CAWANGAN KEJURUTERAAN MEKANIKAL	BORANG - AC_ACMSU - SKM 2 - 2009
	CHECKLIST OF ACCEPTANCE CRITERIA
	SERVICES : AIR CONDITIONING & MECHANICAL VENTILATION SYSTEM
	PROJECT NAME :
	FILE NO. :

ACCEPTANCE CRITERIA

FOR INSTALLATION

OF

AIR COOLED MULTI SPLIT UNIT SYSTEM

CAWANGAN KEJURUTERAAN MEKANIKAL	BORANG - AC_ACMSU - SKM 2 - 2009
	CHECKLIST OF ACCEPTANCE CRITERIA
	SERVICES : AIR CONDITIONING & MECHANICAL VENTILATION SYSTEM
	PROJECT NAME :
	FILE NO. :

ACCEPTANCE CRITERIA FOR INSTALLATION OF AIR COOLED MULTI SPLIT UNITS (ACMSU)

NO.	ITEMS	CRITERIA	(√) / (X)	DATE/INITIAL	REMARKS
1	**DRAWINGS & DOCUMENTS**				
a.	Working drawings	Provided and approved before the system installation is carried out.			
		Coordination with other disciplines at site (Coordinated drawings).			
b.	Contract document/Copy of : • Technical Specification • Design Requirement • Tech. Data of Equip. Offered	Provided for references.			
2	**TECHNICAL CHECKLIST**				
2.1	**CONDENSING UNIT (OUTDOOR)**				
a.	ACMSU no.				
b.	Condensing Unit (CU) type	Modular outdoor unit			
c.	Type of compressor	High efficient hermetic compressor.			
		Equipped with Inverter Control c/w :			
		• Oil failure control			
		• Dual pressure control			
		• Safety valves			
		• Suction and discharge valves			
		• Crankcase heaters			
		• Suction gas strainer			
		• Oil sight glass			
d.	Physical CU appearance :				
	• Housing	Good condition and no dented/crack.			
	• Condenser coils & fins	Good condition and no dented/crack.			
e.	CU Installation	CU install on proper bracket/hanger and bolted to wall/steel support/slab.			
		Distance of CU with walls etc.follows the specification & drawings.			
		Side by side CU installation shall be allowed.			
2.2	**FAN COIL UNIT (INDOOR)**				
a.	FCU type	Floor/wall/ceiling conceal/ceiling mtd			
b.	Physical FCU appearance :				
	• Housing	Good condition and no dented/crack.			
	• Cooling coils & fins	Good condition and no dented/crack.			
c.	FCU installation	FCU install with proper 'C' channel, rubber pad & steel bracket and bolted to wall/slab..			
	Drain pan for FCU (for ceiling conceal type)	Galvanized steel and powder painted to withstand ASTM B-117 Salt Spray Test at 500 hours, and proper insulated.			
d.	Condensate drain pipe at FCU	Installed c/w trap, insulation in good condition and comply to specification.			
e.	Ductworks at FCU	Installed c/w insulation in good condition and comply to specification.			
f.	Air filters for FCU	Average Dust Extraction Efficiency on A.F.I. Test of at least 80% and washable.			
		Test certificate shall be made available.			
g.	Remote controller for ACMSU	Provided and in good condition. (wired / wireless).			
h.	Starter panel for ACMSU	Provided and in good condition.			

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i.	Cable trunking	Surface & concealed - G.I. conduits			
		Cable trays - perforated hot dipped galvanised.			
		Cable trunking - hot dipped galvanised Size - up to 100mm x 100mm (18 swg) Size - up to 150mm x 150mm (16 swg) Size - larger (not less than 14 swg)			

NOTES :

√ - Comply to specification/drawings (Acceptable)

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	CHECKLIST OF ACCEPTANCE CRITERIA
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ACCEPTANCE CRITERIA FOR INSTALLATION OF DUCTWORKS

NO.	ITEMS	CRITERIA	(√) / (X)	DATE/INITIAL	REMARKS
1	**DRAWINGS & DOCUMENTS**				
a.	Working drawings	Provided and approved before the system installation is carried out.			
		Coordination with other disciplines at site (Coordinated drawings).			
b.	Contract document/Copy of : • Technical Specification • Design Requirement • Tech. Data of Equip. Offered	Provided for references.			
2	**TECHNICAL CHECKLIST**				
A.	**DUCTWORK (RIGID)**				
a.	Ductwork (Rigid duct)	Galvanised steel sheets			
		No patched or make up pieced ductwork is allowed.			
	Gauge of sheet metal	Refer Technical Specification.			
	Flexible connections for rigid duct	Provided where the ductwork joins the air handling unit or fan housing.			
		Consist of two layers of 567g (20 oz) vapour proof canvas or nylon fabric			
b.	**External insulation of ducts** i. Fibreglass Insulation	Generally, supply and return air ductwork insulated externally with 50 mm fibreglass.			
		Ductwork in ceiling space immediately below the roof and in the vertical duct shaft insulated with 50 mm thick fibreglass insulation.			
	ii. Polyurethane (P.U) Insulation	All ducts exposed to unconditioned space and in the plantroom shall be insulated with 50 mm thick fire-retardant type P.U.			
	iii. Polyethelyne (P.E) Insulation	Generally, supply and return air ducts insulated with 7.0 mm thick PE foam.			
		Ductworks below the roof or in any vertical shaft have 10.0mm thick PE foam. Ductworks within the plant room and conditioned air ducts exposed to weather insulated with PE foam reinforced with galvanised wire mesh and finished with hybrid plaster.			
c.	**Internal insulation of ducts** i. Fibreglass Insulation	Main supply air duct immediately after the centrifugal fan shall be internally insulated with 50 mm thick fibreglass, faced over with 1 mm thick perforated galvanised steel sheet.			
	ii. Polyethelyne (P.E) Insulation	Main supply air duct immediately after the centrifugal fan shall be internally insulated with 12 mm thick PE.			
	iii. Polyurethane (P.U) Insulation	Main supply air duct immediately after the centrifugal fan shall be internally insulated with 25 mm thick PU.			
B.	**FLEXIBLE DUCTS**				
a.	Flexible ducts	Allowed for connection with branch duct to diffuser/grille.			
		Maximum length shall be not more than 2.0 meters from branch duct.			
		Constructed of double thickness aluminium foil fitted and glued around a core of helically wound zinc-coated high carbon spring steel wire.			

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		Alternatively, manufactured from roll strip aluminium constructed with lock seam to form a continuous flexible spiral duct.			
b.	Flexible ductwork insulation	Insulation shall be of 50mm thick fibreglass.			
		Density = 32 kg/m3.			
		Faced outside with approved vapour barrier and fitted around the flexible duct.			
		All flexible ductwork to diffusers shall be insulated.			
c.	Flexible ductwork connection	Each spigot on rigid ducts for connection to flexible ducts leading to single air outlets shall be standard circular or equivalent oval shape with butterfly type volume control dampers fitted.			
		Flexible duct connections and connections to spigots made using factory fitted male metal end collars and quick acting clamp locks, and each joint shall be made airtight.			
		Ducts installed without restriction to airflow and supported where suspended above the ceiling by 38mm wide straps at not more than 1 meter spacing.			
C.	**FIRE RATED DUCTWORK**				
a.	Fire Rated Ductwork	Minimum of 2 hours fire rating.			
		Encased with a framework of formed metal support channels and furring channels of sizes and at spacings recommended by the supplier of the fire rated construction.			
	Fire Rated Ductwork construction	50 mm (2”) layer of ceramic type spray applied over the walls of the duct or plenum.			
		An expanded metal lath shall be attached to the furring channels.			
		A second coat of ceramic type spray shall be applied to give a minimum overall thickness of 75 mm (3”) spray.			
		The exposed sides of the duct or plenum shall then be sheathed with 0.8 mm galvanised steel fixed as specified for externally insulated duct sheathing.			
D.	**SUPPORT & HANGERS (RIGID DUCT)**				
a.	Supports and Hangers (Rigid duct)	Rigid ductwork shall be supported at centers not greater than 2 meters apart and anchored to the building structure.			
		Duct supports consist of 38 mm (1 1/2") mild steel angle bearers with 9.5 mm (3/8") diameter mild steel rods or 25 mm x 3 mm (1" x 1/8") mild steel strips as hangers.			
		Direct fastening of duct to support with screws is not allowed.			

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BORANG - AC_ACMSU - SKM 2 - 2009

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		Duct hangers fixed to the concrete with anchor bolt. **Wooden and plastic plugs are not allowed**.			
e.	Elbows and Turning Vanes	All elbows have a minimum inside radius equal to the width of the duct where possible.			
		Where space does not permit such radius, sharper or right angle bends may be used together with double thickness aerofoil shape turning vanes.			
		Turning vanes must be securely fitted to the elbows.			

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BORANG - AC_ACMSU - SKM 2 - 2009

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PROJECT NAME :

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ACCEPTANCE CRITERIA FOR INSTALLATION OF AIR COOLED MULTI SPLIT UNIT SYSTEM (ACMSUS)

NO.	ITEMS	CRITERIA	(√) / (X)	DATE/INITIAL	REMARKS
1	**DRAWINGS & DOCUMENTS**				
a.	Working drawings	Acceptable/Not Acceptable			
b.	Contract document/Copy of : • Technical Specification • Design Requirement • Tech. Data of Equip. Offered	Acceptable/Not Acceptable			
2	**TECHNICAL CHECKLIST**				
2.1	**Air Cooled Multi Split Units**	Acceptable/Not Acceptable			
2.2	**Fixed Ductwork**	Acceptable/Not Acceptable			
2.3	**Flexible Ducts**	Acceptable/Not Acceptable			
2.4	**Fire Rated Ducts**	Acceptable/Not Acceptable			
2.5	**Diffusers, Registers, Grilles & Dampers**	Acceptable/Not Acceptable			

NOTES :

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X - Not Comply to specification/drawings (Not Acceptable)

REMARKS/COMMENTS :

Inspected by :

……..

Name :

Designation :

Date:

Verified by :

……...

Name :

Designation :

Date: