



REPUBLIC OF KENYA

KENYA DAIRY BOARD

**PROPOSED ERECTION AND COMPLETION OF KENYA DAIRY
BOARD ADMINISTRATION BLOCK AT UPPER KABETE**

TENDERNO: KDB/W/400/1/2021

W.P ITEM No. D116/CE/KMB/1601 JOB NO. 10126C

VOLUME 3

SPECIFICATIONS AND BILLS OF QUANTITIES

FOR

**SUPPLY, DELIVERY, INSTALLATION, TESTING AND COMMISSIONING
OF
AUTOMATIC FIRE SUPPRESSION SYSTEM INSTALLATIONS
WORKS**

CLIENT

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TABLE OF CONTENTS

<u>TITLE</u>	<u>PAGE</u>
Contents	(i)
Special Notes	(ii)
SECTION A: General Conditions for Tender	A-1 to A-3
SECTION B: General Mechanical Specifications	B-1 to B-2
SECTION C: Particular Specifications for Fire suppression system.....	C-1 to C-10
SECTION D: Bills of Quantities & Schedule of Unit Rates.....	D-1 to D-11
SECTION E: Technical Schedule of Items to be supplied.....	E-1 to F-3
SECTION F: Schedule of Drawings.....	F-1
SECTION G: Standard Forms.....	G-1 to G-5

SPECIAL NOTES

1. These notes shall form part of the Instructions to Tenderers and Conditions of Contract.
2. The tenderer is required to check the number of pages in this document and should he find any missing, or in duplicate, or indistinct he should inform the Chief Mechanical Engineer (BS), Ministry of Transport, Infrastructure, Housing and Urban Development.
3. Should the tenderer be in any doubt about the precise meaning of any item or figure, for any reason whatsoever, he must inform the Chief Mechanical Engineer (BS), Ministry of Transport, Infrastructure, Housing and Urban Development, in order that the correct meaning may be decided before the date of submission of tender.
4. No liability will be admitted nor claim allowed, in respect of errors in the tender due to mistakes in the specification, which should have been rectified in the manner, described above.
5. All tenderers must make a declaration that they have not and will not make any payment to any person which can be perceived as an inducement to enable them to win this tender.
6. Any tenderer whose firm uses the titles “Engineer” and “Engineers” must produce evidence of registration of at least one of the directors by the Engineers Registration Board of Kenya to avoid disqualification.

SECTION A

GENERAL CONDITIONS FOR TENDER

TENDER EVALUATION CRITERIA

Note: The tenderer, who shall be domestic subcontractor to the Main Contractor upon award of the tender, must comply with the following conditions and instructions failure to which the tender shall be rejected.

After tender opening, the tenders will be evaluated in **2 stages**, namely:

1. Preliminary Evaluation;
2. Technical Evaluation;

STAGE 1: PRELIMINARY EVALUATION

This stage of evaluation shall involve examination of the mandatory requirements as set out in the Tender Advertisement Notice or Letter of Invitation to Tender and any other conditions stated in the bid document.

These conditions shall include the following:

- i) Company Certificate of incorporation/registration;
- ii) Current National Construction Authority Registration certificate (NCA 5 and above in Mechanical Engineering Services -Fire Protection Services Works) and current annual practicing license;
- iii) Valid Tax Compliance Certificate;
- iv) Provide a copy of valid business permit;
- v) Dully filled (in ink) Bills of quantities in the format provided;
- vi) Compliance with Technical Specifications;

Note:

On compliance with Technical Specifications, bidders shall supply equipment /items which comply with the technical specifications set out in the bid document. In this regard, the bidder will be required to submit relevant technical brochure/catalogues with the tender document, highlighting (using a mark-pen or highlighter) the Catalogue Number/Model of the proposed items. Such brochure/catalogues should indicate comprehensive relevant data of the proposed equipment/items which should include but not limited to the following:

- (i) Standards of manufacture;
- (ii) Performance ratings/characteristics;
- (iii) Material of manufacture;
- (iv) Electrical power ratings; and
- (v) Any other necessary requirements so as to comply with the bid technical specifications.

The bid will then be analyzed, using the information in the technical brochures, to determine compliance with key technical specifications for the works/items as indicated in the tender document. Bidders not complying with **any** of the key Technical Schedule specifications shall be **Non-Responsive** while those meeting all the key technical specifications shall be **Responsive** (evaluation committee may add more key requirements from the bid technical specifications).

The tenderer shall also fill in the Technical Schedule as Specified in the tender document for Equipment and items indicating the Country of Origin, Model/Make/Manufacturer and catalogue numbers of the Items/ Equipment they propose to supply.

The tenderers who do not satisfy any of the above mandatory requirements shall be considered Non-Responsive and their tenders will not be evaluated further.

STAGE 2 TECHNICAL EVALUATION

A) Assessment for eligibility

The tender document shall be examined based on a detailed scoring plan shall be as shown in table 1 below.

The award of points for the STANDARD FORMS considered in this section shall be as shown below

<u>PARAMETER</u>	<u>MAXIMUM POINTS</u>
(i) Key personnel -----	20
(ii) Contract Completed in the last Five (5) years -----	20
(iii) Schedules of on-going projects -----	8
(iv) Schedules of contractors' equipment -----	20
(v) Litigation History -----	2
TOTAL	<u>70</u>

TABLE 1: Assessment for Eligibility

Item	Description	Point Scored	Max. Point
i	Key Personnel (Attach evidence)		20
	Director of the firm		
	<ul style="list-style-type: none"> • Holder of degree in relevant Engineering field ----- 6 • Holder of diploma in relevant Engineering field ----- 5 • Holder of certificate in relevant Engineering field ----- 3 • Holder of trade test certificate in relevant Engineering field --2 • No relevant certificate -----1 	6	
	At least 1No. degree/diploma of key personnel in relevant Engineering field		
	<ul style="list-style-type: none"> • With over 10 years relevant experience ----- 6 • With over 5 years relevant experience----- 4 • With under 5 years relevant experience ----- 2 	6	
	At least 1No certificate holder of key personnel in relevant Engineering field		
	<ul style="list-style-type: none"> • With over 10 years relevant experience----- 4 • With over 5 years relevant experience ----- 3 • With under 5 years relevant experience -----1 	4	
	At least 2No artisan (trade test certificate in relevant Engineering field)		
	<ul style="list-style-type: none"> • Artisan with over 10 years relevant experience ----- 2 • Artisan with under 10 years relevant experience ----- 1 • Non skilled worker with over 10 years relevant experience -- 1 	4	
ii	Contract completed in the last five (5) years (Max of 5 No. Projects)- <u>Provide Evidence</u>		20
	<ul style="list-style-type: none"> • Project of similar nature, complexity and magnitude ---- 4 • Project of similar nature but of lower value than the one in consideration ----- 3 • No completed project of similar nature -----0 		
iii	On-going projects – <u>Provide Evidence</u>		8
	<ul style="list-style-type: none"> • Four and above Project of similar nature, complexity and magnitude --- 8 • Three and below Project of similar, nature complexity and magnitude -- 6 • No project of similar, nature complexity and magnitude -----4 		
iv	Schedule of contractors equipment and transport (proof or evidence of ownership/Lease)		20
	a) Relevant Transport (at least 2No.)		
	<ul style="list-style-type: none"> • Means of transport (Vehicle) ----- 10 • No means of transport ----- 0 	10	
	b) Relevant Equipment (at least 5No.)		
	<ul style="list-style-type: none"> • Has relevant equipment for work being tendered----- 10 • No relevant equipment for work being tendered----- 0 	10	
v	Litigation History		2
	<ul style="list-style-type: none"> • Filled ----- 2 • Not filled ----- 0 		
TOTAL			70

Any bidder who scores 40 points and above shall be considered for further evaluation

SECTION B

GENERAL MECHANICAL SPECIFICATIONS

SECTION B

GENERAL MECHANICAL SPECIFICATION

CLAUSE	DESCRIPTION	PAGE
2.01	GENERAL.....	B-1
2.02	QUALITY OF MATERIALS.....	B-1
2.03	REGULATIONS AND STANDARDS.....	B-1
2.04	ELECTRICAL REQUIREMENTS.....	B-2
2.05	TRANSPORT AND STORAGE.....	B-2
2.06	SITE SUPERVISION.....	B-2
2.07	INSTALLATION.....	B-2
2.08	TESTING.....	B-2
2.09	COLOUR CODING.....	B-4
2.10	WELDING.....	B-4

SECTION B:

GENERAL MECHANICAL SPECIFICATION

2.01 **General**

This section specifies the general requirement for plant, equipment and materials forming part of the Sub-contract Works and shall apply except where specifically stated elsewhere in the Specification or on the Contract Drawings.

2.02 **Quality of Materials**

All plant, equipment and materials supplied as part of the Sub-contract Works shall be new and of first class commercial quality, shall be free from defects and imperfections and where indicated shall be of grades and classifications designated herein.

All products or materials not manufactured by the Sub-contractor shall be products of reputable manufacturers and so far as the provisions of the Specification is concerned shall be as if they had been manufactured by the Sub-contractor.

Materials and apparatus required for the complete installation as called for by the Specification and Contract Drawings shall be supplied by the Sub-contractor unless mention is made otherwise.

Materials and apparatus supplied by others for installation and connection by the Sub-contractor shall be carefully examined on receipt. Should any defects be noted, the Sub-contractor shall immediately notify the Engineer.

Defective equipment or that damaged in the course of installation or tests shall be replaced as required to the approval of the Engineer.

2.03 **Regulations and Standards**

The Sub-contract Works shall comply with the current editions of the following:

- a) The Kenya Government Regulations.
- b) The United Kingdom Institution of Electrical Engineers (IEE) Regulations for the Electrical Equipment of Buildings.
- c) The United Kingdom Chartered Institute of Building Services Engineers (CIBSE) Guides.
- d) British Standard and Codes of Practice as published by the British Standards Institution (BSI)
- e) The Local Council By-laws.
- f) The Electricity Supply Authority By-laws.
- g) Local Authority By-laws.
- h) The Kenya Building Code Regulations.
- i) The Kenya Bureau of Standards

2.04 **Electrical Requirements**

I.

Plant and equipment supplied under this Sub-contract shall be complete with all necessary motor starters, control boards, and other control apparatus. Where control panels incorporating several starters are supplied they shall be complete with a main isolator.

The supply power up to and including local isolators shall be provided and installed by the Electrical Sub-contractor. All other wiring and connections to equipment shall form part of this Sub-contract and be the responsibility of the Sub-contractor.

The Sub-contractor shall supply three copies of all schematic, cabling and wiring diagrams for the Engineer's approval.

The starting current of all electric motors and equipment shall not exceed the maximum permissible starting currents described in the Kenya Power and Lighting Company (KPLC) By-laws.

All electrical plant and equipment supplied by the Sub-contractor shall be rated for the supply voltage and frequency obtained in Kenya, that is 415 Volts, 50Hz, 3-Phase or 240Volts, 50Hz, 1-phase.

Any equipment that is not rated for the above voltages and frequencies shall be rejected by the Engineer.

2.05 **Transport and Storage**

All plant and equipment shall, during transportation be suitably packed, crated and protected to minimise the possibility of damage and to prevent corrosion or other deterioration.

On arrival at site all plant and equipment shall be examined and any damage to parts and protective priming coats made good before storage or installation.

Adequate measures shall be taken by the Sub-contractor to ensure that plant and equipment do not suffer any deterioration during storage.

Prior to installation all piping and equipment shall be thoroughly cleaned.

If, in the opinion of the Engineer any equipment has deteriorated or been damaged to such an extent that it is not suitable for installation, the Sub-contractor shall replace this equipment at his own cost.

2.06 **Site Supervision**

The Sub-contractor shall ensure that there is an English-speaking supervisor on the site at all times during normal working hours.

2.07 **Installation**

Installation of all special plant and equipment shall be carried out by the Sub-contractor under adequate supervision from skilled staff provided by the plant and equipment manufacturer or his appointed agent in accordance with the best standards of modern practice and to the relevant regulations and standards described under Clause 2.03 of this Section.

2.08 **Testing**

2.08 **General**

The Sub-contractor's attention is drawn to Part 'C' Clause 1.38 of the "Preliminaries and General Conditions".

2.08.2 Material Tests

All material for plant and equipment to be installed under this Sub-contract shall be tested, unless otherwise directed, in accordance with the relevant B.S Specification concerned.

For materials where no B.S. Specification exists, tests are to be made in accordance with the best modern commercial methods to the approval of the Engineer, having regard to the particular type of the materials concerned.

The Sub-contractor shall prepare specimens and performance tests and analyses to demonstrate conformance of the various materials with the applicable standards.

If stock material, which has not been specially manufactured for the plant and equipment specified is used, then the Sub-contractor shall submit satisfactory evidence to the Engineer that such materials conform to the requirements stated herein in which case tests of material may be partially or completely waived.

Certified mill test reports of plates, piping and other materials shall be deemed acceptable.

2.08.3 Manufactured Plant and Equipment – Work Tests

The rights of the Engineer relating to the inspection, examination and testing of plant and equipment during manufacture shall be applicable to the Insurance Companies or Inspection Authorities so nominated by the Engineer.

The Sub-contractor shall give two week's notice to the Engineer of the manufacturer's intention to carry out such tests and inspections.

The Engineer or his representative shall be entitled to witness such tests and inspections. The cost of such tests and inspections shall be borne by the Sub-contractor.

Six copies of all test and inspection certificates and performance graphs shall be submitted to the Engineer for his approval as soon as possible after the completion of such tests and inspections.

Plant and equipment which is shipped before the relevant test certificate has been approved by the Engineer shall be shipped at the Sub-contractor's own risk and should the test and inspection certificates not be approved; new tests may be ordered by the Engineer at the Sub-contractor's expense.

2.08.4 Pressure Testing

All pipework installations shall be pressure tested in accordance with the requirements of the various sections of this Specification. The installations may be tested in sections to suit the progress of the works but all tests must be carried out before the work is buried or concealed behind building finishes. All tests must be witnessed by the Engineer or his representative and the Sub-contractor shall give 48 hours notice to the Engineer of his intention to carry out such tests.

Any pipework that is buried or concealed before witnessed pressure tests have been carried out shall be exposed at the expense of the Sub-contractor and the specified tests shall then be applied.

The Sub-contractor shall prepare test certificates for signature by the Engineer and shall keep a progressive and up-to-date record of the section of the work that has been tested.

2.09 **Colour Coding**

Unless stated otherwise in the Particular Specification all pipework shall be colour coded in accordance with the latest edition of B.S 1710 and to the approval of the Engineer or Architect.

2.10 **Welding**

2.10.1 **Preparation**

Joints to be made by welding shall be accurately cut to size with edges sheared, flame cut or machined to suit the required type of joint. The prepared surface shall be free from all visible defects such as lamination, surface imperfection due to shearing or flame cutting operation, etc., and shall be free from rust scale, grease and other foreign matter.

2.10.2 **Method**

All welding shall be carried out by the electric arc processing using covered electrodes in accordance with B.S. 639.

Gas welding may be employed in certain circumstances provided that prior approval is obtained from the Engineer.

2.10.3 **Welding Code and Construction**

All welded joints shall be carried out in accordance with the following Specifications:

a) **Pipe Welding**

All pipe welds shall be carried out in accordance with the requirements of B.S.806.

b) **General Welding**

All welding of mild steel components other than pipework shall comply with the general requirements of B.S. 1856.

2.10.4 **Welders Qualifications**

Any welder employed on this Sub-contractor shall have passed the trade tests as laid down by the Government of Kenya.

The Engineer may require to see the appropriate to see the appropriate certificate obtained by any welder and should it be proved that the welder does not have the necessary qualifications the Engineer may instruct the Sub- contractor to replace him by a qualified welder.

SECTION C:

**PARTICULAR SPECIFICATIONS
FOR
AUTOMATIC FIRE SUPPRESSION SYSTEM**

PART E: PARTICULAR SPECIFICATIONS FOR

ProInert Inert Gas Fire Suppression System

5.1 General

The ProInert Gas shall be used to extinguish fires in the **Server Rooms** section where valuable data exist, all as specified herein and as shown on contract drawings. It shall be the responsibility of the bidder to confirm the dimensions at site before tendering.

The gas shall be stored under pressure in liquefied form inside cylinders and piped to fire protected areas. Each ProInert system in a given zone shall be supplied complete with its control Unit that shall receive the signal from smoke detector or break glass and automatically release the gas after switching off the Ventilation system and sounding an alarm bell. The fire detection system in all areas where ProInert gas pipe is not installed shall be supplied and installed by the Electrical Contractor but the Contractor shall liaise with him and extend detection signal outputs into the Master Alarm Control Panel in the Security Office.

5.1.1 The Design and installation shall be made in accordance with these specifications, drawings, all applicable National Fire Protection Association Standards and the requirements of the local authority having jurisdiction.

5.1.2 The fire suppression systems shall be designed by competent personnel who are trained and authorized by the equipment manufacturer for design of total flooding ProInert gas systems and the integrated detection systems.

Working Drawings shall be in sufficient detail to indicate the type, size, and arrangement of component materials and devices; and the dimensions needed for installations and correlation with other materials and equipment.

All Working Drawings shall be submitted for review and approval prior to installation.

5.1.3 The Contractor shall furnish detailed literature outlining the operation, recharge and service of the system. Maintenance procedures for the owner shall be outlined. In addition, the contractor shall furnish the equipment manufacturer's recommended spare parts lists with information regarding availability and ordering instructions.

5.1.4. The contractor shall utilize an equipment manufacturer that will provide a 12-month warranty against false discharges when all conditions of the equipment manufacturer are fulfilled for this type of warranty. Details of this warranty be furnished upon request.

5.2 SYSTEM ARRANGEMENT

5.2.1. The ProInert fire suppression system shall be of the engineered, permanently piped, fixed nozzle type with all pertinent components of the same manufacturer. **The system shall have one common bank of cylinders to discharge into the room at a time through the use of selector valves.** All agent storage containers shall be centrally located as vertical, free-standing cylinders with wall mounted retaining brackets. Where multiple cylinders are required for the same hazard, a common manifold should be employed. Manifoldd cylinders shall employ a flexible discharge hose to facilitate installation and system maintenance. Each cylinder on a manifold shall also include an agent check valve installed to the manifold inlet.

5.2.2 Detection system shall be of the engineered type, suitable for direct interface with the Proinert fire suppression system. All pertinent components shall be of the same manufacturer or approved for use with the control/release panel.

Detection network shall be cross-zoned or counting zone for positive and accurate response to fire condition.

For each hazard, both Ionization and Photoelectric type smoke detectors shall be used to provide automatic input to the control panel.

In addition, manual pull station(s) shall be provided for the direct electric release of the Argon Fire Suppression System.

The sequence of operation for the control panel shall be as follows: -

- i) Activation and annunciations of general alarms.
- ii) Activation of shutdown and / or startup of auxiliary function.
- iii) Activation and annunciation of the time delay
- iv) Release of agent.

Alarm bells shall be used for general alarm for visual/ audible signal of system discharge.

An adjustable time delay shall be used prior to Argon release (with) manual abort capability.

5.3 DESIGN PARAMETERS

5.3.1 Design of the total flooding ProInert gas system shall be based upon the enclosure being sufficiently tight against agent leakage with all ventilation shut down and / or fire dampered or provide for static air condition upon discharge.

ProInert gas quantity calculations shall be determined from dimension furnished on the construction drawings and in this specification for a **design concentration of 34.2%** at the minimum **anticipated hazard temperature of 22.5 ° C.**

Calculation for the maximum design concentration shall be based upon maximum anticipated hazard temperature of _____ ° F (_____ ° C).

When applicable, agent quantity shall be adjusted for:

- i) Altitudes of more than (915m) above sea level.
- ii) Non-flooded false ceiling volume.
- iii) Multiple hazards from a common agent supply.
- iv) Manufacturer standard tanks and fill increments
- v) Duct volume for HVAC system.

5.3.2 The system shall be designed to discharge the calculated agent quantity in a nominal 60 second period.

5.3.3 Nozzle spacing shall be in accordance with the listed approved coverage for each nozzle type. In all cases, the need for additional nozzle shall be considered based upon site conditions and manufacturer's recommendations.

5.3.4 Hydraulic calculations for each system shall be used upon two-phase flow equations for unbalanced systems as defined by NFPA –2001 regardless if a single nozzle or balanced piping network is used.

Computerized verification of hydraulic calculations shall be submitted for ProInert system and include the following data as a minimum.

- a) Quantity of Agent per Nozzle.
- b) Type of Nozzle.
- c) Pressure at Nozzle (bar)
- d) Nozzle Body Nominal Size (mm).
- e) Nozzle Drill Size (64'/inch).
- f) Number and size of Tanks.
- g) Tank Fill Weight.
- h) Tank Filling Density.
- i) Total Agent Weight.
- j) Pipe Size Per Pipe Section.
- k) Pipe schedule Per Pipe Section.
- l) Number, Size and Type of Fitting Per Pipe Section
- m) Actual Length Per Pipe Section (m).
- n) Equivalent Length Per Section (m).
- o) Elevation Change Per Pipe Section (m).
- p) Piping Volume (m³).
- q) Discharge Time (sec).
- r) Percent of Agent in Pipe.
- s) Pressure at Start of Network (bar)

- t) Pressure Available at the Start and End of Each Pipe Section (bar).
- u) Density at the Start and End of Pipe Section (kg/m³).
- v) Flow rate Per Pipe Section (litres/sec.).
- w) Pressure Drop Per Pipe Section (N/m²)
- x) Y and Z Factors at the Start and End of Each Pipe Section.

5.3.5 The contractor shall provide data to indicate the free venting area required per NFPA-2001 for each hazard volume.

5.3.6 DESIGN PARAMETERS – DETECTION

5.3.6.1 The design of the detection/control system shall be based on a clean, vibration free, electrical non-hazardous environment

5.3.6.2 As a minimum detector spacing shall be based upon NFPA recommended practices for ceiling construction, air flow and manufacturer recommendations.

At least one smoke detector of each type (ionization and photoelectric) shall be used in each protected area. Where multiple detectors are used, detection shall alternate such that ionization are adjacent to photoelectric.

5.3.6.3 Unless otherwise stated on the drawings manual pull station(s) shall be located at all points of ingress from the protected area.

otherwise stated on the drawings at least one alarm device shall be located within the protected area for the general alarm function.

Battery capacity shall be sufficient to permit normal non-alarm condition for 24 hours with subsequent general alarm for 5 minutes after loss of primary line power.

5.3.7 EQUIPMENT AND MATERIAL

5.3.7.1 General

All materials and equipment furnished by the contractor shall be of new, unused, and undamaged condition in strict accordance with the requirement of this section. Equipment shall be required to meet the following standards; **ISO 14520, UNE 23575, NFPA 2001 AND CEA 4008.**

Where items are specified to a nationally recognized standard of manufacture, any component meeting this standard will be considered equal.

Manufacturer's equipment other than as specified shall be bid as an alternate with the base as an alternate with the base bid furnished as specified.

All equipment and materials shall only be used for their intended application, in locations for which they were designed, and installed in accordance with the manufacturer's instructions and /or recognized standard trade practice.

5.3.7.2. Pipe Material

ProInert gas fire system piping shall be of non-combustible materials having physical and chemical characteristics such that its integrity under stress can be predicted with reliability. Materials other than listed below, such as stainless steel or nonferrous piping or tubing, may be used if the materials satisfy the applicable requirements of NFPA-2001.

As a minimum, piping materials shall be black galvanized seamless steel pipe conforming To BS specifications and **capable of 65 bar operating pressure (ASTM Grade A-106B)**. Under no conditions shall ordinary cast iron pipe, steel pipe or non-metallic pipe be used.

ProInert gas fire system piping joints shall be suitable for the design conditions and shall be selected with consideration of joint tightness and mechanical strength.

As a minimum, fittings shall be black galvanized ANSI 300lb. Class malleable iron, ASTM A-197, m ANSI 300lb. Class ductible iron, ASTM A-395; or steel ASTM A-234.

Ordinary cast iron fittings shall not be permitted. Piping shall be installed accordance with good commercial practice to the appropriate codes, **securely supported** with Listed hangers, and arranged with close attention to the design layout since deviations may alter the design flow performance as hydraulically calculated.

All Piping must be reamed, blown clear, and swabbed with appropriate solvent to remove mill varnish and cutting oils before assembly. The piping shall also be finished off with two coats of red paint after testing.

Muulti- outlet fittings other than tees shall not be permitted.

Assembly of all joints shall conform to the appropriate standards. Threaded pipe joints shall utilize Teflon tape applied to male thread s only.

5.3.7.3 Agent Storage Tank

ProInert gas fire storage containers shall be of high strength alloy steel construction in accordance with NFPA 2001 finished in (baked red enamel) (red epoxy) paint.

Tank assemblies shall be filled with ProInert gas pressurized to 200 bar at (21 °C).

Filling of the tank assembly shall be by a factory authorized U.L listed filling station. Initial filling and recharge shall be done in accordance with the manufacturer's established procedures and shall not require replacements components for normal service.

The size and fill weights of all cylinders shall le based on computer verified system design requirements and shall be of the following nominal sizes: _

i) 80 kg

ii) 140kg

Nominal 270kg tank assembly shall be equipped with an internal liquid level measuring rod, marked in ¼ inch increments to allow direct reading of the liquid level and conversation to the weight of ProInert gas within the tank.

Tank assembles shall be vertical, free standing modules employing suitable wall mounted retaining brackets. Tank assemblies shall be listed or approved to perform in the temperature range of – 650F tp 1300F (-540°C to 540°C).

Aluminum name **plates** indicating manufacturer's name and part number, agent fill weight, total charged weight date of fill, and U.L. Listed fill station case shall be permanently bonded to each tank.

Each tank assembly shall have the means to accommodate lifting devices to facilitate weighing removal and replacing.

Tank assembly shall include a low pressure switch that operates at approximately 225 (1551kpa) to facilitate continuous supervisions of tank pressure.

5.3.7.4 Tank Valve

Agent storage tank assemblies shall include an intergral, high flow valve assembly connected to the tank by a machined thread and sealed by an 0-ring.

Valve outlet sizes shall be based on the nominal tank capacity with a one-inch size for 18,33,54 and 72 pound assemblies, and three inch for 600 pound assemblies.

The valve design shall be of the differential pressure type which utilizes tank pressure to seal the valve assembly. The valve shall be compatible with separate, removable, stackable type actuators for electric, pneumatic, and/or manual actuation.

Operation of the valve by the stackable type actuator shall be such actuation. Operation of the valve by the stackable type actuator shall be such that pressure is relieved from the upper chamber of the valve causing the valve to open. Valves shall be forged brass construction with an o-ring sealed brass spool incorporating the main elastomeric seal surface.

The valve assembly shall include recessed pressure gauge 0 to 250 bar, overpressure safety relief disc assembly, normally pressurized connection port for an optional low pressure switch, normally unpressurized connection port used as pneumatic source for a valve cylinder valve actuation, and brass shipping caps on exposed thread connection.

When pneumatically operated main/reserve systems are used, pilot valves shall be equipped with actuation isolators.

All 3 inch valve assemblies shall be equipped with a removable pressure gauge feature. This gauge shall be capable of being removed from the valve assembly when the tank is pressurized.

5.3.7.5 Tanks Brackets

Each ProInert gas tank shall be furnished with a stainless steel, two part, strap type retaining bracket designed for installation with standard 15/8n continuous slotted channel.

5.3.7.6 Valve Actuators

Argon valve actuators shall be of brass construction stackable design, with swivel connections to allow removal of actuators for maintenance or testing.

Operation of actuators neither shall nor require replacement of components. No electro-explosive devices may be used to actuate the valve assembly.

Electric actuators shall be of the **continuous duty solenoid type** with a maximum power requirement of 7 watts for 24VDC operation.

Pneumatic actuators shall be designed to operate from either ProInert gas tank pressure with appropriate interconnections or by nitrogen pressure from a separate listed or approved source.

Manual override actuators shall be designed to attach to electric actuator or directly to the valve assembly and permit manual operation of the pilot ProInert gas tank assembly. This actuator shall incorporate a detent action with a red phenolic palm bottom and safety ring pin.

Where actuation hose (s) are required stainless steel braid covered types shall be used.

5.3.7.7 Discharge Hose/Check Valve

When manifolding, all tank assemblies shall include a flexible discharge hose and check valve for connection to manifold inlet.

Nominal one and two inch hoses shall be elastomeric with standard NPT male threads and be compatible with the manufacturer's check valve.

Nominal three inch hoses shall be braided stainless construction and incorporate an integral check valve providing a 1 1/2 inch height adjustment to compensate for the height variance between cylinder and manifold connection.

A swivel connection at valve outlet shall be provided on all tank installation to facilitate removal for service and testing.

5.3.7.9 Discharge Nozzles

Gas discharge nozzles shall be of one-piece (brass) construction sized to provide flow rates in accordance with system design hydraulics.

Orifice (s) shall be machined in the nozzle body to provide a horizontal discharge in 90°, 180°, or 360° patterns based upon the approved coverage arrangements. Separate, interchangeable orifice plates are not acceptable.

Nozzles shall be permanently marked with the manufacturer's part number, number of orifice and orifice code. The nozzle shall be threaded directly to the discharge piping without the use of special adaptors.

5.3.7.10 Warning Signs

Etched aluminium Warning Signs shall be provided at all Entrance and Exits of the protected area. Entrance sign shall read: "WARNING \DO NOT ENTRE ROOM WHEN ALARM SOUNDS, **PROINERT GAS** BEING RELEASED."

Exit sign shall read: "WHEN ALARM SOUNDS, VACATE AT ONCE, **PROINERT GAS** BEING RELEASED..."

5.3.8 EQUIPEMENT AND MATERIAL –ELECTRICAL

5.3.8.1 General Materials

All electrical trunkings and conduits shall be employed in accordance with applicable codes and intended use and contain only those electrical circuits associated with the fire detection and control system and shall not contain any circuit that is unrelated to the system.

Unless specifically provided otherwise in each case, all conductors shall be enclosed in steel conduit, rigid or thin walled as conditions dictate, except in computer room where they shall be PVC conduit concealed in building fabrics electrically hazardous classification shall be observed and any equipment for materials installed shall be must meet or exceed the requirements of service.

All wiring shall be of the proper size to conduct the circuit current shall not smaller than No.18 AWG unless otherwise specified for a given purpose. Wire that has scrapes nicks, gouges, or crushed insulation shall not be used.

The use of aluminum wire is strictly prohibited.

Splicing of circuits shall be kept to a minimum and are only to be found in an electrical device suited for the purpose.

Wire spliced together shall have the same colour insulation. Wire splices shall be made with appropriate devices suited for the purposes.

All wire terminations shall be made with crimp terminals unless the device at the termination is designed for bare wire termination.

All electrical circuits shall be numerically tagged with suitable devices at its terminating point and/ or splice.

All circuits' numbers shall correspond with the installation drawings.

The use of coloured wires is encouraged. White coloured wire shall be used exclusively for the identification of the neutral conductor of an alternating current circuit.

Green coloured wire shall be used exclusively for the identification of the earth ground conductor of an AC and DC circuit.

5.3.8.2 Control Panels – General

All control panels shall be F.M

Approved and be utilized with listed or approved operating devices shall be capable of the following features:

- i) Ground Fault Indication
- ii) Supervised Detection Circuits (s).
- iii) Supervised Alarm Circuit
- iv) Supervised Release Circuit
- v) Supervised Manual Pull Circuit
- vi) Supervised Line Power Circuit
- vii) Alarm Overrides Trouble Logic.
- viii) Battery Standby
- ix) Front Panel Indicating Lamps
- x) Key Lock Steel Enclosure
- xi) Programmable Time Delay

- xii) Programmable Detection Logic
- xiii) Prioritized Trouble Logic
- xiv) Solid State Integrated circuitry

5.3.8.3 Control Panel – Dual Zone Unit

In addition to the general requirements for control panels, dual zone control units shall meet the requirements of this section.

The control unit shall consist of power supply, programmable zone actuation, five supervised circuits and six auxiliary relays.

The internal power supply shall operate from 240V 50Hz A.C power supply.

The control unit shall provide provisions for housing its own set of “on-line” float charged emergency batteries within the enclosure.;

The control unit shall provide two supervised detections (input circuits) programmable for:

- i) Independent Zoning
- ii) Priority Zoning
- iii) Cross-Zoning

A supervised dedicated manual pull circuit designated for immediate operation of the release circuit shall be provided.

Abort function (if used) shall be programmed for (immediate Release) (timed release) after abort.

A programmable time delay of 0.60 seconds in 5 seconds increments shall be provided between verification of a fire situation and suppression system release.

A fused polarity reversing, 1 amp, 24VDC supervised dedicated release circuit for use with approved fire suppression system releasing devices shall be provided.

Battery supervision shall be provided for condition and placement of the batteries.

An auxiliary trouble circuit for supervision of other normally closed accessory devices shall be provided.

Six plug in relays shall be provided for auxiliary function. Each of the following actions shall cause one of the six relays to transfer.

- i) System Discharge
- ii) Zone 1 Alarm
- iii) Zone 2 Alarm
- iv) Pre-Discharge Alarms
- v) General Alarm
- vi) System Trouble

LED indicators shall be provided on the front door to annunciate the following conditions:

- i) Power – (Green)
- ii) System Trouble - (Red)
- iii) Zone 1 Alarm – (Red)
- iv) Zone 2 Alarm – (Red)
- v) Pre-Discharge Alarm – (Red)
- vi) System Fired – (Red)

A prioritized LED troubleshooting code shall be provided in order to restore the control unit to normal condition as quickly as possible.

The control unit shall be housed in steel cabinet of approved type with conduit knockouts in a (red) (beige) enamel finish.

The door shall have a continuous hinge a 180° swing. Wiring connections shall be screw terminal blocks.

A trim ring shall be supplied for semi-flush installations. When two dual zone control units are required, they shall be available in a single enclosure, if this feature simplifies the installation and system arrangement.

The control unit shall be F.M Approved as an alarm/releasing control unit

5.3.8.4 Smoke Detector - Ionization

Ionization type smoke detector shall be dual chamber type and compatible with the control unit. The detector shall have an LED in its base which is illuminated in a steady “on” mode when in alarm. Reset of the detector shall be performed by the control unit reset switch.

The design of the ionization detector compensating circuits shall provide stable operation with regard to minor changes in temperature, humidity, and atmosphere conditions.

The sensitivity voltage shall be factory set per U.L 268. A special locking screw shall be provided to lock the head to the base; the head to base connection shall be by use of bifurcated contacts. Terminal connections to the base shall be of the screw type.

Where specifically identified on the contract drawings, detector bases shall incorporate a relay with Form C contacts rated at 1 amp 120 VAC or 28VDC for remote LED alarm annunciation of the detector. The detector shall be F.M Approved.

5.3.8.5 Smoke Detector - Photoelectric

Photoelectric detector shall be a solid-state sensing chamber unit providing stable operations (sensitivity) and compatible with the control unit. The detector shall utilize a light sensing photodiode and a pulse signal processor to measure the density of the combustion products within the sensing chamber. The detector head shall have a stainless steel mesh to prevent foreign objects from entering the sensing chamber.

The sensitivity voltage shall be factory set.

A special locking screw shall be provided to lock the head to the base. The head to base connection shall be by use of bifurcated contacts. Terminal connections to the base shall be of the screw type.

Where specifically identified on the contract drawings, detector bases shall incorporate a relay with Form C contacts rated at 1 amp 120VAC or 28VDC for remote LED alarm annunciation of the detector.

The detector shall be U.L. Listed or F.M Approved.

5.3.8.6 Alarm Bells

The vibrating Alarm Bell shall be approved for use with the listed control unit. The polarized alarm bell shall be rated at 24VDC and draw no more than .063 amps and shall contain a series diode for uses in supervised systems.

It shall have a dB level of 86 – 90 at 3 metres.

The bell shall be constructed of high quality materials to ensure reliability and long life and have a baked red enamel finish.

The device shall be F.M Approved.

5.3.8.7 Manual Pull Stations (Fire man’s switch)

The Manual Pull Station shall be provided for the release (electrical) of the ProInert gas in case of an emergency. The unit shall be contained within a metal body having a (single) (double) pole switch.

[The device shall be that approved by Fire Authority.]

5.3.8.8 Abort Switch

The abort switch shall be used where an investigation delay is desired between detection and actuation of the ProInert gas System.

This switch shall be a momentary contact “dead-man” type switch requiring constant pressure to transfer one set of normally open and one set of normally closed contacts on each contact block. Clear operating instruction shall be provided at the abort switch.

The terminal connections shall be of the screw type.

The device shall be U.L listed or F.M Approved for a delay switch.

5.3.8.9 Pressure Switch

This pneumatically actuated switch shall be used to give positive identification of release of ProInert gas in the piping system.

The switch shall have one set of normally open and one set of normally closed contacts.

5.3.8.10 Selector Switch – Key Operated

The key operated selector switch shall be approved for use with the listed control unit and provide an electrical means of transferring the release circuit signal to the Argon system from the main supply to the reserve supply.

The switch contracts shall provide a set of normally open and normally closed contacts.

5.4 **SYSTEM INSPECTION AND TESTING**

The completed installation shall be inspected by authorized personnel and shall include a full operational test of all components per the equipment's manufacturer recommendation including agent discharge.

This shall be done in the presence of the owner's representative and other insuring authority having jurisdiction.

All mechanical and electrical components shall be tested according to the manufacturer's recommended procedure to verify system integrity.

An inspection shall be provided by the contractor. Inspection shall include a complete checkout of the electronic system, and certification of weight and cylinder pressure. A written report shall be filed with the owner.

Two copies of drawings shall be provided by the Contractor indicating the installed details. All routing or piping and electrical conduit and accessories shall be noted.

Equipment, Installation and Maintenance Manuals shall be provided in additions to the as-built drawings. Prior to final acceptance, the contractor shall provide operational training in all concepts of this system to the owner's key personnel. Training shall consist of: -

- i) System Control Unit Operation
- ii) Trouble Procedures
- iii) Abort Procedures
- iv) Emergency Procedures
- v) Safety Requirements
- vi) A functional test shall be completed prior to the concentration test consisting of detection, release alarm, accessories related to system, control unit, and a review of the tanks, piping, fittings, hangers and cylinder pressure.

Concentration test shall be provided under the supervision of the contractor's authorized personnel in the presence of the owner's representative, local authorities and any other insuring authority.

ProInert gas test procedures shall be recommended by equipment manufacturer and the ProInert gas supplier.

The contractor shall provide a 3 chart thermal conductivity gas analyzer capable of automatically recording three sampling points. Concentration recording shall continue until authorities are satisfied with hazard integrity or 10 minutes have elapsed.

The sampling points shall be located at strategic areas but no higher than the highest combustible contents. If the tests results indicate that the design concentration was not achieved and/or held, the contractor shall determine the cause of failure.

After determination of cause, the system should be recharged and again placed in operation. The contractor shall only be responsible to retest based on equipment failure.

SECTION D:
BILLS OF QUANTITIES
AND
SCHEDULE OF UNIT RATES

SECTION D:

BILLS OF QUANTITIES AND SCHEDULE OF UNIT RATES

CONTENTS

<u>CLAUSE No.</u>	<u>PAGE</u>
5.01 GENERAL NOTES TO TENDERERS.....	D-1
5.02 STATEMENT OF COMPLIANCE.....	D-2
5.03 BILLS OF QUANTITIES	D-3 to D-10
5.04 SUMMARY PAGE.....	D-11
5.05 SCHEDULE OF UNIT RATES.....	D-12

5.01 SPECIAL NOTES

1. The Bills of Quantities form part of the contract documents and are to be read in conjunction with the contract drawings and general specifications of materials and works.
2. The prices quoted shall be deemed to include for all obligations under the sub-contract including but not limited to supply of materials, labour, delivery to site, storage on site, installation, testing, commissioning and all taxes (**including 16% VAT**).

In accordance with Government policy, **6% withholding VAT and 3% Withholding Tax shall be deducted** from all payments made to the Tenderer, and the same shall be forwarded to the **Kenya Revenue Authority (KRA)**.

3. All prices omitted from any item, section or part of the Bills of Quantities shall be deemed to have been included to another item, section or part thereof.
4. The brief descriptions of the items given in the Bills of Quantities are for the purpose of establishing a standard to which the sub-contractor shall adhere. Otherwise, alternative brands of **equal and approved** quality will be accepted.

Should the sub-contractor install any material not specified here in before receiving **written approval** from the Project Manager, the sub-contractor shall remove the material in question and, **at his own cost**, install the proper material.

5. The grand total of prices in the price summary page must be carried forward to the **Form of Tender for the tender to be deemed valid**.

Tenderers must enclose, together with their submitted tenders, detailed manufacturer's Brochures detailing Technical Literature and specifications on all the equipment they intend to offer.

5.02 STATEMENT OF COMPLIANCE

- a) I confirm compliance of all clauses of the General Conditions, General Specifications and Particular Specifications in this tender.

- b) I confirm I have not made and will not make any payment to any person, which can be perceived as an inducement to win this tender.

Signed:*for and on behalf of the Tenderer*

Date:

Official Rubber Stamp:

5.03 BILLS OF QUANTITIES

A) PRICING OF PRELIMINARIES ITEMS.

Prices will be inserted against item of preliminaries in the sub-contractor's Bills of Quantities and specification. These Bills are designated as Bill 1 in this Section. Where the sub-contractor fails to insert his price in any item he shall be deemed to have made adequate provision for this on various items in the Bills of Quantities. The preliminaries form part of this contract and together with other Bills of Quantities covers for the costs involved in complying with all the requirements for the proper execution of the whole of the works in the contract.

The Bills of Quantities are divided generally into three sections: -

a. Preliminaries – Bill 1

Sub-contractors' preliminaries are as per those described in section C – sub-contractor preliminaries and conditions of contractor. The sub-contractor shall study the conditions and make provision to cover their cost in this Bill. The number of preliminary items to be priced by the Tenderer has been limited to tangible items such as site office, temporary works and others. However, the Tenderer is free to include and price any other items he deems necessary taking into consideration conditions he is likely to encounter on site.

b. Installation Items – Other Bills

- i. The brief description of the items in these Bills of Quantities should in no way modify or supersede the detailed descriptions in the contract Drawings, conditions of contract and specifications.
- ii. The unit of measurements and observations are as per those described in clause 3.05 of the section

c. Summary

The summary contains tabulation of the separate parts of the Bills of Quantities carried forward with provisional sum, contingencies and any prime cost sums included. The sub-contractor shall insert his totals and enter his grand total tender sum in the space provided below the summary.

This grand total tender sum shall be entered in the Form of Tender provided elsewhere in this document

BILL No. 1 PRELIMINARIES

ITEM	DESCRIPTION	QTY	UNIT	RATE	KSHS
1	Discrepancies clause 1.02				
2	Conditions of sub-contract Agreement clause 1.03				
3	Payments clause 1.04				
4	Site location clause 1.06				
5	Scope of Contract Works clause 1.08				
6	Extent of the Contractor's Duties clause 1.09				
7	Firm price contract clause 1.12				
8	Variation clause 1.13				
9	Prime cost and provisional sum clause 1.14 (insert profit and attendance, which is a percentage of expended PC or provisional sum.)				
10	Bond clause 1.15				
11	Government Legislation and Regulations clause 1.16				
12	Import Duty and Value Added Tax clause 1.17 (Note this clause applies for materials supplied only. VAT will also be paid by the sub-contractor as allowed in the summary page)				
13	Insurance company Fees clause 1.18				
14	Provision of services by the Main contractor clause 1.19				
15	Samples and Materials Generally clause 1.21				
SUB-TOTAL CARRIED TO PAGE..... D-6					

ITEM	DESCRIPTION	QTY	UNIT	RATE	KSHS
16	Supplies clause 1.20				
17	Bills of Quantities clause 1.23				
18	Contractor's Office in Kenya clause 1.24				
19	Builder's Work clause 1.25				
20	Setting to work and Regulating system clause 1.29				
21	Identification of plant components clause 1.30				
22	Working Drawings clause 1.32				
23	Record Drawings (As Installed) and Instructions clause 1.33				
24	Maintenance Manual clause 1.34				
25	Hand over clause 1.35				
26	Painting clause 1.36				
27	Testing and Inspection – manufactured plant clause 1.38				
28	Testing and Inspection – Installation clause 1.39				
29	Storage of Materials clause 1.41				
30	Initial Maintenance clause 1.42				
SUB-TOTAL CARRIED TO PAGE..... D-6					

ITEM	DESCRIPTION	QTY	UNIT	RATE	KSHS
31	Attendance Upon Tradesmen, etc. (Insert percentage only) clause 1.58				
32	Local and other Authorities notices and fees clause 1.60				
33	Temporary Works clause 1.63				
34	Patent Rights clause 1.64				
35	Mobilization and Demobilization Clause 1.65				
36	Extended Preliminaries Clause 1.66(see appendix on page C- 17)				
37	Supervision by Engineer and Site Meetings Clause 1.67				250,000.00
38	Allow for profit and Attendance for the above				
39	Amendment to Scope of Sub-contract Works Clause 1.68				
40	Contractor Obligation and Employers Obligation clause 1.69(see appendix page C- 18)				
41	Any other preliminaries;				
	Subtotal above				
	Sub-total brought forward from page..... D-4				
	Sub-total brought forward from page..... D-5				
TOTAL FOR BILL NO. 1- PRELIMINARIES CARRIED FORWARD TO PRICE MAIN SUMMARY PAGE..... D-11					

SERVER ROOM AUTOMATIC FIRE SUPPRESSION

Item	Description	Qty	Unit	Rate (Kshs)	Amount (Kshs)
	PIPEWORK				
	Supply, deliver and install schedule 40 seamless black steel pipes with screwed and socketed joints to ASTM A53. Tenderers must allow in their pipework prices for all couplings, unions, connectors, reducers, pipe supports etc required for the satisfactory functioning of the fire suppression pipework system.				
	Pipework-(Schedule 40 Seamless black steel pipe)				
A	32mm diameter Schedule 40 Seamless black steel pipe	8	LM		
B	25mm ditto	8	LM		
C	20mm ditto	8	LM		
D	15mm ditto	22	LM		
	Bends/elbow				
E	32mm diameter pipe bend/elbow	2	No		
F	25mm ditto	2	No		
G	20mm ditto	2	No		
H	15mm ditto	15	No		
	Reducers				
I	32mm x 25mm pipe reducer	2	No		
J	32mm x 20mm ditto	2	No		
K	25mm x 20mm ditto	2	No		
L	20mm x 15mm ditto	9	No		
	Tees				
M	32mm diameter equal tee	2	No		
N	25mm ditto	2	No		
O	20mm ditto	6	No		
P	Allow for joining of the pipes and fittings with arc welding	1	Item		
Q	Associated Builders works including sleeves for passage of pipework and fixing of pipe anchors and making good the affected areas	1	Item		
R	Pipework anchorage/hangers	1	Item		
S	Painting of the entire pipework	1	Item		
T	Testing and commissioning of the pipework installation	1	Item		
Total for fire suppression pipework installation c/f to Summary Page D-11					

Item	Description	Qty	Unit	Rate (Kshs)	Amount (Kshs)
	SUPPRESSION SYSTEM				
	Supply , Installation as per computer verification, fixing , testing and commissioning of the following				
A	80Litre, 200 bar nominal charged capacity cylinders charged with Proinert gas and installed as specified in these specification. The cylinders to be complete with flexible discharge hose, check valves, pressure gauge, Low pressure switch and all items necessary for proper functioning of the cylinder installation.	4	No		
B	Solenoid actuator complete with actuator extension hose and cabling	1	No		
C	Pneumatic actuator comprising of a rechargeable nitrogen cylinder of capacity 410mL and discharge pressure switch with flexible hose	1	No		
D	Cylinder support bracket system and timber with rubber base for holding the cylinders in upright position on the floor and lockable steel cage for housing the cylinders	1	No		
E	40mm 4-cylinder manifold	1	No		
E	32mm 2-cylinder manifold	1	No		
F	4 cylinder Single row racking assembly	1	No		
F	2 cylinder Single row racking assembly	1	No		
G	Manifold safety relief valve	2	No		
H	Manual release valves	3	No		
I	32mm pressure reducing valve	3	No		
J	30 sec Pneumatic delay device	2	No		
K	15mm discharge Nozzles of V type and with 4 orifices. The Nozzle discharge to cover 360 degrees.	2	No		
L	25mm ditto	1	No		
M	15mm ditto	2	No		
N	Pressure vents	4	No		
O	Instruction sign "AREA PROTECTED BY PROINERT"	1	No		
P	Instruction sign "MANUAL RELEASE CONTROL POINT"	1	No		
	OTHER WORKS ASSOCIATED WITH THE SUPPRESSION SYSTEM INSTALLATIONS				
Q	Testing and commissioning of the system with 1 No. pilot test cylinder.	1	Item		
Total for other associated works c/f to Summary Page D-11					

FIRE DETECTION AND FIRE ALARM SYSTEMS

Item	Description	Qty	Unit	Rate (Kshs)	Amount (Kshs)
A	<p>Supply, Installation, Testing & Commissioning of the following:-</p> <p>Microprocessor based 4 loop fire alarm control panel fully networkable, expandable with each loop capable of taking 120 devices with expandable feature, 8 line x 40 character alpha-numeric liquid crystal display. The panel shall be soft addressable type. The Panel should be able to store 10,000 log events in its Memory. The panel shall be able to give pin point location of all fire/fault conditions. Further, the panel must be able to automatically switch off respective control switches when ever any alarm is triggered. The panel shall have in built rectifier, Loop cards, L C D unit to indicate Fire/Fault Signal with address and analog output, option of built in printer to log all fire or fault events complete in all respects, integral SMF lead acid batteries with sealed cells of 24 V capable of running for a minimum of 8 hours with integral battery charger complete as required and as per specification VDS & CNBOP approved.</p>	1	No.		
B	Addressable Intelligent multisensor detector, with decentralize intelligence, soft addressable Photo thermal (Dual Optical with Forward and backward scattering & One Thermal Chambers) type, decentralize intelligence with inbuilt fault isolator as per NFPA style 7 wiring complete with base as required	1	No.		
C	Addressable Intelligent multisensor detector, with decentralize intelligence, soft addressable photo thermal type with two inbuilt optical smoke sensors with backward & forward scattering light angles as well as additional heat detector sensor, photo thermal type with inbuilt fault isolator, sounder and flasher with speech complete with base as required.	2	No.		
D	Addressable Intelligent heat detector with decentralize intelligence, soft addressable type with inbuilt fault isolator complete with base as required.	3	No.		
Total For Fire detection and alarm systems c/f to Summary Page F-11					

Item	Description	Qty	Unit	Rate (Kshs)	Amount (Kshs)
A	Addressable Manual Call Point soft addressable type with in built fault isolator complete as required.	3	No.		
B	Control Module	1	No		
C	Releasing Module	1	No		
D	Horn/strobe	4	No		
E	Addressable siren with high intensity having range of 1 km for out door application etc complete as required.	4	No		
G	Fire Alarm points comprising wiring in 1.5mm ² heat resistant cables drawn in 20mmØ concealed HG PVC conduits	4	No.		
H	100mm x 50mm deep three compartment metal trunking constructed from heavy gauge powder coated steel, and shall be complete with all accessories for 2 coupling and earthing but excluding trunking accessories.	100	Lm		
J	Wiring in 1.5mm ² heat resistant cables drawn in 20mmØ concealed HG Galvanized steel conduits	100	No.		
I	Allow for electrical power supply.	1	Item		
	Fire doors				
K	Fire door measuring 850x2200mm. The door should be fire resisting and should comply with the following standards. The door shall be suitably marked by the manufacturer or a test certificate shall be provided stating the performance of the door in accordance with BS 476-22 or BS EN 1634-1. The Fire door should comply with BS 8214:2008. The door to bear the below listed features: to have drop seals on bottom, weather stripping around Jams, Door latching mechanism and door closure.	1	Item		
Total For Fire detection and alarm systems c/f to Summary Page D-11					

**SUMMARY PAGE FOR SERVER ROOM AUTOMATIC FIRE SUPPRESSION
SYSTEM**

Item	Description	Amount (Kshs)
	Automatic Fire Suppression System	
1	Preliminary brought forward from Page D-6	
	Pipework	
2	Total for pipework as b/f from page D-7	
	Suppression System	
3	Total for Suppression System as b/f from page D-8	
	Fire Detection and Alarm System	
4	Total for Other Associated Works as b/f from page D-9	
5	Total for Fire detection and Alarm System as b/f from page D-10	
6	Contingency sum	400,000.00
Total Amount for Administration Block Automatic Fire Suppression System C/f to Main Grand Summary Page		

5.05 SCHEDULE OF UNIT RATES

ITEM	DESCRIPTION	UNIT	RATE (KShs)
1.	Schedule 40 pipe 50mm	LM	
2.	63mm –ditto-	LM	
3.	32 mm Pressure Reducing valve (Pegler)	No.	
4.	40mm - ditto	No.	
5.	Nozzle	No.	
6.	40Litre, 200 bar nominal charged Cylinder	No.	
7.	Gate Valve 50mm diameter	No.	

SECTION E:

TECHNICAL SCHEDULE OF ITEMS TO BE SUPPLIED

SECTION E:

TECHNICAL SCHEDULE OF ITEMS TO BE SUPPLIED

CONTENTS

<u>CLAUSE No.</u>	<u>PAGE</u>
6.01 GENERAL NOTES TO THE TENDERER.....	E-1
6.02 TECHNICAL SCHEDULE.....	E-2

6.01 General Notes to the Tenderer

- 1.1 The tenderer shall submit technical schedules for all materials and equipment upon which he has based his tender sum.
- 1.2 The tenderer shall also submit separate comprehensive descriptive and performance details for all plant apparatus and fittings described in the technical schedules. Manufacturer's literature shall be accepted. Failure to comply with this may have his tender disqualified.
- 1.3 Completion of the technical schedule shall not relieve the Contractor from complying with the requirements of the specifications except as may be approved by the Engineer.

6.02 TECHNICAL SCHEDULE

The tenderer must complete in full the technical schedule. Apart from the information required in the technical schedule, the tenderer **MUST SUBMIT** comprehensive manufacturer’s technical brochures and performance details for all items listed in this schedule (fill forms attached).

ITEM	DESCRIPTION	MANUFACTURER	COUNTRY OF ORIGIN	REMARKS (Catalogue No. etc.)
1.	Gate Valve			
2.	Fire Suppression Cylinder			
3.	Fire Suppression Nozzle			
4.	Schedule 40 pipe			
5.	Thermal Sensors			
6.	Audible Alarm			
7.	Reducing Pressure Valve			

SECTION F:

DRAWING SCHEDULE

CONTENTS

<u>CLAUSE No.</u>	<u>DESCRIPTION</u>	<u>PAGE</u>
7.01	DRAWING SCHEDULE.....	F-1

7.01 DRAWING SCHEDULE:

As shall be provided during project implementation.

SECTION G:

STANDARD FORMS

NOTE:

**ALL FORMS IN THIS SECTION MUST BE FILLED AS THEY SHALL BE PART OF THE
EVALUATION CRITERIA**

STANDARD FORMS

CONTENTS

<u>FORM</u>	<u>PAGE</u>
1. KEY PERSONNEL.....	G-1
2. CONTRACTS COMPLETED IN THE LAST FIVE (5) YEARS.	G-2
3. SCHEDULE OF ON-GOING PROJECTS.....	G-3
4. DETAILS OF LITIGATIONS OR ARBITRATION PROCEEDINGS	G-4
5. SCHEDULE OF MAJOR ITEMS OF CONTRACTOR'S EQUIPMENT PROPOSED FOR CARRYING OUT THE WORKS.....	G-5

1 KEY PERSONNEL

Qualifications and experience of key personnel proposed for administration and execution of the Contract.

POSITION	NAME	YEARS OF EXPERIENCE (GENERAL)	YEARS OF EXPERIENCE IN PROPOSED POSITION
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

I certify that the above information is correct.

.....
Title

.....
Signature

.....
Date

2 CONTRACTS COMPLETED IN THE LAST FIVE (5) YEARS

Work performed on works of a similar nature and volume over the last five years.

<u>PROJECT NAME</u>	<u>NAME OF CLIENT</u>	TYPE OF WORK AND YEAR OF COMPLETION	VALUE OF CONTRACT (Kshs.)

I certify that the above works were successfully carried out and completed by ourselves.

.....
Title

.....
Signature

.....
Date

3 SCHEDULE OF ON-GOING PROJECTS

Details of on-going or committed projects, including expected completion date.

<u>PROJECT NAME</u>	<u>NAME OF CLIENT</u>	<u>CONTRACT SUM</u>	<u>% COMP LETE</u>	<u>COMPLE TION DATE</u>

I certify that the above works are currently being carried out by ourselves.

.....
Title

.....
Signature

.....
Date

3 DETAILS OF LITIGATIONS OR ARBITRATION PROCEEDINGS IN WHICH THE TENDERER IS INVOLVED AS ONE OF THE PARTIES

- 1. _____.
- 2. _____.
- 3. _____.
- 4. _____.
- 5. _____.
- 6. _____.
- 7. _____.
- 8. _____.
- 9. _____.
- 10. _____.

4 SCHEDULE OF MAJOR ITEMS OF CONTRACTOR'S EQUIPMENT PROPOSED FOR CARRYING OUT THE WORKS

ITEM OF EQUIPMENT	DESCRIPTION, MAKE AND AGE (Years)	CONDITION (New, good, poor) and number available	OWNED, LEASED (From whom?), or to be purchased (From whom?)