

REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF PUBLIC WORKS
AND INFRASTRUCTURE



SERVICE, REPAIR AND MAINTENANCE OF FIRE FIGHTING EQUIPMENT FOR A PERIOD OF 12
MONTHS FOR GROUP 22

ID-3169555



3.5.	SERVICING OF ELECTRICAL COMPONENTS & PANELS.....	13
3.5.1.	Electrical components Inspection	13
3.6.	Pump sets	133-14
3.7.	Sprinklers	155
3.7.1.	Sprinkler pipework	15
3.8.	Batteries & Chargers	15
3.8.1.	Batteries	15
3.8.2.	Battery chargers	16
3.8.3.	Maintenance:	16
3.9.	SERVICING OF VALVES.....	17
4.	Fire Detection and Alarm Systems	17
4.1.	Arranging repair of faults and/or damage:	18
4.2.	After a fire	19
4.3.	Logbook	19
5.	Bill of Quantities	20-26
6.	Costing Summary Page.....	27
7.	Group Areas.....	1



List of Tables

Table 1: Servicing & Maintenance Of Hand-held Fire Equipment	21
Table 2: Servicing & Maintenance Of Sprinkler Systems, Sprinkler Control Valves & Pumps	22
Table 3: Servicing & Maintenance Of Fire Detection Systems, Control Panels & Power Supplies	22
Table 4: Servicing & Maintenance Of CO ₂ & Foam Fire Systems	232
Table 5: Replacement Spares	263-26
Table 6: Miscellaneous Items	26
Table 7: Total Costing	27



Acronyms & Abbreviations

CO ₂	Carbon Dioxide
DCP	Dry Chemical Powder
EVC	Emergency Voice Communication
SANS	South African National Standards
SABS	South African Bureau of Standards
SAQCC	South African Qualification & Certification Committee
STP	Stored Pressure
DC	Direct Current
CSD	Central Supplier Database
COC	Certificate Of Compliance
ASIB	Automatic Sprinkler Inspection Bureau



1.1 General Requirements (see also SANS 10400-T and SANS 10400-W):

On instructions from The Department of Labour the SAQCC-Fire has regulated the fire industry by certifying the competence of fire technicians. The South African Qualification & Certification Committee (SAQCC) Fire is an industry-elected body established to ensure that individuals working within this sector of the fire industry have the appropriate competence through training, qualifications, and experience in compliance with:

- The specifications laid out in SANS 1475 for portable fire extinguishers,
- The requirements of SANS 14520 and/or SANS 306 where individuals and companies designing, installing, commissioning, and servicing gaseous fire extinguishing systems
- The specifications laid out in SANS 10287 for Automatic sprinkler systems for fire firefighting purposes,
- The specifications laid out in SANS 10139 for fire detection and alarm systems for buildings,
- The specifications laid out in SANS 1709 for water spray fixed systems for fire protection purposes.

Automatic pumps shall be driven direct, either by an electric motor or by a diesel engine, provided that where a single pump supplies the water to the sprinkler installation, the unit shall be diesel engine driven.

The Contractor shall start each diesel engine in the presence of the Inspector. The Contractor shall service and check the batteries with each service. Prices for servicing and inspection as stipulated and also as specified by SABS, labour, transport, consumables, minor and incidental repairs and all other overheads included.

All fire pump and sprinkler installations in buildings as stated in the list of installations in the Pretoria area form part of this contract and shall be serviced, maintained and repaired. The quantities in the list of installations are provisional and may change during the course of the contract and shall not alter the contractor's prices for servicing.

Therefore all service providers working with the Department of Public Works and Infrastructure (DPWI) on the abovementioned works, require valid and relevant registration with SAQCC fire before maintenance works of Fire protection equipment/systems belonging to the department.



1.1. Responsive Criteria

RESPONSIVE CRITERIA REQUIRED IS TABULATED BELOW

NB: FAILURE TO COMPLY WITH THE CRITERIA STATED HEREUNDER SHALL RESULT IN THE QUOTATION OFFER BEING DISQUALIFIED FOR FURTHER CONSIDERATION.

DESCRIPTION	RESPONSIVE CRITERIA REQUIREMENT
CIDB CONTRACTOR GRADING DESIGNATION REQUIRED	GRADE 1SF or higher
QUALIFICATION REQUIRED	COMPANY/TECHNICIAN MUST BE REGISTERED WITH SAQCC FIRE. ATTACH CERTIFIED COPY OF THE SABS PERMIT CERTIFICATION FOR FIRE FIGHTING EQUIPMENT AS PER SANS. ATTACH CERTIFIED COPY OF THE CONTRACTOR SAQCC CARD OR CERTIFIED COPY OF ACCREDITED TECHNICIAN WITH SAQCC FIRE CARD & ID CERTIFIED COPIES OF TECHNICIANS
LABOUR COMPLIANCE	LETTER OF GOOD STANDING
VALUE FOR MONEY	ALL PRICES MUST BE MARKET RELATED. IN CASE OF PRICES WHICH ARE NOT MARKET RELATED THE DEPARTMENT RESERVES THE RIGHT TO ADJUST THE BILL OF QUANTITY PRICES OR TO DISQUALIFY THE BIDDER

2. Fire Extinguishers, Hose Reels and Hydrants

2.1. Fire Extinguishers:

- Extinguishers shall be maintained in a fully charged and operable condition, and shall be kept in their designated places at all times when they are not being used.
- Extinguishers shall be conspicuously located where they will be readily accessible and immediately available in the event of fire. They shall preferably be located along normal paths of travel, including exits from areas, and their positions shall be identified by means of signs complying with the provisions of SANS 1186-1.
- Extinguishers shall not be obscured from view, except where their positions are clearly marked, and they shall be kept in a readily accessible, unobstructed, and where necessary, demarcated position.
- When mounted or placed in their intended location, the operating instructions shall face outwards or towards the most likely direction of access.



- Wherever possible, extinguishers shall not be placed in dead-end areas (where access could present a risk to the potential operator), behind doors, in cupboards (except purpose-made cabinets or cupboards) or in deep recesses, or in positions where they might cause obstruction to exit routes or be damaged by trolleys or other vehicles. Extinguishers shall not be placed over or close to heating appliances.

2.2. Hose Reels & Hydrants:

- Fire hose reels and hydrants for installation shall comply with the requirements of SANS 543 and SANS 1128-1.
- Fire hose reels and hydrants shall be conspicuously located where they will be readily accessible and immediately available in the event of fire. They shall preferably be located along normal paths of travel, including near exits from areas, but in such a way that they shall not cause obstruction. Their positions shall be identified by means of signs complying with the provisions of SANS 1186-1.
- Fire hose reels and hydrants shall not be obscured from view, except where their positions are clearly marked.
- The responsible person shall ensure that the hose reels and hydrants are used only for purposes that they are intended for.
- Wherever possible fire hose reels shall be installed so that the center point of the hose reel drum is not lower than 1,5 m from the floor and not higher than 1,7 m from the floor. Where this is not possible, hose reels shall be installed at a height that allows for easy access and operation during maintenance or in the event of a fire.
- A hose reel shall be installed with the inlet stop valve as close as possible to the hose reel in a position that allows for easy access and operation during maintenance or in the event of a fire. A union shall be positioned between the hose reel and the inlet stop valve to allow for easy removal and replacement of the hose reel when necessary.

2.3. Service instructions (Guideline of procedure to be followed):

All firefighting equipment must be serviced in accordance with the SABS code of practice as indicated below. Tenderers must allow for servicing of all equipment, although there is faulty, redundant or vandalized equipment on site.

- Any Portable fire extinguisher shall comply with requirements in SANS 1475-1 and SANS 10105-1, and any mobile fire extinguishers shall comply with the requirements of SANS 11601 and capacities prescribed in SANS 1151 or SANS 1910.
- Any Fire Hydrant shall comply with the requirements of SANS 1128-1 and SANS 1128-2.
- Any hose reel installed in such a building shall comply with the requirements in SANS 543, shall be installed in accordance with SANS 10105-1 and SANS 10400-W and shall be maintained in accordance with the requirements in SANS 1475-2.
- Such fire equipment shall bear a certification mark from an accredited certification body.



No service or repair invoice will be processed for payment unless a service record sheet, pressure test certificate (where applicable), and job card form is fully completed and stamped by the user Department.

2.3.1. Servicing of CO₂ Extinguishers:

- Check date of last pressure test, if period exceeded notify the Department in writing.
- Check extinguisher for rust, dents or other visible damage.
- Remove discharge hose and horn assembly, check for blockages.
- Check operation of head assembly.
- Weigh extinguisher (If underweight – Refill).
- Refit discharge hose and horn assembly.
- Seal extinguisher and make ready for use.
- Wipe extinguisher and affix signed and dated service label and lead seal.

NB: Recharge and Hydro-test all CO₂ extinguishers (If period is exceeded).

2.3.2. Servicing of Stored-Pressure Dry Powder extinguisher:

Depressurized extinguisher. Open the extinguisher and pour the powder into a clean receptacle.

Remove the discharge hose (if fitted) from the discharge hose adapter. Using dry compressed air (or dry gas); remove all traces of powder from the inside and the outside of the container, discharge hose, nozzle, control valve assembly, filler cap and actuating mechanism.

- Sift the powder through a sift of nominal aperture size 2.0mm and examine the powder. Unless it is free from lumps, caking and foreign matter, discard the powder and replace it with a new charge in accordance with the manufacturer's recommendations.
- Refit the discharged hose.
- Before fitting the filler cap, examine and if necessary, replace the sealing washer or "O" – ring, as relevant.
- Pressurize the extinguisher to the correct working pressure, using either dry nitrogen or dry CO₂, as recommended by the manufacturer.
- Note whether the pressure – gauge reading corresponds to the working pressure and if it does not, replace the gauge and re-pressurize the extinguisher. Check the operation and calibration of the pressure gauge.
- Carry out a leakage test.
- Seal unit.
- Clean extinguisher and put a service label on with name and date.

2.3.3. Servicing of Hydrant:

- Open hydrant and allow water pressure to be released.
- Check main washer sealing at normal hand tension.
- Check gland for leaks.



- Check that the hose clip is in correct working order.
- Check condition of lip washer.
- Affix signed service label.

2.3.4. Servicing of Hose Reels:

- Check the hose reel mounting bolts for corrosion and physical damage, check whether the frame is mounted in a secure manner and whether the reel operates freely.
- Unwind reel completely and check condition of hose and physical damage.
- Check waterway and the waterway components for corrosion.
- Check operation of hose nozzle.
- Check condition of hose reel frame.
- Close hose nozzle and switch on water supply at stopcock and check whether the hose is in an acceptable condition and is fitted in an acceptable manner and whether it can with stand the pressure in the supply main.
- While hose is under pressure, check for leaks especially at gland.
- Ensure that waterway of the hose reel and the hose reel hose can with stand a test pressure of 2 000kpa for 3 minutes.
- Close stopcock, empty hose and rewind onto reel and ensure all operating parts operate with ease.
- Check operation of draw-off shackle and general condition of pipe work.
- Wipe hose reel and affix signed and dated service label.
- Affix anti tamper seal next to waterway with date on.

2.3.5. Maintenance:

- A combination of prescribed actions and measures that are taken by a competent person (see SANS 1475-1), intended to retain a fire extinguisher in, or restore it to, a state in which it can perform a required function.
- A combination of prescribed actions and measures that are taken by a competent person (see SANS 1475-2), intended to retain a fire hose reel or hydrant in, or restore it to, a state in which it can perform a required function.

3. Automatic Sprinkler Systems for Fire Fighting Purposes

3.1. Diesel Fire Engines

- 3.1.1. A diesel engine shall be capable of operating continuously on full load at the site elevation for 6 h with a rated output in accordance with BS 5514-3 and at least that specified in 5.5.1.2.(SANS 10287).
- 3.1.2. The engine shall:
- 3.1.3. Be of the compression ignition mechanical injection type that starts without the use of wicks, cartridges, heater plugs or ether, at an engine-room temperature of 4 °C,
- 3.1.4. Accept full load within 15 s from initiation of the start signal,



- 3.1.5. Be naturally aspirated, super charged or turbo-charged, and
 - 3.1.6. Be either air-cooled or water-cooled.
 - 3.1.7. Have a governor to control the engine speed to within 4,5 % of the rated speed under any load condition and up to the full load rating,
 - 3.1.8. Be fitted with a device to measure running time, a tachometer, and a temperature gauge to indicate normal operating temperature,
 - 3.1.9. Have a manually operated shutdown mechanism, and
 - 3.1.10. run at or below the following maximum speeds:
 - 3.1.10.1. Two-cylinder or three-cylinder engine: 2 600 r/min;
 - 3.1.10.2. Four-cylinder naturally aspirated engine: 2 400 r/min;
 - 3.1.10.3. Four cylinder turbo-charged engine: 2 200 r/min;
 - 3.1.10.4. Six-cylinder naturally aspirated engine: 2 400 r/min;
 - 3.1.10.5. Six-cylinder turbo-charged engine: 2 200 r/min; and
 - 3.1.10.6. Any eight-cylinder engine: 1 800 r/min.
 - 3.1.11. Any manual device that is fitted to the engine and that could prevent the engine from starting shall return automatically to the normal position after it has been manually applied.
- Should replacement of diesel engines be necessary sufficient motivation should be provided along with the necessary documentation for approval by the relevant DPWI Official. The quote for replacement should include travel costs and commissioning of the unit.

3.2. Fire Pump House/room

- 3.2. Refer to SANS 10287: The guarantee will encompass servicing and maintenance of pump houses according to the latest SABS/SANS specifications.

3.3. Electric Motors

- 3.3.1. Electric motors shall:
 - Be of squirrel-cage rotor design,
 - Be continuously maximum rated in accordance with BS 5000-99, as in A1, wound class E insulation, and have a temperature rise not exceeding 75 °C above a maximum ambient temperature of 40 °C, when measured by the resistance method given in BS 5000-99,
 - Conform to the dimensions given in SABS 1804-2, and
 - Have three-phase windings suitable for a 50 Hz electrical supply.
- 3.3.2. The motor shall be accommodated in a totally enclosed fan-cooled enclosure.
- 3.3.3. Methods used for the cooling of electric motors shall comply with the requirements of SABS 1804-2.
- 3.3.4. Motors of power exceeding 3 kW shall have the ends of each winding brought out to six terminals in the terminal box, in accordance with SABS 1804-2, so that the motor can be star/delta started if desired. Motors of power less than 3 kW shall have the ends of three windings brought out to three terminals.
- 3.3.5. Starting of electric motors = SABS 1222.

Should replacement of electric motor be necessary, sufficient motivation should be provided along with the necessary documentation for approval by the relevant DPWI Official.



LOAD CURRENT MEASUREMENT AND EARTH CONTINUITY:

- This work will be done according to the rules as laid down in the Machinery and Occupational Safety Act.
 - Compare measured full load current with the nameplate value.
 - Measure earth continuity: A500 Volt merger must be used for this test and results recorded on the service sheet.
 - Batch certificates must be forwarded to the Department, attached to the relevant invoice.
- Removal of electric motors for testing shall comply with the guidelines.

3.4. Electrical Installation & Repeater Panels

- 3.4.1. Separately switched power sub circuits shall be used to supply power:
- For alarm devices connected to pump(s) and for any mains failure alarm system, and
 - For any pump that would be the first to come into operation because of a drop in the sprinkler installation pressure and any mains-powered low water pressure alarm system.
 - The indicating equipment shall be mains-powered by an uninterruptible power system that complies with the requirements of SABS 1474.
- 3.4.2. Power supplies:
- Control and monitoring panels shall be designed for an electrical fault level of 31 mVA at 400 V, three-phase 50 Hz
 - In the case of diesel engine drive controllers, the following shall apply:
 - All DC electrical components shall be capable of functioning effectively at the reduced voltage levels that occur during engine cranking; and
 - Relays shall not chatter on drop-out and solid state circuits shall not "switch" under reduced voltage conditions.
 - The battery power supply for indicator panels or alarm systems shall not be supplied from the batteries provided to start the diesel engine(s).
- 3.4.3. Annunciator/repeater panels, indicator panels and associated components
- Annunciator/repeater panels and indicator panels shall be suitable for sprinkler use and shall be completely assembled, wired and tested by their manufacturers before being despatched from the factory.
 - Each component of an annunciator/repeater panel or an indicator panel shall be clearly marked, in a position that will be permanently visible after installation, to indicate the identifying letter or number given to it in the wiring diagram.
 - Labels for fuses shall indicate the function and the fuse rating.
- 3.4.4. Signalling devices
- Audible and visual signalling devices, such as sirens, bells, hooters, beacons and lamps, shall be suitable for sprinkler use.
 - The signalling devices shall be suitable for operation from the battery that powers the annunciator/repeater panels.
 - The audible range of audible signalling devices shall be adequate for the distance to be covered and for the noise environment of the location.
 - Any device fitted to the installation with the purpose of reducing the frequency of false or intermittent alarms shall be suitable for sprinkler use.
- 3.4.5. Linking to general alarm systems



- If a sprinkler installation has a device or devices that will automatically operate electric-powered audible alarms for the purpose of communicating a general alert or the evacuation of the building, the device(s), the alarm, the linking control and the indicating equipment shall comply with the requirements of SABS 0400 and SABS 0139.

3.5. SERVICING OF ELECTRICAL COMPONENTS & PANELS.

Should replacement of electrical components be necessary, sufficient motivation should be provided along with the necessary documentation for approval by the relevant DPWI Official.

3.5.1. Electrical components Inspection

This work will be done according to the rules as laid down in the Machinery and Occupational Safety Act.

- Check if the "FIRE ALARMS" and "PUMP RUNNING" alarms are registered at the control panel.
 - Test the trunk main jockey pump by lowering the pressure on the pressure switch. Check if the "CUT IN" pressure is above the "CUT IN" pressure of the main pumps.
 - Repeat the above test on the electric and diesel pumps.
 - The electric pump must be isolated to test the diesel pump.
 - Engage engine stop valve and isolate the electric pump. Lower the pressure to start the engine.
 - The engine must crank for 15 seconds and dwell for a period of not more than 6 seconds.
 - The above cycle must repeat automatically for 6 seconds. If the engine has not started after the pre-set number of seconds, the cranking must stop and the "PUMP FAIL" indicator and alarm must be initiated.
 - Remove all dust and carbon from the panels.
 - Check is all indicators lamps and sirens are in a working condition.
 - Check if the phase failure indicators operate according to specifications. Isolate the panel and remove on fuse from the motor supply line. Restore the power and ensure that the power lamp does not illuminate and the pump does not start. Isolate the panel, replace the fuse and restore the power.
 - Check if repeater panels receive the same signals from the main panel.
- Check repeater panel lamps and switches for correct operation.

3.6. Pump sets

- 3.6.1. The performance characteristics of pump sets shall be such that the pressure drops progressively with the rate of demand, so that while being capable of providing the rate of flow and pressure required at the highest and most remote parts of the sprinkler installation, the output will be such as to provide for the excessive rate of discharge at the lowest level in the areas closest to the installation valves.
- 3.6.2. A duplicate pressure switch and starter device shall be provided for diesel engine-driven pumps.
- 3.6.3. The closed outlet valve pressure (under installed conditions) of a suction pump with the water supply at normal maximum level shall not exceed 1 000 kPa except in the case of high-rise installations.
- 3.6.4. In selecting pump characteristics, allowance shall be made for the following:



- 3.6.5. An increase in pressure at zero flow due to an increase in the shaft speed of the prime mover; and
- 3.6.6. An increase or a decrease in pressure due to variations in the water supply level at the pump suction flange.

Jockey pumps

The jockey pump shall:

- Be of capacity not exceeding 40 l/min,
- Have a discharge pressure and flow that are sufficient to maintain the desired pressure in the sprinkler installation pressure, and
- Have steep head capacity characteristics to prevent excessive flow when pumping within the pressure operating range.
- The jockey pump shall start automatically when the pressure in the sprinkler installation has dropped to not less than 85 % of the normal pressure in the installation and shall shut off automatically when the sprinkler installation pressure has reached either the jockey pump churning pressure, or 1 000 kPa, whichever is lower.

PUMP INSPECTION:

This work will be done according to the rules as laid down in the Machinery and Occupational Safety Act.

- Check if pumps are generating the correct pressure.
- Check if there is a steady drip of water from the glands and adjust.
- Check if the gland bowl drains are clear of obstructions.
- Check for any corrosion, remove and repaint corroded parts.
- Check if the "FIRE ALARM" and "PUMP RUNNING" alarms are registered at the control panels.
- Ensure that the trunk main pressure is as required to allow controls to reset.

Booster pumps:

- Start the booster pumps.
- Check if there is a steady drip of water from the glands, and adjust.
- Check for any corrosion, remove and repaint corroded parts.
- Batch certificates must be forwarded to the Department, attached to the relevant invoice.
- Removal of diesel engines for testing shall comply with the guidelines.

Should replacement of pumps be necessary sufficient motivation should be provided along with the necessary documentation for approval by the relevant DPWI Official.



3.7. Sprinklers

3.7.1. Sprinkler pipework

- Steel pipes that comply with the requirements of SANS 62-1 or SANS 62-2 (subject to a minimum wall thickness of 3,25 mm), provided that:
 - i. They are at least equivalent to medium grade steel tube, or
 - ii. when downstream of the installation control valve, they are at least equivalent to medium grade black steel tube;
- Fabricated flanged steel pipes and fittings used upstream of the alarm valve above ground and that comply with the requirements of SABS 1476;
- Shouldered-end pipes, fittings and couplings that comply with the requirements of SABS 815;
- Black polyethylene pipes installed below ground and that comply with the requirements of SABS 533-1 or SABS 533-2 (or both);
- Malleable cast iron pipe fittings that comply with the requirements of SABS 509;
- Cast iron fittings for fibre-cement pressure pipes that comply with the requirements of SABS 546;
- Cast iron fittings and couplings for shouldered-end pipes that comply with the requirements of SABS 815
- Fibre-cement pressure pipes that comply with the requirements of SABS 1223;
- Polypropylene pressure pipes and fittings installed below ground and that comply with the requirements of SABS 1315; pressurised concrete pressure pipes that comply with the requirements of SABS 975;

Note: All flanges and bolts shall be suitable for fire sprinkler use.

3.8. Batteries & Chargers

3.8.1. Batteries

- Batteries shall be suitable maintenance-free lead-calcium batteries.
- Batteries not used for the automatic starting of diesel engine-driven pumps, when fully charged and disconnected from the charger, shall be of sufficient capacity to monitor all specified circuits for at least 48 h, followed by 1 h in fully operational alarm condition.
- Any battery used for an automatic power failure alarm shall not be used for the automatic starting of a diesel engine-driven pump or for any purpose other than protection against fire.
- The battery shall accommodate the method of charging, have an expected life of approximately four years but at least three years, and be capable of providing 3 min of continuous cranking, or 12 cycles of cranking of a cold engine at 4 °C, depending on the method of starting.

BATTERY TESTING

- This work will be done according to the rules as laid down in the Machinery and Occupational Safety Act.
- The level of electrolyte in each cell is to be checked and replenished with distilled water or battery acid with a specific gravity of not more than 1260. Battery acid must be used when



specified gravity is below 1200. The specific gravity for each cell to be checked and all readings recorded on the sheet. If there is a wide variation in the recordings, an equalizing charge must be carried out on site. Batteries may not be removed for charging purposes.

- Dirt and corrosion to be cleaned from batteries and terminals. Recode and connect terminal with copper compound.
- Ensure battery charger delivers a proper charging current.
- Batch certificates must be forwarded to the Department, attached to the relevant invoice.

3.8.2. Battery chargers

- Automatically adjust the charging rate to suit the state of the battery,
- Operate on short-circuit,
- Operate even when the battery is totally flat,
- Be of constant voltage, and limited current,
- Float a fully charged battery continuously,
- Be protected against damage when an attempt is made to charge a reverse connected battery, and
- Initiate an alarm when the charger output has failed.

Note: -- Battery chargers that comply with the requirements of SABS IEC 60335-2-29 are deemed suitable for sprinkler use (please comply with this requirement).

3.8.3. Maintenance:

Note: All components that make up the sprinkler system are to follow the below mentioned requirements (MAINTENANCE GUIDELINES):

a) Servicing and full maintenance guarantee.

Test the component completely. The guarantee will encompass the servicing and maintenance of various types of the component in question (Diesel engine, electric motor, etc) according to the latest SABS/SANS specifications.

b) Removal of components from the building to service provider's yard for maintenance or repairs.

No components shall be removed or returned to site by the Contractor unless the necessary removal and return from site form has been completed, signed and stamped by the User Department.

Failure to comply with this requirement should a discrepancy arise of valves not being returned to site, the Contractor will be held responsible for the replacement of the valve in question, at his/her cost.



c) Damaged units.

Should any components be found damaged on site, this is to be recorded on the removal from site and the Department notified by email with cost implication, so that the necessary repair order can be issued.

d) Invoicing.

NO service, maintenance/repair invoice will be processed for payment unless the following documents are fully completed and attached:

- Service record sheet. (Compulsory)
- Pressure test certificate. (where required/applicable).
- Certificate of Compliance (where required/applicable).
- Inventory list (Compulsory)

NO repair / service invoice will be processed for payment unless all the above are complied with.

3.9. SERVICING OF VALVES

This work will be done according to the rules as laid down in the Machinery and Occupational Safety Act.

- Check the isolating control valves.
- Check the alarm gong.
- Check the false alarm prevention pump.
- Check operation and condition of pressure gauges.
- Service the "CLANK".
- Rotate hand-wheel several times to ensure the spindle and wedges is free.
- Grease the spindle and adjust the gland.
- Check operation of indicator apparatus.
- Drain the system and re-fill.

Should replacement of valves be necessary, sufficient motivation (in writing) should be provided along with the costs and pictures depicting the recent state of the valve(s) for approval by the relevant DPWI Official.

4. Fire Detection and Alarm Systems

On appointment of a new maintenance organization:

- A special inspection of the existing EVC system should be commissioned, including the records in order to produce a plan for effective maintenance of the system;
- Areas of non-conformity should be documented and identified to the responsible person and, although the degree of a non-conformity is subjective, the following non-conformities should be regarded as requiring resolution:



- Calls cannot be established from outstations to master station(s);
- Intelligible two-way conversation is not possible between the master station(s) and outstations;
- The system does not fully operate when the primary power supply is removed;
- Secondary power supplies that fail to conform to relevant SANS/SABS
- Cabling with fire resistance that fails to conform to relevant SANS/SABS
- Monitoring for faults of circuits that fail to conform to relevant SABS/SANS
- Standards of electrical safety that fail to conform to relevant SABS/SANS

NOTE not all non-conformities need to be rectified; this is a matter for the user to determine, based on the advice of the maintenance organization, the enforcing authorities, the insurer and any third-party advisers engaged by the user, as appropriate.

If no logbook suitable for enabling conformity exists, the maintenance organization should provide a suitable logbook.

4.1. Arranging repair of faults and/or damage:

- Where maintenance is carried out by a third party there should be an agreement for emergency call out to deal with any fault or damage that occurs to the system and this agreement should be such that, on a 24-hour basis, a technician of the maintenance organization can normally attend the premises within eight hours of a call from the user;
- The user should record all faults or damage in the system logbook, and arrange for repair to be carried out as soon as possible.

For modification work, regardless of whether it is carried out on site or remotely the following should be noted:

- The responsibility of modifying an EVC system should rest with a person who is competent in the principles of EVC system design, and is conversant with this standard and the installed system, with access to the as-fitted drawings;
- Before modifying an EVC system, care should be taken to ensure that the proposed modifications do not detrimentally affect the conformity of the system to fire safety legislation;
- The responsible person should be aware of and agree in writing any modifications proposed for the system;
- All components, circuits, system operations and site-specific software functions known to be affected by the modifications should be tested for correct operation following the modifications; in particular:

On completion of the modifications, all as-fitted drawings and other relevant system records should be updated as appropriate;

On commissioning of the work and completion of the tests, a modification certificate should be issued, confirming that the work has been carried out in accordance with the recommendations of this standard, or identifying any variations.



Where responsibility for the conformity, or otherwise, of the modified system to the recommendations of Section 2 of this standard rests with any person other than the organization carrying out the modification, that person should sign the appropriate section of the modification certificate and make it available with the system documentation.

4.2. After a fire

Every outstation, master station and repeater that might have been affected by the fire should be inspected and tested in accordance with the SANS/SABS Standards.

A visual examination and suitable tests should be carried out on all other parts of the system that lie within the fire area and other areas affected by corrosive smoke from the fire and that might have been damaged by the fire (e.g. power supplies, master stations and cable). Where there is evidence of damage, suitable action should be taken.

Circuits external to the master station(s) that might have been affected by the fire should be tested for correct operation on completion of the work, any defects found should be recorded in the system logbook, and the responsible person notified accordingly.

After long periods of disconnection of the EVC system, inspection and testing should be carried

4.3. Logbook

The following information should be recorded in the logbook:

- The name of the responsible person;
- Details of the maintenance organization;
- Brief details of maintenance arrangements;
- Dates, times and types of all tests;
- Dates, times and types of all faults and defects;
- Dates and types of all maintenance (e.g. maintenance visit or non-routine attention).



5. Bill of Quantities

NOTE:

- ALL ITEMS MUST BE PRICED
- **PRICES FOR SERVICING MUST INCLUDE LABOUR, CONSUMABLES (SERVICE LABELS, TAMPER PROOF SEALS, SAFETY PINS) & MINOR REPAIRS**
- RATES FOR REPAIR(S)/REPLACEMENT(S) MUST EXCLUDE LABOUR
- MARK-UP NOT EXCEEDING 20% TO BE CHARGED ONLY ON NON-SCHEDULE ITEMS
- SERVICE PROVIDER(S) MUST SUBMIT WRITTEN QUOTATION FOR APPROVAL FOR NON-SCHEDULED ITEMS AND OR THE DEPARTMENT RESERVE THE RIGHT TO SOURCE QUOTATIONS FROM OTHER SERVICE PROVIDERS. NO WORK SHOULD BE EXECUTED BEFORE APPROVAL IS GRANTED
- RATES FOR REPLACEMENT ITEMS MUST ALLOW FOR REMOVAL AND REDUNDANT MATERIAL TO BE OFFICIALLY RECORDED AND TAKEN TO DPWI STORAGE/WORKSHOP AFTER BEING INSPECTED BY DPWI OFFICIAL

5.1 THE FOLLOWING INFORMATION / REQUIREMENTS MUST BE ATTACHED TO THE DOCUMENT:

- Attach a certified copy of the SABS Permit Certification for fire-fighting Equipment / as per SANS
- Attach certified copy of the contractor SAQCC card or certified copy of Accredited Technician with SAQCC fire card and ID certified copies of Technicians working on site.
- Works must be done according to SABS, SANS, SAQCC, Bylaws and Public Works Standards.
- The contractor shall not execute any additional work or shall not take instructions from the Client Department or any other person other than the relevant DPWI official.
- All repair work done by the contractor will be guaranteed for a minimum of (03) months and all new parts, components and material used in this contract shall be guaranteed for a period of (12) months.
- The contractor shall compile and provide inventory list, service sheet or service fire register of any work done on site and must be attached on the quotation and job card.
- The COC shall be requested as and when required.
- Sub-contracting is not allowed.

NB: CONTRACTOR MUST PROVIDE THE FOLLOWING:

1. VAT No. (if applicable): _____
2. CIDB Registration No: _____
3. CSD No: _____
4. SAQCC No: _____
5. SABS No: _____
6. Complaint No: _____



Bill of Quantities cont...d

1.	Service & Maintenance of Hand Equipment	Provisional Quantity	Unit Rate	Amount
1.1	DCP (STP) Extinguisher 2.5kg	1	R	R
1.2	DCP (STP) Extinguisher 4.5kg	1	R	R
1.3	DCP (STP) Extinguisher 9kg	1	R	R
1.4	CO ₂ Extinguisher 6.8kg	1	R	R
1.5	CO ₂ Extinguisher 2kg	1	R	R
1.6	CO ₂ Extinguisher 5kg	1	R	R
1.7	CO ₂ Extinguisher 9kg	1	R	R
1.8	Fire Hose Reels	1	R	R
1.9	Fire Hydrants	1	R	R
1.10	Fire Hydrants hoses (test for leaks)	1	R	R
1.11	Fire Booster connections	1	R	R
1.12	Foam (STP) extinguisher 9kg	1	R	R
1.13	DCP (STP) Extinguisher 50kg	1	R	R
Table 1 Total to be carried over to summary page				R

Table 1: Hand-held Fire Equipment

2.	Service of Sprinkler Systems, Sprinkler Control Valves & Pumps	Provis ional Qty	Unit Rate	Amount
2.1	Pump Stations with Fire Pump Sets	-	-	-
	Complete service of pumps and Panels			
2.1.1	Jockey Pump	1	R	R
2.1.2	Domestic Pump	1	R	R
2.1.3	Diesel Pump	1	R	R
2.1.4	Electrical Pump	1	R	R
2.1.5	Pump House cleaning and repainting	1	R	R
2.1.6	Electrical Control panel	1	R	R
2.2	Sprinkler System & Control Valves			
	Includes complete repair and maintenance of SCV's with an ASIB tag, gauges and instrumentation			
2.2.1	Sprinkler Control Valve	1	R	R
2.2.2	Alarm Gong	1	R	R
2.2.3	Pressure Gauge(s)	1	R	R
2.2.4	Drain system & Refill	1	R	R
2.2.5	Service "Clack"	1	R	R
2.2.6	Isolating Control Valve(s)	1	R	R
2.2.7	Sprinkler Head(s)	1	R	R
2.2.8	Paint (Enamel) per litre	1	R	R
Table 2 Total to be carried over to summary page				R



Table 2: Sprinkler Systems, Sprinkler Control Valves & Pumps

3.	Service & Maintenance of Fire detection Systems, Control Panels & Power Supplies	Provisional Quantity	Unit Rate	Amount
	Includes complete repair and maintenance of all panels and power supplies. All panels and PSU's that can't be repaired due to lack of spare parts are to be replaced with similar units with available spare parts. Specifications and pricing of new units to be approved before commissioning.			
3.1	Control Panels & Power Supplies			
3.1.1	Control Panels & Power Supplies	1	R	R
3.1.2	Repeater Panel	1	R	R
3.1.3	PSU including Blue Ginger	1	R	R
3.1.4	Smoke and Heat Detectors	1	R	R
3.1.5	Control Room Equipment and Software update	1	R	R
Table 3 Total to be carried over to summary page				R

Table 3: Fire Detection Systems, Control Panels & Power Supplies

4.	Service & Maintenance of CO ₂ & Foam Fire Systems	Provisional Quantity	Unit Rate	Amount
4.1	CO₂ Fire Systems			
	Includes complete repair and maintenance of all panels and power supplies. All panels and PSU's that can't be repaired due to lack of spare parts are to be replaced with similar units with available spare parts. Specifications and pricing of new units to be approved before commissioning.			
4.1.1	Gas Control Unit	1	R	R
4.1.2	CO ₂ Cylinders/kg	1	R	R
4.1.3	Trigger Mechanism	1	R	R
4.1.4	CO ₂ Heads	1	R	R
4.1.5	CO ₂ Alarm Lights with Bell	1	R	R
4.1.6	Commissioning and Testing	1	R	R
Sub-Total 1 to be carried over to Table 4 Total				R
4.2	Foam Systems			
	Includes complete repair and maintenance of all panels and power supplies. All panels and PSU's that can't be repaired due to lack of spare parts are to be replaced with similar units with available spare parts. Specifications and pricing of new units to be approved before commissioning.			
4.2.1	Gas Control Unit	1	R	R
4.2.2	Foam Cylinder	1	R	R
4.2.3	Trigger Mechanism	1	R	R
4.2.4	Foam Head	1	R	R
4.2.5	Alarm Lights with Bell	1	R	R
4.2.6	Commissioning and Testing	1	R	R
Sub-Total 2 to be carried over to Table 4 Total				R



Table 4: CO₂ & Foam Fire Systems

5	Spares (Must be of Good Quality)	Provisional Quantity	Unit Rate	Amount
5.1	Hydrant & Hose Spares			
5.1.1	Hydrant Temper proof valve	1	R	R
5.1.2	Hydrant Spindle	1	R	R
5.1.3	Hydrant Fire Hose	1	R	R
5.1.4	Clack Washer	1	R	R
5.1.5	I/R Washer	1	R	R
5.1.6	Hand Wheel	1	R	R
5.1.7	Hydrant Key	1	R	R
5.1.8	LA Branch	1	R	R
5.1.9	Morris Male Hose Coupling (65mm)	1	R	R
5.1.10	Morris Female Hose Coupling (65mm)	1	R	R
5.2	Hose Reel Spares			
5.2.1	Fire Hose Reel Frame	1	R	R
5.2.2	Fire Hose Nozzle (LA)	1	R	R
5.2.3	30m x 20mm PVC Fire Hose	1	R	R
5.2.4	Hose Guide	1	R	R
5.2.5	Hose Clamp (30mm)	1	R	R
5.2.6	Gland Packing	1	R	R
5.2.7	Waterway	1	R	R
5.2.8	CP Valve Complete	1	R	R
5.2.9	CP Valve Handle	1	R	R
5.2.10	CP Valve Washer	1	R	R
5.3	DCP Extinguishers and Spares			
5.3.1	DCP (STP) 2.5kg	1	R	R
5.3.2	DCP (STP) 4.5kg	1	R	R
5.3.3	DCP (STP) 9kg	1	R	R
5.3.4	CPF Valve	1	R	R
5.3.5	CPF Gauge	1	R	R
5.3.6	DCP (STP) Discharge Nozzle	1	R	R
5.3.7	DCP (STP) 50kg			
5.4	CO₂ Extinguishers & Spares			
5.4.1	CO ₂ Extinguishers 2kg	1	R	R
5.4.2	CO ₂ Extinguishers 5kg	1	R	R



5.4.3	CO ₂ Head	1	R	R
5.4.4	CO ₂ Safety Pin	1	R	R
5.4.5	CO ₂ Discharge Hose	1	R	R
5.4.6	CO ₂ Discharge Horn	1	R	R
5.4.7	CO ₂ Plastic Horn Handle	1	R	R
5.4.8	CO ₂ Horn Nipple	1	R	R
5.4.9	CO ₂ Extinguishers 9kg	1	R	R
5.5 Booster Connections & Spares				
5.5.1	Booster Connection	1	R	R
5.5.2	100mm Booster Gauge	1	R	R
5.5.3	Booster Sign	1	R	R
5.6 Fire Equipment And Box Spares				
5.6.1	Single Extinguisher Box (Steel)	1	R	R
5.6.2	Hose Boxes- Wall Mounted (Steel)	1	R	R
5.6.3	Hose Boxes on leg (Steel)	1	R	R
5.6.4	Key Box(Steel)	1	R	R
5.6.6	CP Valve Box(Steel)	1	R	R
5.6.7	00039 Lock	1	R	R
5.6.8	00039 Key	1	R	R
5.6.9	Extinguisher Box (Fibreglass)	1	R	R
5.6.9	Hose Box (Fibreglass)	1	R	R
5.6.10	Hose Reel Box (Fibreglass)	1	R	R
5.7 General Spares				
5.7.1	Tamper Proof Seal	1	R	R
5.7.2	PWD Backboard	1	R	R
5.7.3	Service Label	1	R	R
5.7.4	12mm PVC Discharge Hose	1	R	R
5.7.5	U-Pat	1	R	R
5.7.6	Coach Screw	1	R	R
5.7.7	O-ring (all types)	1	R	R
5.7.8	Symbolic Sign (190 x 190)	1	R	R
5.7.9	Symbolic Sign (290 x 290)	1	R	R
5.7.10	Lift Sign	1	R	R
5.7.11	Uni-bracket	1	R	R
5.7.12	J-bracket	1	R	R
5.7.13	Seal Wires and Lead Seal	1	R	R
5.7.14	Instruction Labels (All Types)	1	R	R
5.7.15	Pressure with Nitrogen	1	R	R
5.7.16	Pressure Test	1	R	R
5.7.17	Hydrostatic Test	1	R	R



5.7.18	Fire blanket	1	R	R
5.8 Recharge				
5.8.1	CO ₂ Recharge (per kg)	1	R	R
5.8.2	ABC Powder 35 MAP (per kg)	1	R	R
5.8.3	Water per 9 Litres	1	R	R
5.8.4	Supply and Recharge of foam concentrate (per kg)	1	R	R
5.8.5	Supply and Recharge of FM200 Gas Cylinders (per kg)	1	R	R
5.9 Fire Doors				
5.9.1	Replace the Fire Door Closer	1	R	R
5.9.2	Replace the Fire Door Lock	1	R	R
5.9.3	Replace standard Fire Door	1	R	R
5.10 Detection System Spares				
5.10.1	Control Panel 1 Loop	1	R	R
5.10.2	Control Panel 2 Loop	1	R	R
5.10.3	Control Panel 4 Loop	1	R	R
5.10.4	Repeater Panel	1	R	R
5.10.5	Control Room (Including computer hardware & Software)	1	R	R
5.10.6	Smoke Detectors including Mounting base	1	R	R
5.10.7	Heat Detectors including Mounting base	1	R	R
5.10.8	Line Relay Unit	1	R	R
5.10.9	Line Isolator unit including mounting base	1	R	R
5.10.10	Control and Repeater panel software	1	R	R
5.10.11	Blue Ginger PSU 27V/3 Amps	1	R	R
5.10.12	Addressable Panel	1	R	R
5.10.13	Convectional Panel	1	R	R
5.10.14	12V Fire panel Lithium Battery	1	R	R
5.11 Sprinklers & Piping Spares				
5.11.1	Sprinkler heads including ceiling, In-rack. OH 5.0 and EHH 7.5	1	R	R
5.11.2	Valve Sets	1	R	R
5.11.3	Pressure Gauges	1	R	R
5.11.4	19mm diameter per meter	1	R	R
5.11.5	25 - 38mm diameter per meter	1	R	R
5.11.6	48 - 50mm diameter per meter	1	R	R
5.11.7	60 - 63mm diameter per meter	1	R	R
5.11.8	76mm diameter per metre	1	R	R



5.11.9	100mm diameter per meter	1	R	R
5.11.10	110 - 115mm diameter per metre	1	R	R
5.11.12	120mm – 150mm diameter per metre	1	R	R
5.11.13	170mm – 180mm diameter per metre	1	R	R
5.11.14	200mm – 250mm diameter per metre	1	R	R
5.11.15	300mm diameter per metre	1	R	R
5.12	Fixed CO₂ and Foam System Spares			
5.12.1	CO ₂ and Foam Heads	1	R	R
5.12.2	Gas Control Unit	1	R	R
Total For Table 5 to be carried to summary page				R

Table 5: Servicing, Repairing & Replacement Spares

6	MISCELLANEOUS ITEMS	Provisional Quantity	Unit Rate	Amount
6.1.	Log Book	1	R	R
6.2	Slimline Fire log book document Holder With key lock	1	R	R
6.3	Transport	1	R /km	R
6.4	Artisan Labour	1	R /hr	R
6.5	Assistant Labour	1	R /hr	R
Total for Table 6 carried to summary page				R

Table 6: Miscellaneous Items



6. Costing Summary Page

	Amount
Table 1 Total :Hand Fire Equipment	R
Table 2 Total: Sprinkler Systems, Sprinkler Control Valves & Pumps	R
Table 3 Total: Fire Detection Systems, Control Panels & Power Supplies	R
Table 4 Total: CO ₂ and Foam Fire Systems	R
Table 5 Total: Service, Maintenance & Replacement Spares	R
Table 6 Total : Miscellaneous Items	R
Total (Excluding VAT)	R
VAT (15%)	R
Total (Including VAT)	R

Table 6: Total Costing