



SECTION 5.0 SPECIFICATIONS FOR COMPREHENSIVE SERVICE AND MAINTENANCE OF THE AIR CONDITIONING PLANT AND ANCILLARY EQUIPMENT

5.1 WATER COOLED CHILLER SYSTEM

1 GENERAL

The work covered by this Specification is for the supply of all materials, appliances, labour and necessary incidentals for the service and maintenance of the Air- Conditioning Plant and Ancillary Equipment.

All work to be performed under this Specification shall be in accordance with the best commercial practice and must be strict accordance with the Specification.

2 WORKMANSHIP AND MATERIALS

The Work described in this Specification shall be performed by workmen skilled in the service, maintenance and repair of all types of Air-Conditioning Plant and shall be executed in accordance with the best commercial practice.

All materials to be supplied in connection with work under this Specification shall be new and unused and shall generally be of the best quality as regards manufacture and performance.

3 SUPERVISION

The Contractor shall have a Foreman in charge of service, maintenance and repair work to be carried out under this Specification. This Foreman must be thoroughly competent in supervising the service, maintenance and repair of all types of Air-Conditioning Plant and shall be in direct employ of the Contractor and acceptable to the Superintending Officer.

4 SCOPE OF WORK

All machinery and equipment comprising the complete Air-Conditioning Plant and Ancillary Equipment shall be serviced and maintained in strict accordance with the Servicing and Maintenance Schedule as set in Clause 5.5 below.

The Contractor shall advise the Superintending Officer of any defects in any part or parts of complete Air-Conditioning Plant and Ancillary Equipment observed during routine inspection and service and shall repair such defects if required to do so by the Superintending Officer.

The Contractor shall also provide emergency repair service during normal working hours and also during overtime hours if required to do so by the Superintending Officer.



5 **SERVICING AND MAINTENACE SCHEDULE**

The Contractor shall inspect and service all machinery and equipment compromising the complete Air-Conditioning Plant and Ancillary Equipment at the above premises at least once a month, except where otherwise directed by the Superintending Officer.

As such monthly inspection and service of the complete Air-Conditioning Plant and Ancillary Equipment, the work detailed below shall be performed by the Contractor:

No	Item	Frequency		
		Every Month	Every 3 Month	Every 6 Month
1	REFRIGERANT COMPRESSOR & SYSTEM			
a	Check all seals and pipe lines for leaks and rectify as necessary.	X		
b	Check all refrigerant and oil levels, and charge the refrigerant and oil into the refrigerant system as necessary.	X		
c	Check the tension of the belt drives, and adjust as necessary.	X		
d	Check the operation of all refrigerant controls, and clean, adjusts and lubricate as necessary.	X		
e	Check the operation of all safety devices, clean, adjust and lubricate as necessary.		X	
f	Check the suction and discharge pressures of all refrigerant compressors and if abnormal trace the fault, rectify.	X		
g	Check all bolts and nuts for tightness and tighten as necessary.	X		
2	WATER PUMPS			
a	Check all seals, glands and pipelines for leaks and rectify as necessary.	X		
b	Re-pack and adjust pump glands or mechanical seals as necessary.	X		
c	Check all pump bearings and lubricate with oil or grease as necessary.	X		
d	Check the alignment and condition of all rubber couplings between pumps and drive motors, and rectify as necessary.	X		
e	Check the tension of all belt drives, and adjust as necessary.	X		
3	EVAPORATOR/AIR HANDLING UNIT			
a	Check al filters, and clean as necessary.	X		
b	Check all water coils, seals and pipelines for leaks and rectify as necessary.	X		
c	Purge air from all water coils.	X		
d	Check all fan bearings, and lubricate with grease as necessary.			X
e	Check the tension of all belt drives, and adjust as necessary.	X		
f	Check the operation of all automatic water regulating valves, and clean, adjusts and lubricate as necessary.		X	



g	Check the operation of all automatic multi blade face and by-pass dampers, and clean, adjust and lubricate as necessary.	X		
h	Clean all condensate pans, trays and drains.	X		
4	COOLING TOWER			
a	Check all fan bearing and lubricate with grease as necessary.		X	
b	Check the tension of all belt drives, and adjust as necessary.	X		
c	Clean all water screens.		X	
d	Check the operation of all water nozzles and clean as necessary.		X	
e	Drain, clean and flush out the water tanks of the cooling tower when found necessary.		X	
5	ELECTRIC MOTOR			
a	Check all motor bearings, and lubricate with grease as necessary.			X
b	Check carbon brushes and slip rings of all motors, and clean as necessary. Renew carbon brushes as necessary.	X		
c	Check safety devices fitted to all motors and clean, adjust and lubricate as necessary.	X		
6	ELECTRIC STARTERS, CONTROL GEARS, ANCILLARY APPARATUS			
a	Clean, adjust and lubricate all bearings, pivots and other moving parts as necessary.	X		
b	Clean or renew electric contactors as necessary.	X		
c	Renew electric fuses as necessary.	X		
7	TEMPERATURE CONTROL GEARS AND RELAYS			
a	Clean, adjust and lubricate all bearings, pivots and other moving parts as necessary.	X		
b	Renew electric fuses as necessary.	X		

Others:

- a) Check the performance of the complete air-conditioning plant and adjust the air volume control dampers as necessary.
- b) Instruct the operators responsible for the operation of the plant and equipment on correct method of operating the plant and equipment, and on the maintenance points to be watched.
- c) Report in writing to the Superintendent Officer any defects observed on any part or parts of the complete Air-Conditioning Plant and Ancillary Equipment. The report shall state the cause/s of the defect/s observed and shall include and estimate of the cost of repairs required.



6 CONSUMABLE MATERIAL

The Contractor shall supply the following consumable materials as and when required:-

- a) All oils and grease required for lubrication of compressors, fan bearings, motor bearings, pivots and other moving parts.
- b) All refrigerant required to replace refrigerant losses in the refrigerant system.
- c) All carbon brushes required to replace worn brushes in electric motors.
- d) All consumable filter elements.
- e) All electric contact points required to replace worn electric contact points in switch gears, motor starter gears, electric control gears and electric relays.
- f) All electric fuses required to replace blown fuses.
- g) All cotton waste, soap detergent and other cleaning materials required for cleaning purposes.

The costs of these consumable materials shall not be charged for separately by the Contractor, but shall be included in the fixed monthly rate quoted by the Contractor for the Service and Maintenance of the Complete Mechanical System and Ancillary Equipment after the guarantee period.

7 REPAIRS

The Contractor shall repair defects in the complete Mechanical Systems and Ancillary Equipment on the instructions of the Superintending Officer. The costs of such repair shall not be included in the fixed monthly rate quoted by the Contractor for the Service and Maintenance of the complete Mechanical Systems and Ancillary Equipment but shall be charged for separately by the Contractor.

All repairs on the complete Mechanical Systems and Ancillary Equipment shall be guaranteed by the Contractor against defects in workmanship and materials for a period of one year to take effect from date of completion of repairs. During the guarantee period the Contractor shall rectify defects in repairs carried out by him with no additional charge to the Government.

8 SERVICE AND MAINTENANCE RECORD

The Contractor shall provide a service and maintenance record book for the complete Mechanical Systems and Ancillary Equipment being serviced and maintained by him. This record book shall be kept in the plant room or control room of the Mechanical System and Ancillary Equipment being serviced and maintained, and brief details of all service, maintenance and repairs carried out on the complete Mechanical System and Ancillary Equipment shall be entered by

the Contractor into this book for checking purposes. The address and telephone



number of the Contractor's service station shall also be entered into this record book to facilitate emergency service calls.

The Contractor shall also keep an accurate detailed record in duplicate of all service, maintenance and repair work carried out by him on the complete Mechanical System and Ancillary Equipment. This record shall be in the form of a Maintenance/Repair Sheet, and shall be countersigned by the Superintending Officer each time the Mechanical Systems and Ancillary Equipment is attended to by the Contractor.

9 RATES FOR SERVICE AND MAINTENANCE

The rates for the Service and Maintenance of the complete Mechanical Systems and Ancillary Equipment shall be as shown in the Schedule of Prices for this Contract.

These rates shall be quoted for by the Contractor at the time he submits his tender, and shall hold good for the period of THREE years commencing from the end of the free maintenance period. The Contractor may be required to enter into a contract for the above period with the Government on the Standard Form of Contract for Service and Maintenance of Mechanical Systems and Ancillary Equipment (a copy of this Standard Form may be inspected at the Office of the Pengarah Kanan, Cawangan Kejuruteraan Mekanikal, Ibu Pejabat J.K.R. Malaysia, Kuala Lumpur).