Request for Quotation (RFQ) for the provision of mechanical design and installation of a New Gas Installation System to the CSIR

RFQ No. 9275/03/02/2021

Date of issue	Tuesday, 19 January 2021
Closing Date and Time	Wednesday, 03 February 2021
Contact details	For submission of quotations or any other enquiries: Email tender@csir.co.za

1 INVITATION FOR QUOTATION

Quotations are hereby invited to supply and install a proposed new laboratory gas installation consisting of new high pressure hydrogen; new high pressure hydrogen / carbon dioxide mixture; new high pressure nitrogen; and the relocation of an existing hydrogen manifold; to the hydrogen laboratories on first floor at CSIR building 15.

2 SCOPE OF WORKS AND DELIVERABLES

The CSIR invites experienced mechanical contractors to submit quotations for a New Gas Reticulation System at the **CSIR Pretoria campus in building 15.** Services must include the supply and the installation of the gas reticulation system.

2.1 General Overview:

- A new laboratory gas installation is to be installed at building 15 from the upgraded gas bank. The gas mains will reticulate from the existing gas bank via an existing pipe bridge to the building. There is an existing pipe bridge and does not form part of this contract. The gas mains will reticulate on the outside of the

building on surface below the window on First Floor before it enters the laboratory in question.

- There are numerous gases with certain gases being highly flammable. ***All gas mains are to be 316 Stainless Steel, suitable with a rated pressure of at least 200 bar. All pipe joints and fittings are to be welded joints, and all welded joints in the laboratories are to be x-rayed.*** All pipe work is surface mounted to the various outlet points in the laboratories as indicated on the drawing.

The laboratory gases consist of Hydrogen; Hydrogen / Carbon Dioxide mixture; Nitrogen; one off relocated Hydrogen manifold and revised pipework.

- Due to the nature of some of the gases, certain safety precautions are being taken for the risk of fire, gas leaks, and safety of the laboratory staff working in the laboratories. The safety precautions include a gas detection system interconnected to an alarm system, which is further interconnected to solenoid isolating valves.
- All pipework and fittings are to be specified as oxygen cleaned prior to installation to avoid side reactions that could cause a hazard to the staff operating in the laboratories.
- In general the main reticulation pipework will be 1/4" with welded fittings.

A. Hydrogen:

The Hydrogen manifold will consist of a 2x1 manual change over manifold, complete with midrail and chain, multistage regulator and purge valves, and stainless steel braided serpentine, solenoid valve and flashback arrestor.
Similarly the Hydrogen will be reticulated to the First Floor on surface in 316 Stainless Steel piping.
Each termination point will consist of an isolating valve, flashback arrestor with in line regulator complete with pressure gauges with connection suitable for laboratory equipment. The isolating valve and in line regulator with pressure gauge will be mounted on a powder coated bracket suitable to be mounted against the wall. The colour of the powder coating is to be finalised with the client.

B. Hydrogen / Carbon Dioxide Mixture:

The Hydrogen / Carbon Dioxide manifold will consist of 2x1 manual change over manifold, complete with midrail and chain, multistage regulator and purge valves, and stainless steel braided serpentine, solenoid valve and flashback arrestor. The final type of manifold is to be finalised and advised.
Similarly the Hydrogen / Carbon Dioxide will be reticulated to the First Floor on surface in 316 Stainless Steel piping.
Each termination point will consist of an isolating valve with in line regulator flashback arrestor, complete with pressure gauge with connection suitable for laboratory equipment. The isolating valve and in line regulator with pressure gauge will be mounted on a powder coated bracket suitable to be mounted against the wall. The colour of the powder coating is to be finalised with the client.

C. Nitrogen:

The Nitrogen manifold will consist of a 2x1 manual change over manifold, complete with midrail and chain, multistage regulator and purge valves, and stainless steel braided serpentine. The final type of manifold is to be finalised and advised.
Similarly the Nitrogen will be reticulated to the First Floor on surface in 316 Stainless Steel piping.
Each termination point will consist of an isolating valve with in line regulator complete with pressure gauge with connection suitable for laboratory equipment. The isolating valve and in line regulator with pressure gauge will be mounted on a powder coated bracket suitable to be mounted against the wall. The colour of the powder coating is to be finalised with the client.

D. Existing Relocated Hydrogen Manifold:

The existing Hydrogen manifold to be relocated consist of a 2x1 manual change over manifold, complete with midrail and chain, multistage regulator and purge valves, and stainless steel braided serpentine. Additional flashback arrestor and solenoid valve will be added to the existing Hydrogen manifold.

The new pipework of the relocated Hydrogen manifold will be connect into the existing 316 Stainless Steel piping which reticulates to the laboratory.
The redundant pipe from the existing installation which will no longer be required and in use will be removed and handed over to the client.

E. Existing Gasbank:

The existing gasbank shall be upgraded with the addition of a new wing consisting of two gas cubicles for the storage of high pressure Hydrogen and the Hydrogen / Carbon Dioxide mixture. The wing will consist of a screen wall, two side walls and another wall on the end of the gas bank and two steel gates. All gas pipes shall be sleeved where pipes pass through walls and slabs, and sealed with suitable flie gauze. Warning notices shall be positioned adjacent to the valves clearly and prominently stating that the valves shall not be closed by unauthorised persons. All relevant safety signs must be mounted at the gasbank i.e no naked flame, no smoking, flammable and danger. All new brickwork and concrete work for the floor as well as roof is to match the existing work. All steel gates and steelwork is to match the existing steelwork.

F. Safety Alarm System:

At the Hydrogen manifolds an inline solenoid valve will be installed in the gas line. The valves will be 24V operated and will be normally closed. The valves will all have an electrical override. The valves will be spark proof and suitable for flammable gases with a working pressure up to 200 bar.
The solenoid valves for the Hydrogen, Hydrogen / Carbon Dioxide and relocated Hydrogen manifolds shall be intrinsic safe and comply to class 1 division 1.
The valves will be of the type Bürkett or approved equal.

The valve will be activated and closed under the following conditions:

- Power failure: Should there be a power failure the solenoid valves will shut down.

- Gas detection by the gas alarm system. Should there be a gas leak and the gas detectors sense the excessive gas and are activated, the solenoid valves will shut down.
- Panic button activation. Should the panic button/s be activated the solenoid valves will shut down.
- Excessive pressure drop, due to pipe rupture, activating a pressure switch. Should there be a sudden pressure drop in the line the solenoid valves will shut down.
- The solenoid valves have to be reset once they have shut down, due to any of the possible states that could have activated these valves.

Further the solenoid valves, gas detectors and the alarm panel are to be inter connected. The alarm panel is to be 12V with a back up battery. The alarm panel will indicate the various gases with a normal and failure state, with an audible alarm, test button, alarm accept button. The normal state of the various gases will be indicated by green lights, and the alarm state will be indicated by red lights.

The alarm panel will be installed in the passage as indicated on the drawing.
The regulators, inline regulators for gases Hydrogen; Hydrogen / Carbon Dioxide; Nitrogen; Teskom Stainless suitable for instrument grade gases.
The regulators shall be of type Teskom or approved equal.

G. UPS Facilities:

A UPS facility is to be provided for and is part of this contract to cater for the solenoid valves, as well as the alarm system.

H. Additional DCP Fire Extinguishers:

- The contractor is to install an additional 4,5 kg DCP fire extinguisher in the passage as indicated.
- The contractor is to install an additional 9 kg DCP fire extinguisher at the gasbank as indicated on the drawing.

I. Termination points at the laboratories:

The termination points at the laboratories will be according to detail by the client, to facilitate isolating valves.

NOTE:
ALL REGULATORS, SOLENOID VALVES, FLASHBACK ARRESTORS, ISOLATING VALVES, PIPES AND FITTINGS ARE TO BE CERTIFIED OXYGEN CLEAN.

3 QUOTATION REQUIREMENTS

Quotations are requested from mechanical contractors' firms with a proven track record. It will be expected of the firms to possess the following:

- Proven records of managing gas reticulation projects.
- South African Qualification and Certification Committee (SAQCC) Gas registered for the installation and maintenance of the specific categories of gases listed under clause 2 above.
- On site project management and cost management.
- The services are required immediately from date of appointment.
- A JBCC Minor Works contract will be signed as a form of agreement.
- The supplier must quote on all the items listed on the BOQ and submit, duly completed, with their quotation
- Supplier must:
    - complete and submit their quotation on the Form of Tender, under Part C1.1 Clause E of the Minor Works Agreement: Contract Data, included in the tender specification document
    - Submit all Returnable Schedules, duly completed, included in Part T2 of the tender specification document

Mandatory documents required/ Returnables:

- The service provider must provide a CIDB certification of 2ME or higher

- Three written testimonial letters for similar work done recently- in the last 3 years. We do not want appointment letters or purchase orders. (For similar supply and installing of gas reticulation systems).
- Provide a list of similar projects which indicates: description of works, client, year when the works were completed, and contact details of the responsible person of the client, for the project listed.
- Proof of SAQCC Gas registered certification or registration
- Registration with COID. Proof of valid registration or certification must be submitted.
- The supplier must submit a detailed project plan and timelines.

Supporting information/ Annexes:

Annex A: General conditions

Annex B: Technical Specification and Bill of Quantities (BOQ).

Annex C: Site Drawing

Annex D: Gas Storage and Reticulation layout

4 EVALUATION CRITERIA

4.1 Selection of suppliers will be based on the 80/20 preference point system.

4.2 Indicate valid B-BBEE status on quotation. No B-BBEE status will equal zero points.

4.3 Indicate CSD number (National Treasury Central Supplier Database) on quotation. If not registered yet on CSD, use www.csd.gov.za to register. - Please ensure that the tax status on CSD is updated and compliant.

4.4 No order will be issued or no contract will be signed without a valid CSD number.

4.5 Elimination criteria;

Suppliers will be disqualified under the following conditions:

- Non-submission of CIDB certificate of 2ME or higher
- Non-submission of at least a minimum three (3) testimonial letters on similar work done OR list of contactable references
- Non-submission of any mandatory or returnable documents

- Non-submission of proof of SAQCC Gas registered certification for the certified individual (s) who will be performing the installation and maintenance of the installation and issue the Certificate of Conformity.

5 PROCEDURE FOR SUBMISSION OF QUOTATIONS

- All quotations must be submitted electronically to: **tender@csir.co.za**
- Respondents must use the RFQ number as the subject reference number when submitting their bids
- The email and file sizes should not exceed a total of 30mb per email
- The naming / labelling syntax of files or documents must be short and simple (e.g. BBBEE Certificate)
- Each bidder will be limited to send two emails with their submissions, and the subject of the email must clearly reference the bidder name and RFQ number
- All documents submitted electronically via email must be clearly visible.
- Tenders or documents received after the closing date and time will be considered as a late submission. Late submissions will not be evaluated.

NB: NO HARD COPIES OR PHYSICAL SUBMISSIONS WILL BE ACCEPTED

6 PRICING QUOTATION

6.1 Price needs to be provided in South African Rand (excl. VAT), with details on price elements that are subject to escalation and exchange rate fluctuations clearly indicated.

6.2 Price should include additional cost elements such as freight, insurance until acceptance, duty where applicable, etc.

6.3 Payment will be according to the CSIR Payment Terms and Conditions.

6.4 The prices shall be fixed and shall not be subject to any escalation.

7 SUB-CONTRACTING

7.1 A tenderer will not be awarded points for B-BBEE status level if it is indicated in the tender documents that such a tenderer intends sub-contracting more than 25% of the

value of the contract to any other enterprise that does not qualify for at least the points that such a tenderer qualifies for, unless the intended sub-contractor is an exempted micro enterprise that has the capability and ability to execute the sub-contract.

7.2 A tenderer awarded a contract may not sub-contract more than 25% of the value of the contract to any other enterprise that does not have an equal or higher B-BBEE status level than the person concerned, unless the contract is sub-contracted to an exempted micro enterprise that has the capability and ability to execute the sub-contract.

7.3 If the tender intends to sub-contract, they must indicate the value of the work in Rands to be sub-contracted in relation to the total tendered amount. The supplier must also indicate the name(s) of the company / contractor.

7.4 All BBBEE certificates of the sub-contractors must also be submitted. Non-submission will result in 0 points being awarded for BBBEE.

7.5 In case of proposal from a joint venture, the following must be submitted together with the proposal/Quotation:

- Joint venture Agreement including split of work signed by both parties;
- The original or certified copy of the B-BBEE certificate of the joint venture;
- The Tax Clearance Certificate of each joint venture member;
- Proof of ownership/shareholder certificates/copies; and
- Company registration certificates

8 CORRECTNESS OF RESPONSES

8.1 The tenderer must confirm satisfaction regarding the correctness and validity of their proposal and that all prices and rates quoted cover all the work/items specified in the RFQ. The prices and rates quoted must cover all obligations under any resulting contract.

8.2 The tenderer accepts that any mistakes regarding prices and calculations will be at their own risk.

9 ADDITIONAL TERMS AND CONDITIONS

9.1 A tenderer shall not assume that information and/or documents supplied to CSIR, at any time prior to this request, are still available to CSIR, and shall consequently not make any reference to such information document in its response to this request.

9.2 Copies of any affiliations, memberships and/or accreditations that support your submission must be included in the tender.

9.3 An omission to disclose material information, a factual inaccuracy, and/or a misrepresentation of fact may result in the disqualification of a tender, or cancellation of any subsequent contract.

9.4 Failure to comply with any of the terms and conditions as set out in this document will invalidate the Quotation.

10 OTHER TERMS AND CONDITIONS

10.1 The supplier shall under no circumstances offer, promise or make any gift, payment, loan, reward, inducement, benefit or other advantage, which may be construed as being made to solicit any favour, to any CSIR employee or its representatives.

10.2 Such an act shall constitute a material breach of the Agreement and the CSIR shall be entitled to terminate the Agreement forthwith, without prejudice to any of its rights.

11 CSIR RESERVES THE RIGHT TO

11.1 Extend the closing date;

11.2 Verify any information contained in a proposal;

11.3 Request documentary proof regarding any tendering issue;

11.4 Appoint one or more service providers, separately or jointly (whether or not they submitted a joint proposal);

11.5 Award this RFQ as a whole or in part;

11.6 Cancel or withdraw this RFQ as a whole or in part

12 DISCLAIMER

This RFQ is a request for quotations only and not an offer document. Answers to this RFQ must not be construed as acceptance of an offer or imply the existence of a contract between the parties. By submission of its quotation, tenderers shall be deemed to have satisfied themselves with and to have accepted all Terms & Conditions of this RFQ. The CSIR makes no representation, warranty, assurance, guarantee or endorsements to tenderer concerning the RFQ, whether with regard to its accuracy, completeness or otherwise and the CSIR shall have no liability towards the tenderer or any other party in connection therewith.

13 OTHER TERMS AND CONDITIONS

13.1 The supplier shall under no circumstances offer, promise or make any gift, payment, loan, reward, inducement, benefit or other advantage, which may be construed as being made to solicit any favour, to any CSIR employee or its representatives. Such an act shall constitute a material breach of the Agreement and the CSIR shall be entitled to terminate the Agreement forthwith, without prejudice to any of its rights.

13.2 A validity period of 90 days will apply to all quotations except where indicated differently on the quote.

14 No goods and/or services should be delivered to the CSIR without an official CSIR Purchase order. CSIR purchase order number must be quoted on the invoice. Invoices without CSIR purchase order numbers will be returned to supplier.

15 Note: This is not a Purchase Order.

Annexure A: General conditions

1 EXISTING WORK

The Contractor must protect the existing building, goods and works against damage during the execution of the works. Any damage caused to existing works shall be for the account of the Contractor. The work is to be executed in the existing building and shall be co-ordinated with the employer.

16 TOILETS AND ABLUTIONS

The Contractor's personnel will have free access to existing toilets, which shall be identified by the Contractor.

17 THE WORKS

The Contractor must in the same way protect his own equipment, material and works against loss or damage by others. All repairs, improvements or removal and replacement of damaged or unacceptable work shall be the responsibility of the Contractor or carried out at his expense.

18 CLEANING OF THE SITE

The Contractor shall remove all material and rubbish deposited by him from the site during construction and on completion of his work.

19 SCAFFOLDING AND HOISTING

The Contractor shall be responsible for the supply of all hoisting and scaffolding equipment which is necessary to perform the work, and shall include all the costs there-of in his quotation.

20 THE STORAGE FACILITIES

The erection of storage facilities for equipment and unfixed materials (if needed) will be the responsibility of the Contractor. Space for such a facility will be identified by the Employer.

21 FIRST YEAR'S MAINTENANCE

The Contractor shall maintain the installation for a period of one year after handing over and shall supply all spare parts, lubricants, and other consumables required during this first year operating period, taking into consideration fair wear and tear due to the nature of the corrosive gases.

22 SHOP DRAWINGS AND EQUIPMENT SUBMISSIONS

The Contractor will be required to submit shop drawings and full details of equipment to the engineer for approval, prior to the installation of materials and equipment, should he deviate from the equipment specified.

23 INSTALLATION INSTRUCTIONS AND MANUALS

Prior to handing over of the installation, the contractor shall furnish to the engineer three copies of indexed loose leaf manuals containing the information for the installation covered by this contract.
The contractor shall provide 3 sets “as built” drawings and O & M manuals.

24 INSURANCE

Insurance of materials and equipment during the construction period will be the responsibility of the Contractor.

25 PAINTING, CODING AND IDENTIFICATION

All pipework shall be coded as specified in SABS 051: Part III Latest amendment.

26 MATERIALS, INSTALLATION AND TESTING

All the pipework shall be 316 Stainless Steel, suitable with a rated pressure of at least 200 bar.
All pipework will be in PVC sleeves where the pipework passes through walls, slabs. The pipework will be sealed where it passes through the sleeves.
No makeshift fittings will be permitted.
All pipework and fittings should be oxygen cleaned to avoid possible reactions with the specified gases.
All joints and fittings to be welded. All welded joints inside the laboratory to be x-rayed.
After completion of the installation the system is to be purged with Nitrogen and pressure tested for 24 Hours to $1^1/_2$ times working pressure to the satisfaction of the Engineer.
Thereafter the installation shall be handed over to the client.

27 PROGRAMME OF WORK

Work shall be done to suit the general building programme as required by, and after consulting with the Employer
The building programme to be advised

Annexure B: Technical Specification and Bill of Quantities (BOQ)

C.S.I.R. Building Number 15

Page 1

BILL NO. 1 : Laboratory Gas Installation First Floor

ITEM No.	DESCRIPTION	UNIT	QTY
	This bill shall be priced to provide a complete installation		
1	Supply Laboratory Gas fittings		
1.1	**Gasbank**		
	Supply multistage regulator for a 2x1 manual change over manifold, complete with braided stainless steel serpentine, pressure gauges, midrail and chain for **Hydrogen Gas downstream pressure 200 bar**	no.	1
	Supply multistage regulator for a 2x1 manual change over manifold, complete with braided stainless steel serpentine, pressure gauges, midrail and chain for **Hydrogen / Carbon Dioxide downstream pressure 200 bar.**	no.	1
	Supply for a 2x1 manual change over manifold, complete with braided stainless steel serpentine, pressure gauges, midrail and chain for **Nitrogen Gas downstream pressure 200 bar.**	no.	1
1.2	**MeOH Reactor**		
	Supply end of use regulator multistage Stainless Steel complete with pressure gauge and isolating valve for **Nitrogen Gas** suitable for **200 bar working pressure.**	no.	1
	Supply end of use regulator multistage Stainless Steel complete with pressure gauge and isolating valve for **Hydrogen Gas** suitable for **200 bar working pressure.**	no.	1
	Supply end of use regulator multistage Stainless Steel complete with pressure gauge and isolating valve for **Hydrogen / Carbon Dioxide Gas** suitable for **200 bar working pressure.**	no.	1
	Charge / Dischage Demo		

C.S.I.R. Building Number 15

BILL NO. 1 : Laboratory Gas Installation First Floor

ITEM No.	DESCRIPTION	UNIT	QTY
	Supply end of use regulator multistage Stainless Steel complete with pressure gauge and isolating valve for Hydrogen **Gas suitable for 200 bar working pressure.**	no.	1
1.3	**PCT Pro**		
	Supply end of use regulator multistage Stainless Steel complete with pressure gauge and isolating valve for **Hydrogen Gas suitable for 200 bar working pressure**.	no.	1
1.4	**Gas Bank**		
	Relocated existing Hydrogen manifold		
	Solenoid valve normally closed Oxygen clean intrinsic safe class 1 devision 1 suitable for working pressure of 50 bar	no.	1
	Flashback Arrestor Oxygen clean suitable for 50 bar working presure	no.	1
	Globe isolating valve Oxygen clean suitable for 50 bar working presure	no.	1
	New High Pressure Hydrogen manifold		
	Solenoid valve normally closed Oxygen clean intrinsic safe class 1 devision 1 suitable for working pressure of 200 bar	no.	1
	Flashback Arrestor Oxygen clean suitable for 200 bar working presure	no.	1
	Globe isolating valve Oxygen clean suitable for 200 bar working presure	no.	1
	Emergency Globe isolating valve Oxygen clean suitable for 200 bar working presure	no.	1
	New High Pressure Hydrogen / Carbon Dioxide manifold		
	Solenoid valve normally closed Oxygen clean intrinsic safe class 1 devision 1 suitable for working pressure of 200 bar	no.	1
	Flashback Arrestor Oxygen clean suitable for 200 bar working presure	no.	1
	Globe isolating valve Oxygen clean suitable for 200 bar working presure	no.	1
	Emergency Globe isolating valve Oxygen clean suitable for 200 bar working presure	no.	1

C.S.I.R. Building Number 15

BILL NO. 1 : Laboratory Gas Installation First Floor

ITEM No.	DESCRIPTION	UNIT	QTY
	New High Pressure Nitrogen manifold		
	Solenoid valve normally closed Oxygen clean intrinsic safe class 1 devision 1 suitable for working pressure of 200 bar	no.	1
	Globe isolating valve Oxygen clean suitable for 200 bar working presure	no.	1
	Emergency Globe isolating valve Oxygen clean suitable for 200 bar working presure	no.	1
1.5	**MeOH reactor**		
	New High Pressure Nitrogen		
	Globe isolating valve Oxygen clean suitable for 200 bar working presure	no.	1
	New High Pressure Hydrogen / Carbon Dioxide		
	Supply end of use regulator Stainless Steel complete with pressure gauge and isolating valve for **Hydrogen / Carbon Dioxide Gas suitable for 200 bar working pressure**.	no.	1
	Flashback Arrestor Oxygen clean suitable for 200 bar working presure	no.	1
	Globe isolating valve Oxygen clean suitable for 200 bar working presure	no.	1
	New High Pressure Hydrogen		
	Supply end of use regulator Stainless Steel complete with pressure gauge and isolating valve for **Hydrogen Gas suitable for 200 bar working pressure**.	no.	1
	Flashback Arrestor Oxygen clean suitable for 200 bar working presure	no.	1
	Globe isolating valve Oxygen clean suitable for 200 bar working presure	no.	4
	3 way regulating valve Oxygen clean suitable for 200 bar working presure	no.	2

C.S.I.R. Building Number 15

BILL NO. 1 : Laboratory Gas Installation First Floor

ITEM No.	DESCRIPTION	UNIT	QTY
1.6	**Charge / Discharge**		
	Globe isolating valve Oxygen clean suitable for 200 bar working presure	no.	1
1.7	**Pipework and Fittings**		
	Relocation of Hydrogen Manifold		
	Remove existing redundant piping and hand over to the client		
	3/8" 316 Stainless Steel Piping	m	4
	3/8" 316 Stainless Steel Couplers	no.	0
	3/8" 316 Stainless Steel Elbows	no.	6
	3/8" 316 Stainless Steel Tees	no.	0
	7/8" P.V.C. Sleeves	no.	1
	3/8" Pipe Holder Bats	no.	6
	New High Pressure Hydrogen		
	1/4" 316 Stainless Steel Piping	m	42
	1/4" 316 Stainless Steel Elbows	no.	20
	1/4" 316 Stainless Steel Tees	no.	3
	1/4" Pipe Holder Bats	no.	45

	7/8" P.V.C. Sleeves	no.	6
	New High Pressure Hydrogen / Carbon Dioxide		
	1/4" 316 Stainless Steel Piping	m	42
	1/4" 316 Stainless Steel Elbows	no.	20
	1/4" 316 Stainless Steel Tees	no.	3
	1/4" Pipe Holder Bats	no.	45
	7/8" P.V.C. Sleeves	no.	6
	New High Pressure Nitrogen		
	1/4" 316 Stainless Steel Piping	m	42
	1/4" 316 Stainless Steel Elbows	no.	20
	1/4" 316 Stainless Steel Tees	no.	3
	1/4" Pipe Holder Bats	no.	45
	7/8" P.V.C. Sleeves	no.	6
1.8	**UPS**		
	Supply UPS System to facitate power to solenoid valves, alarm panel.	no.	1

C.S.I.R. Building Number 15

BILL NO. 1 : Laboratory Gas Installation First Floor

ITEM No.	DESCRIPTION	UNIT	QTY
1.9	**In line Pressure switches**		
	Supply low pressure switches linked to the alarm panel system to indicate warning in case of a rapid pressure drop in the gas main.	item	1
1.10	**Additional Panic Button**		
	Supply panic button as indicated on the drawing and link to existing panic button and alarm system	item	1
1.11	**Additional gas detection sensors**		
	Supply hydrogen gas detectors in the Hydrogen laboratory to detect any gas leaks at the various testing equipment and link to existing gas detection system and alarm panel	no	3
1.12	**Additional 4,5 kg DCP fire extinguishers**		
	Supply 4,5 kg DCP fire extinguishers at the laboratory as indicated on the drawing	no.	1
1.13	**Additional 9 kg DCP fire extinguishers**		
	Supply 9 kg DCP fire extinguishers at the gasbank as indicated on the drawing	no.	1
1.14	**Safety Signage**		
	Supply new safety signage at the gasbank and at the laboratory as per drawing	item	1