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

ACCEPTANCE CRITERIA
FOR INSTALLATION
OF
AIR COOLED SPLIT DUCTED SYSTEM

CAWANGAN KEJURUTERAAN MEKANIKAL	BORANG - AC - ACSD - SKM 2 - 2009
	CHECKLIST OF ACCEPTANCE CRITERIA
	SERVICES : AIR CONDITIONING & MECHANICAL VENTILATION SYSTEM
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ACCEPTANCE CRITERIA FOR INSTALLATION OF AIR COOLED SPLIT DUCTED UNIT (ACSDU)

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	**ACSDU**				
a.	ACSDU no.				
2.2	**COND. UNIT (CU) (OUTDOOR)**				
a.	Type of compressor	Serviceable type.			
		Compressor equipped with:			
		• Filter drier			
		• Oil sight glass			
		• Solenoid stop valve			
		• Thermal expansion valve			
		• Oil failure control			
		• Dual pressure control			
		• Safety valves			
		• Suction and discharge valves			
		• Crankcase heaters			
		• Suction gas strainer			
		All valves & fittings for compressor and refrigerant pipeline in good condition.			
b.	Physical CU appearance :				
	• Housing	Good condition and no dented/crack.			
	• Condenser coils & fins	Good condition and no dented/crack.			
c.	CU Installation	CU install on proper bracket/hanger and bolted to wall/steel support/slab.			
		Distance between outdoor units & wall follow the specification & drawings.			
d.	Cable trunking from CU to FCU	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)			
2.3	**AIR HANDLING UNIT (AHU) (INDOOR)**				
a.	Type of AHU	Single/Double Skin.			
b.	Type of compressor	Hermetic compressor.			
c.	Physical AHU appearance :				
	• Housing	Good condition and no dented/crack.			
	• Cooling coils & fins	Good condition and no dented/crack.			
c.	AHU Installation	AHU install on proper plinth c/w isolator.			
d.	Ductwork at AHU	Installed c/w insulation in good condition and comply to specification.			
e.	Duct flexible connections	Provided at location where ductwork joins the AHU.			
		Consist of 2 layers of 567g vapour proof canvas or nylon fabric.			

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f.	Filter section • Primary filters	Provided and can be remove/replace easily.			
		50mm thickness.			
		``			
	• Secondary filters (Optional)	Provided and can be remove/replace easily.			
		Air tight seal between filter holding frame & housing (approved propietry factory made).			
		Additional set of filter supplied for number of filter supplied.			
g.	Starter panel for AHU	Provided and in good condition.			
h.	Refrigerant pipes material	Hard drawn seamless copper refrigerant pipes with copper fittings and silver soldered joints.			
i.	Refrigerant pipes insulation	Whole of the liquid and suction refrigerant lines including fittings, valves and strainer bodies, flanges, etc. insulated with 50 mm thick Armaflex expanded rubber compound or approved equivalent.			
j.	Condensate drain pipes	PVC Class C for all sizes.			
		Insulated with 25 mm thick Armaflex or flexible expanded rubber compound c/w trap.			

NOTES :

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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.			

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NO.	**ITEMS**	**CRITERIA**	**(√) / (X)**	**DATE/INITIAL**	**REMARKS**
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.			
		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.			

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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.			
		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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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 Split Ducted**	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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REMARKS/COMMENTS :

Inspected by :

……..
Name :
Designation :
Date:

Verified by :

……..
Name :
Designation :
Date: