

## **PORTION 3: ADDITIONAL SPECIFICATIONS**

### **ADDITIONAL SPECIFICATION**

#### **SA                    GENERAL MAINTENANCE**

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#### **SA 01                SCOPE**

Maintenance of the specified systems, services and/or parts of buildings and infrastructure shall all be referred to as "Maintenance of an Installation". Maintenance of all completed installations shall ensure reliable functioning and optimum service life thereof. Monthly maintenance responsibilities for each installation including all units and components as specified, shall commence with access to the Site (Maintenance Prior to Practical Completion). Commencement of maintenance after Practical Completion of each installation shall mean that the installation has been repaired to an acceptable level of serviceability and shall leave the Contractor with a functional installation to maintain for the remaining period of the 36-month Contract.

A difference shall be made in payment for the maintenance prior to and after practical completion of repair work.

Maintenance of an installation shall be performed in accordance with the Technical and Particular Specifications, the Operating and Maintenance Manuals (where applicable) and the Maintenance Control Plan.

Remuneration for maintaining "installations" (systems, services and/or buildings and parts of the infrastructure) in good functional condition is provided for in the Schedules of Quantities by means of monthly payment items.

This Additional Specification covers maintenance requirements, development of a maintenance control plan, identification of equipment, site maintenance administration, maintenance performance measurement, as well as the items for measurement of the Contractor's service level and resulting payment.

#### **SA 02                MAINTENANCE REQUIREMENTS**

##### **SA 02.01            CONTRACTOR'S RESPONSIBILITIES**

The Contractor shall maintain the complete installations for the 12-month Contract period thereafter for the 12 month liability period.

Maintenance implies and shall include monthly preventative maintenance, corrective maintenance, as well as breakdown maintenance on all components of the specified installations.

## SA.2

The maintenance control plan (specified in Clause SA 03) will be developed by the Contractor, to schedule the frequency of routine inspections and format of reports. The Contractor shall carry out inspections on the equipment as detailed in the Technical and Particular Specifications and the maintenance control plan. Each inspection, test or breakdown shall be recorded in an approved format and listed in a quarterly report (part of the maintenance control plan).

As part of repair of each installation, the Contractor shall submit a set of Operating and Maintenance Manuals where applicable. The Contractor shall ensure through training that the operating and maintenance personnel are conversant with the instructions as presented in the Operating and Maintenance Manuals. Continued training shall be included in the scope of maintenance work for the duration of the Contract, in accordance with Additional Specification SD: General Training.

The Operating and Maintenance Manuals, as approved by the Engineer, shall be used as a basis of preventative maintenance. The Contractor shall perform all preventative and corrective maintenance as described in the Operating and Maintenance Manuals. This shall be in accordance with the Technical and Particular Specifications.

The Contractor shall, as part of his maintenance responsibilities repair or replace faulty equipment upon logging of a breakdown, within the down-time as defined in Clause SA 05.02 at the Contractor's cost, except in the event of replacement being labelled as exceeding liability as specified in Clause 63 of the Project Specific Conditions of Contract, in which case the Client NHLS will bear part of the costs.

The Contractor shall rectify any faulty condition of which he becomes aware, even if it has not been logged. Such rectification shall also be logged and listed in the quarterly report.

### **SA 02.02      CONDITIONS FOR EXCEEDING THE CONTRACTOR'S LIABILITY DUE TO OPERATIONAL DAMAGE BREAKDOWNS**

Irrespective the definition of operational damage given in the Oxford dictionary, it shall be defined for the purpose of this clause as being any damage caused on purpose or through negligence by the User Client's employees, inmates (where applicable), suppliers, subcontractors, etc for any reason whatsoever. For the purpose of this clause, operational damage and vandalism shall have the same meaning. Where repair work is necessitated as a result of operational damage caused by User Clients or their associates, the Contractor will be requested to:

- (a) perform work, using tendered rates for the supply, delivery and installation of material forming part of the repair work schedule, within the maximum down-time allowed for operational damage, where the Engineer rules that the damage has been caused by incorrect operation;
- (b) submit one (1) quotation for repair and/or replacement of the damaged unit, where tendered rates are not available and where the Engineer rules that the damage has been caused by incorrect operation;
- (c) perform the work on receipt of an order from the Engineer, within the time offered as part of the quotation, and
- (d) notify the Engineer well in advance of completion of the repair work in order to enable inspection.

The responsibility of determining whether damage to the installation was caused by people other than employees or associates of the Contractor shall rest with the Engineer.

Operational damage caused by the employees, suppliers, subcontractors, etc of the Contractor, shall be repaired by the Contractor at his own cost.

**SA 02.03      CONDITIONS FOR EXCEEDING THE CONTRACTOR'S LIABILITY ABOVE MARGINAL BREAKDOWN COST**

In the event where the cost for the repair or replacement of any single component/subassembly where a breakdown has occurred due to a single failure, or where the cost for replacing a single item of equipment completely, exceeds the value of R15 000,00 (transport, accommodation and travelling cost excluded), the liability of the Contractor is limited to the value of R15 000,00. The additional cost above the value of R15 000,00 will be paid for by the Employer provided that conditions 1, 2 and 3 below have been met.

1. The defective part/component/subassembly or machine must be identifiable as a single subassembly or component and not the total of a number of small defects or breakdowns on subassemblies/components on any one or more machines.

Examples of subassemblies/components are the following:

(a) Should the wiring or bearings on an electric motor fail, the complete motor must be removed for repairs and the cost for the repairs on the complete motor will be regarded as repairs on a single subassembly/component.

(b) A starter motor, for example, is a subassembly, which can be removed from the machine for repairs. The repairs on the starter motor together with the repairs on the main bearings will not be regarded as a repair on a single subassembly/component. If the complete diesel engine is replaced with its associated subassemblies the replacement of the complete unit will be regarded as a single component.

(c) A pump as a whole is regarded as a single component. The pump and driving machine on long coupled pumps are regarded as separate subassemblies. Pumps and motors on close-coupled equipment are regarded as a single component. The pump and motor of a sump pump are therefore regarded as a single component.

(d) Control equipment for the control of a single item, with the sensing device, the controller itself and the final controlled variable are regarded as a single component of the system. The repairs on any one item on a controller have an influence on the rest of the control equipment and must after the replacement be commissioned again as a unit.

2. The Contractor shall submit a written report to the Engineer for approval. This report shall contain the following information:

(a) The make and model number of the machine serviced/inspected/ repaired/replaced;

(b) The identification number of the machine;

(c) A description or name and part number of the defective part/component or subassembly;

(d) A statement on whether the component could be repaired, together with a cost estimate;

(e) A quotation valid for a minimum period of 60 days if the component/part/subassembly has to be replaced or repaired by an outside firm. If the subassembly/machine is to be repaired or replaced by an outside company, the Contractor shall supply one (1) quotation for such parts/repairs or a quotation from any sole supplier. Only an original quotation will be accepted. The mark-up on such work shall be a percentage as tendered and shall be applicable to the total cost (VAT excluded) of repair work by outside companies;

(f) The expected urgency for the replacement or repairs, and

(g) The delivery time of a new component/subassembly/machine or delivery times on spares required to repair the defective component/ subassembly.

3. A written approval to proceed with the work must be issued by the client or his representative. Copies of the original VAT invoices from outside companies for all repairs or spare parts supplied must be attached to the Contractor's invoice.

#### **SA 02.04      COMPONENTS INCLUDED IN MAINTENANCE SCOPE**

The main sections of a facility with their subsections are as set out in the Technical Specifications and Particular Specifications where applicable and in the Schedule of Quantities and will each be deemed "an installation". Maintenance, as specified, will be applicable to all of these installations.

- Installations MA – HVAC Installations

Maintenance of each of these installations will be the responsibility of the Contractor and will be evaluated on a monthly basis by the Engineer. The remuneration for maintenance work and responsibilities will be certified accordingly.

This description of the Works is not necessarily complete and shall not limit the work to be carried out by the Contractor under this Contract.

Approximate quantities of each type of work are given in the Schedule of Quantities.

**NOTE:** A clear distinction will be made between the repair work and the maintenance responsibilities of each installation.

#### **SA 02.05      COMMENCEMENT OF MAINTENANCE PERIOD**

Maintenance responsibilities for an installation prior to practical completion of the repair and upgrade work shall include maintenance of all individual units, equipment or components thereof, for which no replacement or upgrade work is required (as per the contract document) or for which the repair work has not yet started, and shall commence with access to the installation.

Where access to an installation with a view to commence repair work is delayed, then the maintenance responsibilities which in such cases will consist of keeping the installation in the condition it is in, shall commence immediately at the start of the Contract.

Such maintenance before access is obtained, shall consist for example of fixing leaks without replacing pipework or opening a blocked pipeline without further altering or inspecting such pipes.

The Contractor shall accept full maintenance responsibilities for each completed installation upon issue of a Certificate of Practical Completion for refurbishment or replacement work of that installation.

The preliminary construction programme differentiates between commencement of maintenance on various installations.

#### **SA 02.06      PREVENTATIVE MAINTENANCE : DEFINITION**

This entails the rendering of services and servicing of equipment according to a predetermined maintenance control plan to:

- (a) replace and service components of equipment, units or parts thereof for each installation at prescheduled moments regardless of condition;
- (b) readjust, reset, clean, corrosion protect all components of equipment, units or parts thereof for each installation, and
- (c) Carry out all implied actions to maintain installations in their present functional condition.

Preventative maintenance shall be aimed at minimisation of breakdowns.

**SA 02.07      CORRECTIVE MAINTENANCE : DEFINITION**

This entails regular observation of the equipment, identifying pending breakdowns, maladjustment or anomalies of equipment, units or parts of installations and subsequent action to restore installations to the functional condition as before the breakdown.

**SA 02.08      BREAKDOWN MAINTENANCE: DEFINITION**

This entails repair and/or replacement of defective equipment, units or parts of installations following a breakdown that leaves the installation inoperable or unsafe, and subsequent action to restore installations to their normal functional condition, within the maximum down-time allowed.

**SA 02.09      SITE MAINTENANCE RECORD KEEPING**

The Contractor shall provide and maintain hard-cover A4 maintenance files for each installation for the duration of the Contract. All schedules, checklists, breakdown reports, preventative maintenance records, component replacement records and quarterly reports shall be filed, together with information regarding repairs exceeding the Contractor's liability, as set out in SA 02.02 and SA 02.03.

Site maintenance records shall be submitted at each monthly meeting.

**SA 02.10      SUPPLY OF LABOUR, EQUIPMENT AND MATERIAL****SA 02.10.01      Labour**

Competent personnel that have been trained by the Contractor, in accordance with Additional Specification SD: General Training shall execute all maintenance work.

**SA 02.10.02      Equipment**

All tools and equipment required for maintenance work shall be supplied by the Contractor at his cost (except where otherwise provided).

**SA 02.10.03      Material**

All material, spare parts, components, equipment and appurtenances necessary for the complete maintenance of each installation shall be supplied and installed by the Contractor at his cost, to a maximum value per part/subassembly as specified in the Special Conditions of Contract for exceeding Contractor's Liability.

Materials as provided for in the Schedule of Quantities, shall be supplied and delivered by the Contractor at the tendered rates upon order of the Engineer only, and shall be free-issued to the User Client for own use. The Contractor shall inform the Engineer of all scheduled deliveries to arrange official hand-over with the User Client.

**SA 02.11      IDENTIFICATION OF EQUIPMENT**

A unique identification number will be allocated only to each mechanical equipment item forming part of the installation. This identification number will be allocated and administered in collaboration with the User Client and must be described in the maintenance control plan.

Reference shall be made to identification numbers in the maintenance control plan, operating and maintenance manuals and during all maintenance activities, including the logging of breakdowns and other correspondence. Identification numbers shall also be indicated on as-built drawings.

**SA 03        MAINTENANCE CONTROL****SA 03.01       SCOPE**

Maintenance quality control shall be the responsibility of the Contractor. The Contractor shall introduce a maintenance control plan to assist him in ensuring that preventative, corrective and breakdown maintenance are performed as described in the operating and maintenance manuals and Technical and Particular Specifications.

**SA 03.02       PRELIMINARY MAINTENANCE CONTROL PLAN**

A preliminary version of the maintenance control plan shall be submitted with the programme and the framework of the preliminary version shall be as close as possible to that of the final maintenance control plan as specified in SA 03.03 below. Detail contained in this preliminary maintenance control plan shall include:

- (a) Actual time that a representative of the Contractor will be present on Site for the duration of the maintenance period;
- (b) The scope and frequency of routine inspections
- (c) Repair methodology
- (d) Details of training plan to be implemented in accordance with Additional Specification SD

**SA 03.03       MAINTENANCE CONTROL PLAN**

- (a) The maintenance control plan shall be based on the Contractor's preliminary maintenance control plan, and shall be bound in a neat, A4-sized, ring-bound document with a cover page and back cover. The contents of the document shall be indexed.

In drawing up the document, the Contractor may reproduce relevant paragraphs and clauses from any of the specifications forming part of the Contract documents, but should there be any discrepancies between such clauses and paragraphs in the maintenance control plan and those in the Contract documents, those in the Contract documents shall be regarded as being correct and shall apply.

- (b) To ensure that the Engineer is satisfied that the Contractor understands the purpose and advantage of carrying out maintenance work according to a maintenance control plan he shall, as an introduction to the control plan document, set out his views as to what he believes the implementation of a maintenance control plan will achieve.
- (c) The maintenance control plan shall also contain the following:
  - (i) A summary of the repair and maintenance work to be carried out under the Contract giving details of the conditions of the various installations at the facility(ies) affected by the activities under the Contract. The Contractor shall bear in mind that maintenance work may have to be carried out before the repair phase of the installation has been entirely completed and the summary mentioned above shall therefore differentiate between maintenance work before and after the repair phase has been completed.
  - (ii) Details of how the Contractor intends to carry out the various types of maintenance work especially breakdown maintenance should breakdowns occur.

## SA.7

- (iii) Details of how the call centre works, as specified in clause SA 04 as well as all statistics of breakdowns, leakages, blockages, etc. available from the call centre for the installation and the age of the installation that has been taken into account in compiling the contents of the maintenance control plan.
  - (iv) A list of organisations and persons directly involved with the Contract or whose requirements have to be taken into account during the entire Contract Period such as the Client NHLS, the User Client, the Consulting Engineer, the Contractor, the Local Authority, etc. Each person's position within his organisation as well as the applicable phone numbers shall be given.
  - (v) Details of monthly meetings to be held with the Client NHLS, the User Client, Contractor and Engineer;
  - (vi) Reports to be submitted after every routine inspection (all reports, checklists, breakdown records, score card results, etc. for each system of an installation shall be kept on the site in a hard cover file);
  - (vii) Procedures to address complaints and logged breakdowns;
  - (viii) Details of quarterly reports, summarising all inspections, together with inspection data such as nature of test, names of persons carrying out tests and inspection results. Detail of repairs and replacements, together with testing of repaired equipment shall also be reflected in this report, and
  - (ix) Assistance to be given by the Engineer with decisions regarding material, equipment and other recommendations.
- (d) The codes of practice as set out in ISO 10006 and ISO 9004 for quality systems and management shall be used as a guideline for compiling a maintenance control plan. ISO accreditation is not a requirement in terms of this Contract.
  - (e) The maintenance control plan shall be upgraded when its contents are no longer representative of actual conditions.
  - (f) The Contractor shall check the contents of existing Operating and Maintenance Manuals (if available) and shall update or modify and then incorporate applicable data into his own manuals. Where no manuals exist, the Contractor shall draw up his own Operating and Maintenance Manuals.

Pertinent data contained in the Operating and Maintenance Manual may be transferred to the Maintenance control plan to make it a document which can be used as an independent handbook for maintenance work.

The Contractor is referred to the contents of paragraph (a) above regarding the reproduction of data, as this shall also be applicable to data reproduced from Operating and Maintenance Manuals.

## **SA 04**      **COMMUNICATION**

The maintenance control plan (Clause SA 03) will provide, after agreement between the Contractor and the Engineer, for the following communication and complaint logging procedure:

- (a) The Contractor shall establish a telephone and fax line and a cellular telephone connection to ensure that he can be reached at any time.

- (b) The Contractor shall primarily be responsible for determining the items requiring preventative, corrective and breakdown maintenance, and shall communicate this information directly to his maintenance workforce.
- (c) Should the Engineer or operating personnel of the User Client determine or suspect that preventative, corrective or breakdown maintenance is required, a call shall be logged through the call centre to reach the Contractor as soon as possible.
- (d) Reaction times will be as described in Clause SA 05.02.
- (e) All complaints of the User Client shall be reported to the Engineer via the call centre, as set out in the maintenance control plan, and the Engineer shall issue instructions to the Contractor. After the Contractor has attended to the complaint, the Engineer will provide feedback to the call centre both telephonically and via fax.

The call centre logs the details of the Engineer's call and provides feedback to the complainant.

## **SA 05 PERFORMANCE MEASUREMENT**

The Contractor's performance shall be measured against the following parameters:

### **SA 05.01 SPECIAL TESTING OF AN INSTALLATION**

The Engineer may at any time inspect any part of the entire installation. During Maintenance work, the Engineer shall at his discretion order special tests to be carried out on complete installations at intervals of not less than four months, to verify the satisfactory functional condition of the installation.

The Engineer reserves the right to select at random component equipment and trade practices to be tested by independent authorities for compliance with specifications as specified in this Contract document.

The Contractor shall provide all equipment, tools and instruments required for testing.

### **SA 05.02 MAXIMUM MAINTENANCE DOWN-TIME**

After a complaint has been logged and forwarded to the Contractor, the Contractor shall be expected to minimise the maintenance down-time until the system component is fully operational to the satisfaction of the Engineer. Should the Contractor not respond within the maximum down-time, the Engineer may arrange, at the cost of the Contractor, for the necessary repair work to be done by others.

Should the actual down-time exceed the maximum down-time the Contractor shall be liable to a payment reduction for the difference between actual down-time and maximum down-time. This is reflected in the table below:

<b>REQUIRED MAINTENANCE</b>	<b>MAXIMUM DOWN-TIME ALLOWED</b>	<b>PAYMENT REDUCTION IF EXCEEDED</b>
Fatal breakdown (where specified)	2 hours (immediate response)	R2 500/hour
Emergency Breakdown	24 hours	R2 500/day



## SA.9

Ordinary Breakdown	7 days	R500/day
Operational damage repair	7 days	R500/day

"Maximum down-time" shall mean the period of time allowed to repair a breakdown, and "actual down-time" shall mean the measured period from the instant when the breakdown was logged with the Contractor until the installation has been repaired to its functional specification.

"Immediate response repairs" shall imply breakdown maintenance repair work where no breakdowns are allowed at any time in terms of the Technical Specification.

"Fatal" breakdown (immediate response) repairs are:

- (a) Chiller not functional/inoperable
- (b) Essential AHU
- (c) Essential fresh air Units
- (d) Essential extraction Fans
- (e) Animal labs HVAC not functional/inoperable.
- (f) Production facility HVAC not functional/inoperable.

"Emergency maintenance repairs" shall imply any breakdown maintenance repair work required to rectify a component or unit of the installation that disables the installation from functioning at its designed maximum requirement in terms of the Technical Specification.

"Emergency" breakdowns are also applicable to the above items where the extent of the breakdown is repaired without normal operation being affected.

Examples are:

- (a) Non essential AHU installations
- (b) Non Essential Fans
- (c) Hot Water Repairs

"Ordinary maintenance repairs" shall imply all breakdown maintenance repair work required other than immediate response or emergency maintenance repairs.

## SA 05.03 **PERFORMANCE-BASED PAYMENT**

**Remuneration for all value-related as well as all time-related preliminary and general charges shall be deemed included in the monthly maintenance payments for the various installations.**

### SA 05.03.01 **Score-card**

The Engineer shall inspect each installation monthly after Practical Completion of the repair phase of the installation. The Engineer shall use a score-card to measure the quality of preventative and corrective maintenance rendered by the Contractor during the preceding month, on all components that form part of the installation, in accordance with the maintenance specifications. The Engineer will record his inspection directly onto the score-card. The score-card shall serve to evaluate ten performance indicators each month in the manner set out below.

The Contractor shall always have the opportunity to score the maximum points, provided that his preventative and corrective maintenance work comply with the Specifications. The Employer shall be protected against a reduced or unsatisfactory service level and may refuse payment on such points.

**SA 05.03.02    Performance indicators**

Performance indicators shall be selected to measure the Contractor's service level of preventative and corrective maintenance.

The Contractor and the Engineer shall each have the opportunity to select five (5) performance indicators each month, which shall focus on the measurement of maintenance quality against the relevant specifications for the ensuing month. All ten (1) performance indicators are known to both the Engineer and the Contractor.

The Contractor shall aim to perform satisfactorily on all ten performance indicators. All indicators shall be selected from the scope of his normal preventative and corrective maintenance work and shall be based on the maintenance control plan and operating and maintenance manuals. The work shall either be satisfactory, or unsatisfactory, and the Contractor shall score one (1) or zero (0) respectively per indicator.

Performance indicators shall be used to focus on certain key aspects of the work and shall in no way limit the Contractor's responsibility to do all the required work.

**SA 05.03.03    Satisfactory performance**

The Engineer shall inspect the site on an arbitrary day to measure the quality of maintenance against the ten selected performance indicators. Should the Contractor score the maximum points (10) he shall receive his full maintenance payment for the installation. Should the quality of preventative maintenance, or components requiring persistent corrective maintenance be unsatisfactory according to the score-card, the Contractor may fail to achieve full payment due to a reduced service level. Each monthly payment for maintenance shall be subject to evaluation based on the score-card.

A copy of the score-card including a guideline for the use thereof is included in this Specification.

**SA 06                MEASUREMENT AND PAYMENT****SA.01                MAINTENANCE OF A COMPLETED INSTALLATION ..... Unit: point**

The unit of measurement shall be a point. Each month shall represent a maximum of ten points and a minimum of zero points, depending on the performance and quality of maintenance. Ten points per month, determined by using the tendered rate per point, shall include full compensation for all liabilities and obligations described or implied in the Contract document and deemed by the Contractor to be applicable to the maintenance phase of the Contract, for the complete monthly maintenance of an entire installation after practical completion of repair work, and all appurtenant works deemed to form part thereof, as defined in the relevant Technical or Particular Specifications.

The combined tendered rate for ten points (which shall not be less than 10% of the total tendered Contract Price) shall also include full compensation for complete preventative, corrective and breakdown maintenance (as defined in this General Maintenance Specification), including full compensation for all costs related to resetting, repair, procurement, supply, delivery, replacement, protecting, furnishing, installing, testing and commissioning of all items and material required to maintain the complete installation in a perfect functional condition. The only items not to be included in the rate for monthly maintenance points are:

1. Supply, delivery, installation and testing of special equipment/materials that will be measured elsewhere, and
2. Special testing of an installation.

## SA.11

Different installations shall be listed in the Schedule of Quantities, in accordance with the definition of each installation.

Although ten points per month shall include full compensation for preventative, corrective and breakdown maintenance, the Contractor might fail to achieve all points applicable in the event of unsatisfactory performance, in which case he shall still perform all maintenance requirements according to specification, but at his own cost where a reduction in points awarded is insufficient to cover his cost.

Remuneration for all value-related as well as all time-related preliminary and general charges shall be deemed included in the monthly maintenance payments for the various installations.

## SA.02

### **MAINTENANCE OF AN INSTALLATION PRIOR TO PRACTICAL COMPLETION**..... Unit: point

The unit of measurement shall be a point. Each month shall represent a maximum of ten points and a minimum of zero points, depending on the quality of maintenance. Ten points per month determined by using the tendered rate per point, shall include full compensation for the monthly maintenance of an incomplete installation until practical completion of the repair work thereof.

The combined rate tendered for ten points (which shall not be less than 10% of the total tendered Contract Price) shall include full compensation for preventative, corrective and breakdown maintenance (as defined in this General Maintenance Specification) of all units, equipment and/or components thereof that require no initial repair work in terms of the complete installation. As repair work progresses, maintenance responsibilities shall be extended to include those units, equipment or parts thereof that have been serviced, repaired or reconditioned.

Different installations shall be listed in the Schedule of Quantities, immediately below maintenance of a completed installation. The total number of points for maintenance of a completed installation plus maintenance of the same installation prior to practical completion shall be 360.

Although ten points per month shall include full compensation for preventative corrective and breakdown maintenance, the Contractor might in the event of unsatisfactory performance fail to achieve all points applicable, in which case he shall still perform all maintenance requirements according to specification, but at his own cost where a reduction in points awarded is insufficient to cover his cost.

## SA.03

### **ADDITIONAL TESTS:**

### SA.03.01

**Where ordered by the Engineer** ..... Unit: rand (R)

### SA.03.02

**Charge required by the Contractor on subitem SA.03.01 above** ..... Unit: %

An amount has been allowed in the Schedule of Quantities to cover the cost of additional tests required by the Engineer. The Engineer will have the sole authority to spend the amount or part thereof under subitem SA.03.01.

The tendered percentage under subitem SA.03.02 will be paid to the Contractor on the value of each payment made to the approved testing authority.

## SA.04

### **PAYMENT REDUCTION DUE TO EXCEEDING OF MAXIMUM ALLOWABLE DOWN-TIME DURING FATAL BREAKDOWN**..... Unit: hours

The unit of measurement shall be the number of hours during which a component of an installation was in a disfunctional condition and required immediate response repairs.

## SA.12

The negative fixed rate shall include full compensation for the User Client's loss in productivity and, multiplied by the number of hours measured, shall be deducted from the certified amount due to the Contractor.

### **SA.05      PAYMENT REDUCTION DUE TO EXCEEDING OF MAXIMUM ALLOWABLE DOWN-TIME DURING EMERGENCY BREAKDOWN .... Unit: days**

The unit of measurement shall be the number of days, in excess of 48 hours, during which a component of an installation was in a disfunctional condition that required emergency repairs.

The negative fixed rate shall include full compensation for the User Client's loss in productivity and, multiplied by the number of days measured, shall be deducted from the certified amount due to the Contractor.

### **SA.06      PAYMENT REDUCTION DUE TO EXCEEDING OF MAXIMUM ALLOWABLE DOWN-TIME DURING ORDINARY BREAKDOWN .....Unit: days**

The unit of measurement shall be the number of days, in excess of 7 days, during which a component of an installation was in a disfunctional condition that required ordinary repairs.

The negative fixed rate shall include full compensation for the User Client's loss in productivity and, multiplied by the number of days measured, shall be deducted from the certified amount due to the Contractor.

### **SA.07      PAYMENT REDUCTION DUE TO EXCEEDING OF MAXIMUM ALLOWABLE DOWN-TIME DURING OPERATIONAL DAMAGE BREAKDOWN..... Unit: days**

The unit of measurement shall be the number of days, in excess of 7 days, during which a component of an installation was in a disfunctional condition that required ordinary repairs.

The negative fixed rate shall include full compensation for the Client's loss in productivity and, multiplied by the number of days measured, shall be deducted from the certified amount due to the Contractor.

### **SA.08      MAINTENANCE CONTROL PLAN ..... Unit: each**

The unit of measurement shall be the number of A4 documents compiled and supplied for each installation or part thereof, as required under sub-items SA 03.02 and SA 03.03.

## **SA 09      MAINTENANCE TO INSTALATION AND EQUIPMENT**

### **SA 09.01      GENERAL**

Monthly maintenance responsibilities for each installation including all units and components as specified, shall commence with commencement of the Contract. A difference shall be made in payment for the maintenance prior to and after practical completion of the work.

Maintenance responsibilities of the completed installation shall commence upon the issue of a certificate of practical completion for refurbishment and upgrade work, and shall continue for the liability period of 12 months.

### SA.13

This part of the Contract shall include:

- (a) Routine preventative maintenance;
- (b) Corrective maintenance; and
- (a) Breakdown maintenance,

as defined in Additional Specification SA02-6 to 8: General Maintenance, for the specified installations described under herewith.

The maintenance work to be performed and executed shall be done strictly in accordance with this specification.

The said maintenance work shall be executed in accordance with the relevant codes of practice, statutory regulations, standards, regulations, municipal laws and by-laws and the manufacturers' specifications and codes of practice.

The maintenance schedules and frequency shall be developed under the maintenance control plan to be instituted by the Contractor, as specified under SA03.03: General Maintenance.

All new equipment, components and materials supplied and installed under the contract shall be furnished with prescribed manufacturer's guarantees.

The maintenance work and items are to be categorised by the Contractor for each maintenance activity under the following headings:

- (a) Ventilation systems
- (b) chiller units.
- (c) Cooling towers
- (d) Water pumps
- (e) Air handling units
- (f) Fan coil Units
- (g) Ducting network
- (h) Chilled water piping

The Contractor shall be remunerated monthly, based on his performance, for maintaining the complete installation in a perfect functional condition.

**SA 09.02      DEFINITION AND QUALIFICATION OF ACTIONS****SA 09.02.01      Daily maintenance actions**

Daily actions are the responsibility of the User Client. These checks are to be performed by staff responsible of the facility. Air conditioning units and ventilation systems should run during working hours and/or continuously. The status of these systems can thus be monitored by observation on a daily routine.

(a)      Ventilation systems:

- *Are the systems running and is the operation quiet?*

(b)      Air-conditioning units:

- *Does the unit perform and maintain temperature?*
- *Is the temperature in the areas concerned satisfactory?*
- *Is the condensate drain working properly?*
- *Check the chiller's control for fault codes*
- *Inspect and clean the condenser coils*
- *Ensure the refrigerant is properly charged*
- *Check for debris, fouling or scaling in the condenser water loops*
- *Check for refrigerant or air leaks*
- *Check tubes for fouling      Check for excessive condensation*

These daily checks shall be logged at the facility, i.e. by the Unit Manager and the maintenance personnel.

**SA 09.02.02      Monthly maintenance actions**

TABLE SA 09.02.02/1: VENTILATION SYSTEMS

REFERENCE NUMBER	ACTION
V-1	Inspect air intake for blockages
V-2	Check all accessible duct work for leakages, damages, and damages supports
V-3	Clean filters
V-4	Check electric motor running temperature
V-5	Check electric connections for tightness
V-6	Check operation of relief air grilles and check that they are not blocked
V-7	Check for motor noise and check bearings
V-8	Check for leaks on canvas collars

Note: The monthly actions shall include the activities of the daily maintenance actions.

**SA 09.02.03 Biannual maintenance actions**

TABLE SA 09.02.03/1: VENTILATION SYSTEMS

REFERENCE NUMBER	ACTION
V-1	Inspect air intake for blockages
V-2	Check all accessible duct work for leakages, damages, and damages supports
V-3	Clean filters
V-4	Check electric motor running temperature
V-5	Check electric connections for tightness
V-6	Check operation of relief air grilles and check that they are not blocked
V-7	Check for motor noise and check bearings
V-8	Check for leaks on canvas collars
V-9	Clean fan blades and check for unbalance
V-10	Clean exterior casing
V-11	Clean all grilles
V-12	De-rust, neutralise and touch up paint work
V-13	Check vibration mounts of fan and tightness of mounting bolts

Note: The above biannual actions include the activities of the monthly maintenance actions.

# MAINTENANCE SCORE-CARD

CONTRACT NUMBER: \_\_\_\_\_

CONTRACT: \_\_\_\_\_

CONTRACTOR: \_\_\_\_\_

ENGINEER: \_\_\_\_\_

INSTALLATION:  MONTH:   OF 36

The following components of the installation were selected by the contractor at the Monthly Maintenance Meeting nr.   as performance indicators to be tested according to specification:

## 1. CONTRACTOR'S SELECTION

- 1.1 \_\_\_\_\_
- 1.2 \_\_\_\_\_
- 1.3 \_\_\_\_\_
- 1.4 \_\_\_\_\_
- 1.5 \_\_\_\_\_

SUBTOTAL:

0	1

The following components of the installation were selected by the Engineer as performance indicators to be tested According to specification:

## 2. ENGINEER'S SELECTION

- 2.1 \_\_\_\_\_
- 2.2 \_\_\_\_\_
- 2.3 \_\_\_\_\_
- 2.4 \_\_\_\_\_
- 2.5 \_\_\_\_\_

SUBTOTAL:


TOTAL SCORE:

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D	D	/	M	M	/	Y	Y
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\_\_\_\_\_  
Engineer's Representative

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date



## **GUIDELINE FOR THE USE OF THE MAINTENANCE SCORE-CARD**

The score-card and performance indicators must be used as a maintenance management tool. The aim with each score-card is to ensure that:

- (a) The project focuses on key aspects of maintenance per month;
- (b) The Contractor receives payment for his work, and
- (c) The Employer receives value for money and a sustained high level of service.

Performance indicators must be selected to measure the Contractor's service level of preventative and corrective maintenance that will be based on the Maintenance Control Plan and the Operating and Maintenance Manuals (containing information specified in the Contract documentation).

For each specific installation, different performance indicators must be defined each month based on the content of the maintenance in relation to the scope of maintenance work per installation and must be based on the Contractor's service level record on preventative and corrective maintenance.

Breakdowns must be dealt with if and when necessary by logging of the breakdown and monitoring the downtime.

The Contractor and the Engineer must agree on all performance indicators at an occasion prior to the month during which the Contractor's performance (service level of maintenance) will be measured.