch				
			3/4	1	unit	47.20	
			1	1	unit	48.40	
			1 1/4	1	unit	49.80	
			1 1/2	1	unit	51.80	
			2	1	unit	54.80	
			2 1/2	1	unit	81.70	
			3	1	unit	108.20	
			4	1	unit	133.50	
5	1		unit	164.00			
6	1		unit	270.00			
8	1		unit	360.00			
2	Bend.		3/4	1	unit	37.80	
			1	1	unit	38.60	
			1 1/4	1	unit	39.70	
			1 1/2	1	unit	40.00	
			2	1	unit	43.80	
			2 1/2	1	unit	47.20	
			3	1	unit	71.40	
			4	1	unit	85.20	
			5	1	unit	100.00	
6	1		unit	160.00			
8	1		unit	270.00			
3	Elbow.		3/4	1	unit	37.80	
		1	1	unit	38.60		
		1 1/4	1	unit	39.70		
		1 1/2	1	unit	40.00		
		2	1	unit	43.80		
		2 1/2	1	unit	47.20		
		3	1	unit	71.40		
		4	1	unit	85.20		
		5	1	unit	100.00		
6	1	unit	160.00				
8	1	unit	270.00				
4	Reducer Tee.	3/4	1	unit	34.40		
		1	1	unit	42.00		
		1 1/4	1	unit	40.95		
		1 1/2	1	unit	42.25		
		2	1	unit	61.70		
5	Equal Tee.	1/2	1	unit	21.38		
		3/4	1	unit	29.60		
		1	1	unit	39.20		
		1 1/4	1	unit	48.15		
		1 1/2	1	unit	49.00		
		2	1	unit	57.60		
		2 1/2	1	unit	166.40		
6	Reducing Socket.	1/2	1	unit	13.05		
		3/4	1	unit	12.00		
		1	1	unit	14.18		
		1 1/4	1	unit	18.00		
		1 1/2	1	unit	19.00		
		2	1	unit	20.20		
		2 1/2	1	unit	59.00		
7	End Cap.	1/2	1	unit	8.33		
		3/4	1	unit	10.20		
		1	1	unit	12.25		
		1 1/4	1	unit	15.90		
		1 1/2	1	unit	17.13		
		2	1	unit	19.40		
		2 1/2	1	unit	55.60		
8	Connector.	1/2	1	unit	17.55		
		3/4	1	unit	21.40		
		1	1	unit	24.85		
		1 1/4	1	unit	28.80		
		1 1/2	1	unit	30.88		
		2	1	unit	44.50		

4.2.6 INDOOR & OUTDOOR AIR COOLED SPLIT UNIT

No.	Description	Type	Capacity	Quantity	Unit	Price (RM)
	Indoor Units		Btu/hr			
1	Air-cooled Split Unit air-conditioners , interlock wiring, starter, wireless controller for temperature & fan speed settings, brackets, refrigerant, insulation, drain piping, motors compressors, fans, valves, drain pipes, switchboard, coring, hacking, punching of holes in walls/floors, making good, painting, G.Steel trunking & conduiting.	Wall mounted	9,000	1	set	570
			10,000	1	set	600
			12,000	1	set	780
			13,000	1	set	790
			15,000	1	set	870
			18,000	1	set	1,200
			20,000	1	set	1,210
			24,000	1	set	1,410
			27,000	1	set	1,450
			30,000	1	set	1,560
		Ceiling mounted /suspended	9,000	1	set	1,370
			10,000	1	set	1,390
			12,000	1	set	1,410
			13,000	1	set	1,420
			15,000	1	set	1,500
			18,000	1	set	1,520
			20,000	1	set	1,550
			24,000	1	set	1,710
			25,000	1	set	1,870
			27,000	1	set	2,000
			30,000	1	set	2,070
			35,000	1	set	2,400
		40,000	1	set	2,450	
		50,000	1	set	2,720	
		60,000	1	set	3,020	
		Cassette 4 way blow	9,000	1	set	1,730
			10,000	1	set	1,840
			12,000	1	set	1,870
			13,000	1	set	1,890
			15,000	1	set	2,000
			18,000	1	set	2,450
			20,000	1	set	2,560
			24,000	1	set	2,640
			25,000	1	set	2,650
			27,000	1	set	2,670
			30,000	1	set	2,770
			35,000	1	set	2,880
		40,000	1	set	3,060	
		50,000	1	set	3,110	
		Floor standing	30,000	1	set	4,500
			40,000	1	set	5,000
			50,000	1	set	5,800
			60,000	1	set	6,240
			80,000	1	set	6,450
			100,000	1	set	8,000
125,000	1		set	8,800		
150,000	1		set	9,300		
Fan coil unit ducted	40,000	1	set	2,290		
	50,000	1	set	2,680		
	60,000	1	set	3,270		
	80,000	1	set	4,050		
	100,000	1	set	4,400		
	125,000	1	set	6,100		
	150,000	1	set	6,100		

Outdoor Units		Btu/hr				
2	Air-cooled Split Unit air-conditioners , interlock wiring, starter, wireless controller for temperature & fan speed settings, brackets, refrigerant, insulation, drain piping, motors compressors, fans, valves, drain pipes, switchboard, coring, hacking, punching of holes in walls/floors, making good, painting, G.Steel trunking & conduiting.	Condensing units	9,000	1	set	880
			10,000	1	set	1,020
			12,000	1	set	1,050
			13,000	1	set	1,100
			15,000	1	set	1,300
			18,000	1	set	1,780
			20,000	1	set	1,880
			24,000	1	set	2,000
			25,000	1	set	2,080
			27,000	1	set	2,570
			30,000	1	set	3,030
			35,000	1	set	4,160
			40,000	1	set	4,350
			50,000	1	set	4,800
			60,000	1	set	5,660
			70,000	1	set	7,050
			80,000	1	set	7,950
100,000	1	set	9,300			
125,000	1	set	9,900			
150,000	1	set	14,300			

4.2.7 ELECTRICAL WORKS

Rujuk Jadual Kadar Harga JKR Elektrik 2011 (Website CKE).

5.0

KADAR HARGA SISTEM PENCEGAH KEBAKARAN

5.1 KADAR HARGA BAGI SISTEM

5.1.1 PORTABLE FIRE EXTINGUISHER

No.	Description	Quantity	Unit	Price (RM)
1	9.0 kg. dry powder portable fire extinguishers c/w mounting brackets.	1	set	160
	Lockable cabinet.	1	set	110
	9.0 kg. dry powder portable fire extinguishers c/w mounting brackets and lockable cabinet.	1	set	270
2	5.0 kg. carbon dioxide fire extinguishers c/w mounting brackets.	1	set	260
	Lockable cabinet.	1	set	160
	5.0 kg. carbon dioxide fire extinguishers c/w mounting brackets and lockable cabinet	1	set	420
3	2.0 kg. carbon dioxide fire extinguishers c/w mounting brackets.	1	set	150
	Lockable cabinet.	1	set	150
	2.0 kg. carbon dioxide fire extinguishers c/w mounting brackets and lockable cabinet.	1	set	300

5.1.2 HOSE REEL SYSTEM

No.	Description	Quantity	Unit	Price (RM)
1	i. Heavy duty electric motor pump set c/w starter, couplings, base plate, neoprene pads, etc. [3.0 - 4.0 HP]	1	set	4,500
	[5.0 - 6.0 HP]	1	set	5,000
	ii. Heavy duty standby diesel engine motor pump set c/w diesel tank, base plate, neoprene pads, insulated exhaust pipe, etc. [4.0 - 5.0 HP]	1	set	8,000
	[6.0 - 7.0 HP]	1	set	9,000
	Swing universal type hydraulic hose reels each c/w 30m long 25mm diameter hose, 25mm diameter stop valve and shut-off nozzle, etc.	1	set	550
3	Lockable nozzle box.	1	set	100
4	Lockable hose reel steel cabinet.	1	set	400
5	Galvanised steel/iron class C-Under ground and above ground pipe works c/w valves, fittings, supports and hangers, pressure gauges, pressure switches, automatic air release valves etc.	1	lot	Rujuk anggaran kadar harga peralatan 5.2.2
6	Pump switchboard (control panel) c/w single line schematic circuit diagram, over voltage protector, earthling, voltmeter, ammeter cabling, conduits, electrical works(power and control) include control wiring between switchboard and various equipment, automatic controls, alarms, etc.	1	set	4,500
7	Additional wiring to main/ sub. fire alarm control. (if applicable)	1	set	2,000/ Panel

No.	Description	Quantity	Unit	Price (RM)
8	Hot- dipped galvanised pressed steel water tank (2,400 gallons) c/w I-beam, water level indicator (stainless steel wire rope),SS electrodes c/w holder and spacer, ball valve, cover, ladder, overflow pipe, scour pipe, etc.	1	set	17,000
9	Piping (within plant room) c/w valves, fittings and accessories.	1	lot	2,000

5.1.3 DRY RISER SYSTEM

No.	Description	Quantity	Unit	Price (RM)
1	4-way breeching inlet c/w cabinet, additional pipe, fittings, valves and accessories.	1	set	2,000
2	Landing valve.	1	unit	500
3	Canvas hose c/w jet and spray nozzle.	1	unit	400
4	Swing type cradle.	1	unit	250
5	Galvanised steel/iron class 'C' - underground and above ground pipe works c/w valves, fittings, supports and hangers, pressure gauges, flow switches, strainers, flexible couplings, pressure switches, automatic air release valves etc.	1	lot	Rujuk anggaran kadar harga peralatan 5.2.2

5.1.4 WET RISER SYSTEM

No.	Description	Quantity	Unit	Price (RM)
1	Heavy duty electric motor pump set c/w starter, couplings, base plate, inertial block, spring vibration isolators c/w neoprene pads, etc.			
	75 HP	1	set	16,000
	100 HP	1	set	17,000
	125 HP	1	set	18,000
2	Multistage electrical jockey pump set c/w starter, couplings, neoprene pads, etc.			
	7.5 HP	1	set	7,500
	15 HP	1	set	8,500
3	Heavy duty standby diesel engine motor pump set c/w diesel tank, base plate, inertial block, spring vibration isolators c/w neoprene pads, etc.			
	75 HP	1	set	18,000
	100 HP	1	set	20,000
	125 HP	1	set	22,000
4	Pump switchboard c/w cabling, conduits, controls wiring between switchboard and various equipment, automatic controls, alarms, single line schematic circuit diagram, overvoltage protector, earthing, voltmeter, ammeter, etc.	1	set	16,000
	Tank capacity [10,000-12,800 gallon].			

No.	Description	Quantity	Unit	Price (RM)
5	4-way breeching inlet c/w cabinet, additional pipe, fittings, valves and accessories.	1	set	2,000
6	Landing valve.	1	unit	500
7	Swing type cradle each c/w canvas hose coupling jet and spray nozzle, etc.	1	set	650
8	Galvanised steel/iron class C - under ground and above ground pipe works c/w valves, fittings, supports and hangers, pressure gauges, flow switches, strainers, flexible couplings, pressure switches, automatic air release valves, etc.	1	lot	Rujuk anggaran kadar harga peralatan 5.2.2
9	Hot- dipped galvanised pressed steel water tank c/w water level indicator (stainless steel wire rope), SS electrodes c/w holder and spacer, ball valve, cover, ladder, overflow pipe, scour pipe, etc.	1	set	36,000
	Tank capacity [10,000-12,800 gallon].			

5.1.5 SPRINKLERS SYSTEM

No.	Description			Quantity	Unit	Price (RM)
1	Heavy duty electric motor pump set c/w base plate, inertial block, spring vibration isolators c/w neoprene pads, etc.					
	HAZARDS CLASS	SPRINKLERS HEIGHT (m)	MOTOR (hp)	Quantity	Unit	(RM)
	OH I	15	7.5	1	set	7,400
		30	15	1	set	9,500
		45	20	1	set	10,000
			30	1	set	12,700
	OH II	15	15	1	set	9,200
			20	1	set	10,200
		30	25	1	set	11,300
			30	1	set	13,500
		45	40	1	set	15,000
			50	1	set	17,600
	OH III	15	20	1	set	9,700
			25	1	set	11,000
		30	15	1	set	15,800
		45	30	1	set	20,800

No.	Description	Quantity	Unit	Price (RM)		
2	Heavy duty standby diesel engine motor pump set c/w diesel tank, base plate, inertial block, spring vibration isolators c/w neoprene pads, Heavy duty maintenance free lead acid rechargeable type battery and metal box, etc.					
	HAZARDS CLASS	SPRINKLERS HEIGHT (m)	MOTOR (hp)	Quantity	Unit	(RM)
	OH I	15	7.5	1	set	11,500
		30	15	1	set	15,200
		45	20	1	set	16,000
			30	1	set	20,700
	OH II	15	15	1	set	14,600
			20	1	set	16,200
		30	25	1	set	18,200
			30	1	set	22,100
		45	40	1	set	24,600
			50	1	set	29,300
	OH III	15	20	1	set	15,500
			25	1	set	18,000
		30	15	1	set	26,000
		45	30	1	set	35,000
3	Multistage electrical jockey pump set c/w starter, couplings, neoprene pads, etc.					
	[3.0 – 4.0 HP]	1	set	5,000		
	[5.0 – 6.0 HP]	1	set	6,000		
4	Pump switchboard c/w cablings, conduits, controls wiring between switchboard and various equipment, automatic controls, alarms, single line schematic circuit diagram, overvoltage protector, earthling, voltmeter, ammeter, etc.		1	lot	11,000	
5	4-way breeching inlet c/w cabinet, additional pipe, fittings, valves and accessories.		1	set	2,000	
6	Sprinklers head.		1	unit	40	
7	Galvanised steel/iron class C - under ground and above ground pipe works c/w valves, fittings, supports and hangers, pressure gauges, flow switches, alarm gongs, strainers, flexible couplings, pressure switches, automatic air release valves, butterfly valves, etc.		1	lot	Rujuk anggaran kadar harga peralatan 5.2.2	
8	Hot- dipped galvanised pressed steel water tank c/w water level indicator (stainless steel wire rope), electrodes c/w holder and spacer, ball valve, cover, ladder, overflow pipe, scour pipe, etc.					
	a. Tank capacity (18,000-22,000) gallon.		1	set	53,000	
	b. Tank capacity (30,000-48,000) gallon.		1	set	84,000	

5.1.6 AUTOMATIC FIRE DETECTION & ALARM SYSTEM (CONVENTIONAL)

No.	Description	Quantity	Unit	Price (RM)
1	Manual call points (break-glass).	1	unit	100
2	Alarm bells/sounder.	1	unit	100
3	Heat detector.	1	unit	100
4	Smoke detector.	1	unit	150
5	Main fire alarm panel c/w mimic diagram, relays, wiring, indications, overvoltage protector, earthing, heavy duty nickel cadmium rechargeable type c/w battery chargers, etc.	1	set	4,500
6	Repeater fire alarm panel (guard house) c/w mimic diagram, LED light, relays, control wiring, indications, overvoltage protector, etc.	1	set	4,000
7	All electrical wiring c/w conduit, underground cable, supports and hangers between fire alarm panel to various points of detectors, alarms, break glass, etc.	1	lot	Rujuk anggaran kadar harga peralatan 5.2.1
8	Earthing, lightning and surge protection.	1	set	2,000

5.1.7 ADDRESSABLE FIRE DETECTION & ALARM SYSTEM

No.	Description	Quantity	Unit	Price (RM)
1	Addressable manual call points (break-glass).	1	unit	230
2	Addressable alarm bell/ sounder.	1	unit	160
3	Addressable smoke detector.	1	unit	280
4	Addressable heat detector.	1	unit	250
5	Addressable Main fire alarm panel c/w central controller (CPU, I/O, power supply module, buzzer ,module), keyboard panel, facial LED display panel, heavy duty nickel cadmium rechargeable type c/w battery chargers overvoltage protector, earthing, dot matrix printer and DC printer supply, etc.	1	set	24,000
6	Addressable Repeater fire alarm panel c/w cubicle, zone card etc.	1	set	12,000
7	Central monitoring system (CMS) inclusive direct telecommunication link to Bomba, approval submission of application fees, etc.	1	set	6,500
8	All electrical wiring c/w conduit, underground cable, supports and hangers between fire alarm panel to various points of detectors, alarms, break glass, etc.	1	lot	Rujuk anggaran kadar harga peralatan 5.2.1
9	Programming and system calibration.	1	set	4,500
10	Lightning surge protector signal and power.	1	set	4,000

5.1.8 TOTAL FLOODING FIRE EXTINGUISHING SYSTEM

No.	Description	Quantity	Unit	Price (RM)
1	Room size (Agent).		RM/m ³	250
2	Switchboard c/w batteries, chargers, etc.	1	set	2,500
3	Conventional smoke detector.	1	unit	180
4	Conventional heat detector.	1	unit	140
5	Manual key switch.	1	set	130
6	Conventional alarm bells/sounder.	1	unit	120
7	Warning lights.	1	unit	140
8	Emergency instruction, signage, etc .	1	set	160
9	Fire curtain c/w actuator and wiring (size fire curtain).		m ²	150
10	Mechanical works including piping, nozzle and fittings c/w support and hanger, accessories, etc.	1	set	3,400
11	Electrical works including cabling, wiring, control wiring c/w G.I. conduits and accessories	1	set	2,200
12	Interfacing unit/Interconnected cable from control panel clean agent to main fire alarm panel.	1	set	1,700
13	Earthing, lightning and surge protection.	1	set	2,000
14	Testing and Commissioning as per specification. (Section 3.7; item 10)	1	set	5,000

5.1.9 WET CHEMICAL SYSTEM

No.	Description	Quantity	Unit	Price (RM)
1	Storage tank c/w wet chemical gas, pressure gauge, valves and bracket, etc. Capacity 9.5 litres.	1	set	6,500
2	20mm dia. sch. 40 seamless steel pipe c/w flexible connectors, discharge nozzle, couplers brackets, fittings, etc.	1	set	2,500
3	ADP/ Plenum/ Duct nozzle.	1	unit	200
4	Switchboard/ control panel c/w batteries, chargers, wiring etc. as per drawings and specification.	1	set	1500
5	Flash light (Green/red).	1	unit	150
6	Master alarm bell.	1	unit	150
7	Triggering system c/w control panel wiring, detectors, alarm bell and manual key switch.	1	set	1,000
8	Manual pull station.	1	set	180

KADAR HARGA BAGI PERALATAN

5.2.1 ELECTRICAL WORKS

No.	Description	Specification	Quantity	Unit	Price (RM)
1	PVC cables/Electric cable only.	1½ mm ²	1	m	31
		2½ mm ²	1	m	41
		4 mm ²	1	m	70
2	PVC cables/Electric cable in conduit.	1.5mm ²	1	m	44
		2.5mm ²	1	m	68
		4.0mm ²	1	m	108
3	G.I. conduit.	19 mm	1	m	52
		25 mm	1	m	60
4	G.I. trunking.	1" x 2"	1	m	45
		2" x 2"	1	m	60
		2" x 3"	1	m	70
5	PVC/SWA/PVC cable. (Armoured cable)	4C x 1½ mm ²	1	m	25
		3C x 2½ mm ²	1	m	30
		4C x 2½ mm ²	1	m	60
		3C x 4 mm ²	1	m	70
		4C x 4 mm ²	1	m	85
6	MCB.	6A SPN	1	unit	22
		13A SPN	1	unit	23
		13A 3P	1	unit	25
		16A 3P	1	unit	28
		20A 3P	1	unit	37
		30A 3P	1	unit	45
7	MCCB.	16A 3P	1	unit	57
		20A 3P	1	unit	62
		30A 3P	1	unit	68
8	Control timer.	240VAC	1	unit	78
		24VAC	1	unit	56
9	Control relays.	240VAC	1	unit	95
		24VAC	1	unit	65
10	Contactor.	AC3 16A 4P	1	unit	50
		AC3 20A 3P	1	unit	54
		AC3 30A 3P	1	unit	62
		AC3 40A 3P	1	unit	66
		AC3 60A 3P	1	unit	78
11	Overload.	4 ~ 16 A 3P	1	unit	83
		16 ~ 25 A 3P	1	unit	95
		25 ~ 35 A 3P	1	unit	105
12	Battery.	10 AH	1	unit	1,140
		12 AH	1	unit	1,448
		20AH	1	unit	1,795
13	Battery charger.		1	unit	460

5.2.2 PIPING

No.	Description	Specification	Quantity	Unit	Price (RM)
1	Underground galvanised iron/steel class 'C' pipes. (pre insulated bituminous factory wrapped externally)	<u>Dia. (inch)</u>			
		1	1	m	94
		1¼	1	m	120
		1½	1	m	150
		2	1	m	154
		2½	1	m	185
		3	1	m	242
		4	1	m	292
2	Above ground galvanised iron/steel class 'C' pipes.	6	1	m	380
		½	1	m	36
		¾	1	m	43
		1	1	m	49
		1¼	1	m	60
		1½	1	m	78
		2"	1	m	90
		2½	1	m	110
3	Schedule 40 seamless galvanised iron/steel.	3"	1	m	130
		4	1	m	158
		6	1	m	198
		½	1	m	49
		¾	1	m	60
		1	1	m	101
		1¼	1	m	126
1½	1	m	156		
2	1	m	197		
2½	1	m	225		

5.2.3 VALVES

No.	Description	Specification	Quantity	Unit	Price (RM)
1	Non rising spindle gate valves.	<u>Dia. (inch)</u>			
		½	1	unit	19
		1	1	unit	23
		1½	1	unit	32
		2	1	unit	60
		2½	1	unit	70
		3	1	unit	85
2	Stop valves.	4	1	unit	105
		1	1	unit	150
3	Landing valves.	2	1	unit	160
			1	unit	540

No.	Description	Specification	Quantity	Unit	Price (RM)
4	Gate valves.	<u>Dia. (inch)</u>			
		1	1	unit	33
		1½	1	unit	50
		2"	1	unit	54
		2½	1	unit	62
		3	1	unit	70
		4	1	unit	87
		5	1	unit	145
5	Check valves.	6	1	unit	430
		½	1	unit	53
		1	1	unit	70
		1½	1	unit	80
		2	1	unit	90
		2½	1	unit	99
		3	1	unit	107
		4	1	unit	150
5	1	unit	210		
6	1	unit	240		

5.2.4 PIPE WORK FITTINGS & ACCESSORIES

No.	Description	Specification	Quantity	Unit	Price (RM)
1	G.I. elbows.	<u>Dia. (inch)</u>			
		½	1	unit	15
		¾	1	unit	16
		1	1	unit	18
		1¼	1	unit	24
		1½	1	unit	28
		2"	1	unit	50
		2½	1	unit	60
		3	1	unit	75
		4	1	unit	100
2	G.I. tees.	6	1	unit	122
		½	1	unit	15
		¾	1	unit	19
		1	1	unit	21
		1¼	1	unit	27
		1½	1	unit	52
		2	1	unit	60
		2½	1	unit	42
		3	1	unit	70
		4	1	unit	90
6	1	unit	118		

No.	Description	Specification	Quantity	Unit	Price (RM)
3	G.I. cross tees.	<u>Dia. (inch)</u>			
		½	1	unit	27
		¾	1	unit	29
		1	1	unit	30
		1¼	1	unit	33
		1½	1	unit	45
		2"	1	unit	58
		2½	1	unit	83
		3	1	unit	89
4	G.I. reducing tees.	2 x 1	1	unit	30
		2½ x 1	1	unit	45
		2½ x 2	1	unit	52
		4 x 1	1	unit	58
		4 x 2	1	unit	70
		4 x 2½	1	unit	90
5	G.I. reducing bush.	2 x 1	1	unit	16
		2½ x 1	1	unit	27
		2½ x 2	1	unit	35
		4 x 1	1	unit	40
		4 x 2	1	unit	52
		4 x 2½	1	unit	58
6	Schedule 40 seamless galvanized steel elbows.	½	1	unit	20
		¾	1	unit	22
		1	1	unit	25
		1¼	1	unit	30
		1½	1	unit	40
		2	1	unit	48
		2½	1	unit	62
7	Schedule 40 seamless galvanized steel tees.	½	1	unit	24
		¾	1	unit	26
		1	1	unit	32
		1¼	1	unit	36
		1½	1	unit	46
		2	1	unit	55
		2½	1	unit	61
8	Schedule 40 seamless galvanized steel cross tees.	¾	1	unit	27
		1	1	unit	32
		1¼	1	unit	43
		1½	1	unit	59
		2	1	unit	65
		2½	1	unit	80

No.	Description	Specification	Quantity	Unit	Price (RM)
9	Schedule 40 seamless galvanized steel reducing tees.	<u>Dia. (inch)</u> 2 x 1	1	unit	45
		2½ x 1	1	unit	53
		2½ x 2	1	unit	55
10	Schedule 40 seamless galvanized steel reducing bush.	2 x 1	1	unit	14
		2½ x 1	1	unit	20
		2½ x 2	1	unit	25
11	Strainer.	2	1	unit	87
		2½	1	unit	109
		3	1	unit	128
		4	1	unit	162
		5	1	unit	180
12	Flexible coupling.	6	1	unit	250
		½	1	unit	25
		1	1	unit	40
		1½	1	unit	65
		2	1	unit	90
		2½	1	unit	103
		3	1	unit	110
13	Pressure gauge.	4" Dail face	1	unit	238
		6" Dail face	1	unit	330
14	Automatic air release valve.	1	1	unit	150
		2	1	unit	200
15	Pressure differential switch.		1	unit	355

5.2.5 DETECTION, ALARM & TOTAL FLOODING (CLEAN AGENT)

No.	Description	Specification	Quantity	Unit	Price (RM)
1	Cylinder actuating valve.	Electric	1	unit	520
		Pneumatic	1	unit	600
		Manual	1	unit	390
2	Clean agent discharge nozzle.	½"	1	unit	320
		¾"	1	unit	480
		1 "	1	unit	525
3	Alarm bell.	6" Dail face	1	unit	120
		9" Dail face	1	unit	250
4	Manual call point.	Conventional	1	unit	100
		Addressable	1	unit	250

No.	Description	Specification	Quantity	Unit	Price (RM)
5	Smoke detector.	Conventional	1	unit	180
		Addressable	1	unit	300
6	Heat detector.	Conventional	1	unit	150
		Addressable	1	unit	250
7	Smoke and heat detector.	Conventional	1	unit	200
		Addressable	1	unit	300
8	Smoke detector duct type.	Conventional	1	unit	365
		Addressable	1	unit	445
9	Warning light.		1	unit	180
10	Control panel for clean agent.	2 zone	1	unit	2,000
		4 zone	1	unit	1,570
		6 zone	1	unit	2,750
11	Manual pull station.		1	unit	980
12	Fire curtain c/w actuator and wiring.		1	m ²	150

5.2.6 OTHERS

No.	Description	Specification	Quantity	Unit	Price (RM)
1	Hose reel cabinet.		1	unit	400
2	Hose reel drum c/w stop valve, shut-off nozzle and hose, etc.	Swing type	1	unit	550
		Fixed type	1	unit	525
3	Cradle each c/w canvas hose coupling jet and spray nozzle, etc.	Swing type	1	set	650
4	Sprinklers head.	Miniature	1	unit	110
		Conventional	1	unit	100
		Roof type	1	unit	140
5	Hot dipped galvanised pressed steel plates water tank per panel.	5mm	1	unit	400
		6mm	1	unit	470
6	Complete stainless steel non float electrodes c/w holder and wiring.		1	set	2,000
7	2.0 kg. portable fire extinguisher.	Carbon dioxide	1	unit	170
8	Hose reel pump test port c/w pressure switch, pressure gauges and wiring.		1	set	1,000
9	Alarm/sounder outside pump room .		1	unit	100
10	4-way breeching inlet cabinet c/w signage.		1	unit	500
11	4-way breeching inlet c/w additional pipe, fittings, valves and accessories.		1	unit	1,500
12	Canvas hose c/w jet and spray nozzle.		1	unit	400
13	Swing type cradle.		1	unit	250
14	9.0 kg. Portable fire extinguisher.	Dry powder	1	unit	160
15	Grease.		1	per kg	105

6.0

KADAR HARGA SISTEM BEKALAN AIR SEJUK DALAMAN

6.1 KADAR HARGA BAGI SISTEM

6.1.1 BOOSTER PUMP SYSTEM

No.	Descriptions	Quantity	Unit	Price (RM)
1	Electric motor driven vertical multistage pump system (duty & standby) c/w starter, mountings, base plates, concrete plinths, neoprene pads etc.	2	nos	20,000
	1.5 Hp			22,000
	2.0 Hp			25,000
	3.0 HP			28,000
	5.5 Hp			
2	Control panel c/w conduits, cabling, control wiring between switchboard and various equipment (above and underground), automatic switches and controls, 30 A ammeter, voltmeter, overvoltage protector, earthing, pump hour run meter, 4P ELCB, phase light, TPN main isolator, storage tank indicator light, etc.	1	set	3,200
3	Glass-framed single line schematic circuit diagram, valve indicator etc.	1	set	350
4	Earthing & lightning surge protector minimum of 3 nos 10kA each.	1	set	2,000
5	Stainless steel non-float electrodes c/w holder and wiring, etc.	1	set	2,000
6	Piping (within plant room) c/w fittings, valves, supports, hangers, bracket, strainer, pressure gauge, flexible joint, drain pipe to the nearest drain, etc. for each pump system above.	1	lot	2,000

6.1.2 HYDROPNEUMATIC BOOSTER PUMP SYSTEM

No.	Descriptions	Quantity	Unit	Price (RM)
1	Electric motor driven pump system (duty & standby) c/w starter, mountings, base plates, concrete plinths, neoprene pads, etc.	2	nos	10,000
	0.75 Hp			12,000
	1.5 Hp			18,000
	3.0 HP			22,000
	5.0 Hp			
2	Control panel c/w conduits, cabling, control wiring between switchboard and various equipment (above and underground), automatic switches and controls, 30 A ammeter, voltmeter, overvoltage protector, earthing, pump hour run meter, 4P ELCB, phase light, TPN main isolator, storage tank indicator light, etc.	1	set	3,200
3	Glass-framed single line schematic circuit diagram, valve indicator etc.	1	set	350
4	Earthing & lightning surge protector minimum of 3 nos 10kA each.	1	set	2,000
5	Stainless steel non-float electrodes c/w holder and wiring, etc.	1	set	2,000
6	Piping (within plant room) c/w fittings, valves, supports, hangers, bracket, strainer, pressure gauge, flexible joint, drain pipe to the nearest drain, etc. for each pump system above.	1	lot	2,000

6.1. VARIABLES SPEED DRIVE PUMP SYSTEM

No.	Descriptions	Quantity	Unit	Price (RM)
1	Electric motor driven pump system (duty & standby) c/w starter, mountings, base plates, concrete plinths, neoprene pads, etc.	2	nos	20,000
	1.0 Hp			23,000
	2.0 Hp			25,000
	2.5 HP			30,000
1	3.0 Hp	2	nos	20,000
	1.0 Hp			23,000
	2.0 Hp			25,000
	2.5 HP			30,000
2	Control panel c/w conduits, cabling, control wiring between switchboard and various equipment (above and underground), automatic switches and controls, 30 A ammeter, voltmeter, overvoltage protector, earthing, pump hour run meter, 4P ELCB, phase light, TPN main isolator, storage tank indicator light, etc.	1	set	4,500
3	Glass-framed single line schematic circuit diagram, valve indicator etc.	1	set	350
4	Earthing & lightning surge protector minimum of 3 nos 10kA each.	1	set	2,000
5	Stainless steel non-float electrodes c/w holder and wiring, etc.	1	set	2,000
6	Piping (within plant room) c/w fittings, valves, supports, hangers, bracket, strainer, pressure gauge, flexible joint, drain pipe to the nearest drain, etc. for each pump system above.	1	lot	2,000

7.0

KADAR HARGA PUKAL BAGI SISTEM MEKANIKAL

7.1 A. SISTEM PENYAMAN UDARA

BI L.	SISTEM	UNIT	HARGA (RM)
1	AIR COOLED SPLIT UNIT (Wall Mounted)		
	9,000 BTU/HR (1.0 HP)	PER NO.	2,000
	13,000 BTU/HR (1.5 HP)	PER NO.	2,200
	18,000 BTU/HR (2.0 HP)	PER NO.	3,100
	24,000 BTU/HR (2.5 HP)	PER NO.	3,600
	27,000 BTU/HR (3.0 HP)	PER NO.	4,600
	AIR COOLED SPLIT UNIT (Ceiling Mounted)		
	9,000 BTU/HR (1.0 HP)	PER NO.	2,700
	13,000 BTU/HR (1.5 HP)	PER NO.	3,200
	18,000 BTU/HR (2.0 HP)	PER NO.	3,800
	24,000 BTU/HR (2.5 HP)	PER NO.	4,500
	27,000 BTU/HR (3.0 HP)	PER NO.	5,200
	30,000 BTU/HR (3.5 HP)	PER NO.	6,200
	40,000 BTU/HR (4.0 HP)	PER NO.	7,000
	50,000 BTU/HR (5.0 HP)	PER NO.	7,800
	60,000 BTU/HR (6.0 HP)	PER NO.	8,800
	AIR COOLED SPLIT UNIT (Ceiling Cassette)		
	13,000 BTU/HR (1.5 HP)	PER NO.	4,200
	18,000 BTU/HR (2.0 HP)	PER NO.	4,600
	24,000 BTU/HR (2.5 HP)	PER NO.	4,700
	27,000 BTU/HR (3.0 HP)	PER NO.	5,100
35,000 BTU/HR (3.5 HP)	PER NO.	5,700	
40,000 BTU/HR (4.0 HP)	PER NO.	7,000	
50,000 BTU/HR (5.0 HP)	PER NO.	8,300	
2	AIR COOLED SPLIT DUCTED SYSTEM	PER TR	4,500
3	AIR COOLED SPLIT DUCTED SYSTEM PROJEK HOSPITAL	PER TR	6,500
4	WATER COOLED PACKAGED SYSTEM	PER TR	5,000
5	AIR COOLED CHILLER SYSTEM	PER TR	5,500
6	AIR COOLED CHILLER PROJEK HOSPITAL	PER TR	6,500
7	WATER COOLED CHILLER SYSTEM	PER TR	6,000
8	WATER COOLED CHILLER SYSTEM PROJEK HOSPITAL	PER TR	8,500
9	AIR COOLED MULTI SPLIT SYSTEM (VRV/VRF)	PER TR	6,000
10	PRECISION AIR CONDITIONING	PER TR	6,300
11	BUILDING AUTOMATION SYSTEM	PER TR	500
12	VENTILATION SYSTEM	PER CFM	2.50
13	SMOKE SPILL SYSTEM	PER CFM	0.50
14	PRESSURIZED SYSTEM	PER CFM	0.70

Nota:

1. Kaedah pemilihan peralatan mestilah di ambil kira unit yang lebih besar. Contoh: Kapasiti reka bentuk penyaman udara wall mounted 17,000 Btu/hr perlu memilih kadar harga peralatan berkapasiti 18,000 Btu/hr.
2. Jadual ini sebagai rujukan bagi menyediakan anggaran awalan untuk projek baru.
3. TR – *Tonne Refrigerant*.

7.1 B. PERALATAN PENYAMAN UDARA

BIL.	SISTEM	UNIT	HARGA (RM)
1	WATER COOLED CHILLER UNIT	PER TR	1,900
2	AIR COOLED CHILLER UNIT	PER TR	1,800
3	COOLING TOWER UNIT	PER TR	120
4	CONDENSER WATER PUMP	PER TR	1,100
5	CHILLED WATER PUMP	PER TR	810
6	MAKE UP WATER TANK	PER GALLON	4
7	EXPANSION TANK	PER GALLON	13
8	CHILLED WATER PIPE	PER TR	1,300
9	CONDENSER WATER PIPE	PER TR	420
10	AHU/FCU (WATER COOLED)	PER TR	1,100
11	AHU/FCU(AIR COOLED)	PER TR	600
12	SWITCHBOARD (WATER COOLED)	PER TR	310
13	SWITCHBOARD (AIR COOLED)	PER TR	470
14	SWITCHBOARD (INVERTER UNIT)	PER TR	1,700
15	DUCTING (SHEET METAL C/W FIBREGLASS)	PER TR	1,100
16	DUCTING (FIBREGLASS)	PER FT2 AIR CONDITIONING AREA (GFA)	2.10
17	DUCTING [POLYETHYLENE (PE) INSULATION]	PER FT2 AIR CONDITIONING AREA (GFA)	5.30
18	DUCTING (BARE DUCT)	PER FT2 AIR CONDITIONING AREA (GFA)	1.80
19	BUILDING AUTOMATION SYSTEM	PER UNIT I/O POINT	500

Nota:

1. Jadual ini sebagai rujukan bagi menyediakan anggaran awalan untuk projek ubah suai.
2. Anggaran harga *ducting* termasuk *supply diffusers* dan *returns grilles*.
3. TR – *Tonne Refrigerant*.
4. GFA – *Gross Floor Area*.

7.2 SISTEM PENCEGAH KEBAKARAN

BIL.	SISTEM	FORMULA	NOTA
1	HOSE REEL SYSTEM	$[RM40,000 + (BILANGAN\ DRUM\ x\ RM600) + KOS\ PEPAIPAN^{**}]$	OPTION A (GFA)
		$[RM40,000 + (AREA/800m^2) x RM600 + KOS\ PEPAIPAN^{**}]$	OPTION B (GFA)
2	DRY RISER SYSTEM	$[(BILANGAN\ LANDING\ VALVE\ x\ RM1,200) + (NO.\ BREECHING\ INLET\ x\ RM1,500) + KOS\ PEPAIPAN^{**}]$	GFA
3	WET RISER SYSTEM	$[RM120,000 + (BIL.\ LANDING\ VALVE\ x\ RM1200) + KOS\ PEPAIPAN^{**}]$	GFA
4	SPRINKLER SYSTEM	$(AREA\ SINGLE\ LAYER/12m^2) x RM400$	KOS SINGLE LAYER (GFA)
		$KOS\ SINGLE\ LAYER + [(AREA\ DOUBLE\ LAYER/12m^2) x RM250]$	KOS DOUBLE LAYER (GFA)
5	CLEANT AGENT TOTAL FLOODING SYSTEM	$(VOLUME\ m^3\ x\ RM250) + RM150\ PER\ FIRE\ CURTAIN\ m^2 + RM17,000$	GFA
6	CONVENTIONAL ALARM SYSTEM	$[(FLOOR\ AREA/5.6m^2) x RM300 + RM10,000]$	GFA
7	ADDRESSABLE ALARM SYSTEM	$[(FLOOR\ AREA/5.6m^2) x RM500 + RM30,000]$	GFA

Nota:

- **Anggaran kos pepaipan hendaklah di kira secara berasingan.
- Jadual ini sebagai rujukan bagi menyediakan anggaran awalan untuk projek baru.
- GFA – *Gross Floor Area*.

7.3 SISTEM LIF

BIL.	BANGUNAN	HARGA LIF	HARGA LANDING PER FLOOR	HARGA KESELURUHAN (RM)
1	PEJABAT	180,000	8,000	HARGA LIF + (NO. OF LANDING X HARGA LANDING PER FLOOR)
2	KUARTERS	140,000	4,500	
3	HOSPITAL	300,000	50,000	
4	DUMBWAITER	45,000	2,800	
5	LIF BARANG	280,000	6,500	

Nota:

- Jadual ini sebagai rujukan bagi menyediakan anggaran awalan untuk projek baru.
- Harga ini adalah berdasarkan kelajuan 1.0 – 2.0 m/s dan beban muatan 10 – 20 orang penumpang.
- Harga ini adalah berdasarkan jenama yang popular di pasaran.

7.4 SISTEM BEKALAN AIR SEJUK DAN SANITARI DALAMAN

BIL.	SISTEM	FORMULA
1	SISTEM BEKALAN AIR SEJUK	RM25/m ² (GFA)
2	TANGKI SEDUTAN/DOMESTIK	RM5/GALLON
3	SANITARI DALAMAN (ABS PIPE)	RM15/m ² (GFA)

Nota:

Jadual ini sebagai rujukan bagi menyediakan anggaran awalan untuk projek baru.

(GFA) – *Gross Floor Area*.

8.0 RUJUKAN

- 8.1 Kos Purata Semeter Persegi.
Kerja-Kerja Pembinaan Bangunan Bagi Tempoh Julai-Disember 2011.
- 8.2 Anggaran Kos Harga Mekanikal 2009.
- 8.3 Jadual Kadar Harga Kerja-Kerja Kecil dan Pembelian 2012.
- 8.4 Harga Pembekal.
- 8.5 Input Teknikal Bengkel Di Awana, Genting Highlands.
- 8.6 Input Teknikal Dari JKR Mekanikal Negeri.
- 8.7 Laman Web Berkaitan.
- 8.8 Dokumen Kontrak 2009-2012 (Mekanikal).
 - IPD Yan, Kedah.
 - IPD Temerloh, Pahang.
 - Pusat Pertahanan Awam Pahang.
 - IPD Johor Bahru, Johor.
 - Pusat Latihan Polis Jalan Semarak, Kuala Lumpur.
 - Akademi Imergresen Negeri Sembilan.
 - Kompleks Mahkamah Syariah Negeri Kelantan.
 - AADK Kuala Selangor, Selangor.
 - Bangunan Persekutuan Gunasama Klang, Selangor.
 - MARDI Serdang, Selangor.
 - Stadium Raja Muda, Kuala Lumpur.
 - Universiti Darul Iman, Terengganu.
 - TLDM Lumut, Perak.
 - KK3 Kuala Berang, Terengganu & KK3 Marang, Terengganu.
 - KK3 Johor, Negeri Sembilan, KK3 Bahau, Negeri Sembilan & KK3 Johor Jaya, Johor.
 - KK3 (Cermai 2) Kuantan, Pahang, KK3 Indera Mahkota, Kuantan, Pahang & KK3 (Cermai 2) Tumpat, Kelantan.
 - Hospital Tuanku Ampuan Klang, Selangor.
 - Pejabat Kastam Kuantan, Pahang.
 - JUPEM, Kuala Lumpur.
 - Wisma Persekutuan Kuala Terengganu.
 - Penjara Simpang Renggam, Johor.

- LHDN Bangi, Selangor.
- Mahkamah Kuantan, Pahang.
- IPD Johor Bahru Utara, Johor.
- Mahkamah Syariah Pulau Pinang.
- Pusat Asasi Sains, Gambang, Pahang.
- Pusat Promosi Perkayuan Johor Bahru, Johor.
- Mahkamah Syarikah Nilai, Negeri Sembilan.
- Kuliyyah Teknologi Maklumat dan Komunikasi, UIAM Kampus Gombak, Selangor.
- Fakulti Pergigian dan Kolej Kediaman Uitm Sg. Buluh, Selangor.
- Institut Latihan Statistik Malaysia, Sungkai, Perak.
- Pejabat Pencegah KASTAM Negeri Sembilan Universiti Darul Iman Kompleks Asrama, Terengganu.
- Blok Pangsapuri Kos Sederhana 14 Tingkat, Kg. Relau Pulau Pinang.
- Jabatan Perikanan Malaysia, Kuala Lumpur.
- Kompleks KHEDN Langkawi, Kedah.
- UIAM, Pusat Asasi Sains Fasa 2, Bangunan Pentadbiran dan Kolej Kediaman Gambang, Pahang.
- Pusat Aktiviti Perpaduan Seberang Perai, Pulau Pinang.
- Blok D, Universiti Darul Iman kampus Besut, Terengganu.
- Blok F, Universiti Darul Iman kampus Besut, Terengganu.
- Pejabat Pencegah KASTAM Negeri Sembilan.
- Jabatan Perikanan Malaysia Kuala Lumpur.
- Pangkalan TLDM Lumut (Pakej B), Perak.
- Balai Polis Sri Hartamas, Brickfields Kuala Lumpur.
- Ibu Pejabat Jabatan Bomba dan Penyelamat Malaysia Negeri Johor. di Mukim Tebrau, Johor.
- SMART Fasa 2 Sepang, Selangor.
- Akademi Imegresen Port Dickson, Negeri Sembilan.
- Fasa 2 Kampus Institut Keselamatan Dan Kesihatan Pekerja Negara, Johor.
- Makmal Jabatan Perikanan Malaysia, Kuala Lumpur.
- Pusat Latihan Keselamatan dan Pelindungan, Bandar Enstek, Negeri Sembilan.
- Pusat Pelancongan Malaysia, Ampang, Kuala Lumpur.
- Tempat Letak Kereta Bertingkat Hospital Melaka.
- Pangkalan TLDM Lumut Perak (Pakej B).

9.0 PENGHARGAAN

PENAUNG

Ir. Syed Abdullah Bin Syed Abdul Rahman

PENYELARAS

1. Ir. Nasir Bin Abdul Hamed
2. Tn. Hj. Ishak Bin Abas

AHLI JAWATANKUASA

1. Ir. Zulkifli Bin Abdul Rashad
2. Ir. Zalina Binti Mohd Yusuf
3. Pn. Nor Hazlin Binti Mohammad
4. Tn. Hj. Ahmad Zaki Bin Bahari
5. Ir. Ahmad Apandi Bin Lakim
6. Ir. Mohamad Zaini Bin Bakar
7. Ir. Mohd Muzakkir Bin Abdullah
8. Ir. Isfanizam Bin Ismail
9. En. Azilan Bin Mohd Ali
10. En. Mohd Izzanee Bin Mohd Ishak
11. En. Fardly Bin Mohd Nasib
12. En. Mohd Faizal Bin Romli
13. En. Muhammad Firdaus Bin Musa
14. En. Roonie Protasius
15. En. Azizul Rahim Bin Mohamad Zulkifli
16. En. Mohd Hairul Bin Asnawee
17. En. Mohd Affendy Bin Sukarseh
18. Pn. Sharul Ain Binti Sahhari
19. En. Muhamad Zafran Bin A.Rahim
20. En. Mohd Zulkifli Bin Zakaria

