

## BILL NO. 1 : Laboratory Gas Installation First Floor

ITEM No.	DESCRIPTION	UNIT	QTY	RATE	TOTAL
<b>1</b>	This bill shall be priced to provide a complete installation Supply, Install, Test and Commission the Laboratory Gas Installation				
<b>1.1</b>	<b>Gasbank</b>				
	Supply and install multistage regulator type Tescom 443464S24 for a 2x1 manual change over manifold, complete with braided stainless steel serpentine, pressure gauges, midrail and chain for <b>Hydrogen Gas downstream pressure 200 bar</b>	no.	1		ZAR 0.00
	Relocate and install existing multistage regulator type Tescom 443464S24 for a 2x1 manual change over manifold, complete with braided stainless steel serpentine, pressure gages, midrail and chain for <b>Hvdroaen Gas.</b>	no.	1		ZAR 0.00
	Supply and install multistage regulator type Tescom 443464S24 for a 2x1 manual change over manifold, complete with braided stainless steel serpentine, pressure gauges, midrail and chain for <b>Hydrogen / Carbon Dioxide downstream pressure 200 bar.</b>	no.	1		ZAR 0.00
	Supply and install multistage regulator type Tescom 443464S24 for a 2x1 manual change over manifold, complete with braided stainless steel serpentine, pressure gauges, midrail and chain for <b>Nitrogen Gas downstream pressure 200 bar.</b>	no.	1		ZAR 0.00
	<b>East Gasbank for Ground Floor</b> Remove existing not in use existing <b>Nitrogen 2x1 manual change over manifold</b> and hand over to the client.	no.	1		ZAR 0.00
	Extend the existing N2 pipework through wall and tie into the <b>West Gasbank for First Floor</b> existing N2 main from the existing <b>Nitrogen 2x1 manual change over manifold for First floor.</b> Cut in with a T - piece and install a globe isolating	no.	1		ZAR 0.00
<b>1.2</b>	<b>MeOH Reactor</b>				
	Supply and install end of use regulator type Teskom 44-3400 multistage Stainless Steel complete with pressure gauge and isolating valve for <b>Nitrogen Gas</b> suitable for <b>200 bar working pressure.</b>	no.	1		ZAR 0.00
	Supply and install end of use regulator type Teskom 44-3400 multistage Stainless Steel complete with pressure gauge and isolating valve for <b>Hydrogen Gas</b> suitable for <b>200 bar workinga pressure.</b>	no.	1		ZAR 0.00
	Supply and install end of use regulator type Teskom 44-3400 multistage Stainless Steel complete with pressure gauge and isolating valve for <b>Hydrogen / Carbon Dioxide Gas</b> suitable for <b>200 bar workina pressure.</b>	no.	1		ZAR 0.00
	<b>TOTAL CARRIED FORWARD</b>				ZAR 0.00

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ITEM No.	DESCRIPTION	UNIT	QTY	RATE	TOTAL
	<b>TOTAL CARRIED FORWARD FROM PREVIOUS PAGE</b>				ZAR 0.00
<b>1.3</b>	<b>Continuous Flow Reactor</b>				
	Supply and install end of use regulator type Teskom 44-3400 multistage Stainless Steel complete with pressure gauge and isolating valve for <b>Hydrogen Gas suitable for 200 bar working pressure.</b>	no.	1		ZAR 0.00
	Supply and install end of use regulator type Teskom 44-2200 Stainless Steel complete with pressure gauge and isolating valve for <b>Hydrogen / Carbon Dioxide Gas suitable for 200 bar working pressure.</b>	no.	1		ZAR 0.00
	Supply and install end of use regulator type Teskom 44-2200 Stainless Steel complete with pressure gauge and isolating valve for <b>Nitrogen Gas suitable for 200 bar working pressure.</b>	no.	1		ZAR 0.00
	Globe isolating valve Oxygen clean suitable for 200 bar working pressure	no.	5		ZAR 0.00
	Oxygen clean non return valve suitable fro 200 bar working pressure	no.	3		ZAR 0.00
<b>1.4</b>	<b>PCT Pro</b>				
	Supply and install end of use regulator type Teskom 44-3400 multistage Stainless Steel complete with pressure gauge and isolating valve for <b>Hydrogen Gas suitable for 200 bar</b>	no.	1		ZAR 0.00
	Globe isolating valve Oxygen clean suitable for 200 bar working pressure	no.	2		ZAR 0.00
	Oxygen clean non return valve suitable fro 200 bar working pressure	no.	2		ZAR 0.00
<b>1.5</b>	<b>Gas Bank</b>				
	<b>Relocated existing Hydrogen manifold</b>				
	Solenoid valve normally closed Oxygen clean intrinsic safe class 1 deviation 1 suitable for working pressure of 50 bar	no.	1		ZAR 0.00
	Flashback Arrestor Oxygen clean suitable for 50 bar working pressure	no.	1		ZAR 0.00
	Globe isolating valve Oxygen clean suitable for 50 bar working pressure	no.	1		ZAR 0.00
	<b>TOTAL CARRIED FORWARD</b>				ZAR 0.00

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ITEM No.	DESCRIPTION	UNIT	QTY	RATE	TOTAL
	<b>TOTAL CARRIED FORWARD FROM PREVIOUS PAGE</b>				ZAR 0.00
	<b>New High Pressure Hydrogen manifold</b>				
	Solenoid valve normally closed Oxygen clean intrinsic safe class 1 deviation 1 suitable for working pressure of 200 bar	no.	1		ZAR 0.00
	Flashback Arrestor Oxygen clean suitable for 200 bar working presure	no.	1		ZAR 0.00
	Globe isolating valve Oxygen clean suitable for 200 bar working presure	no.	1		ZAR 0.00
	Emergency Globe isolating valve Oxygen clean suitable for 200 bar working presure	no.	1		ZAR 0.00
	<b>New High Pressure Hydrogen / Carbon Dioxide manifold</b>				
	Solenoid valve normally closed Oxygen clean intrinsic safe class 1 deviation 1 suitable for working pressure of 200 bar	no.	1		ZAR 0.00
	Flashback Arrestor Oxygen clean suitable for 200 bar working presure	no.	1		ZAR 0.00
	Globe isolating valve Oxygen clean suitable for 200 bar	no.	1		ZAR 0.00
	Emergency Globe isolating valve Oxygen clean suitable for 200 bar working presure	no.	1		ZAR 0.00
	Emergency Globe isolating valve Oxygen clean suitable for 200 bar working presure	no.	1		ZAR 0.00
1.6	<b>MeOH reactor</b>				
	<b>New High Pressure Nitrogen</b>				
	Globe isolating valve Oxygen clean suitable for 200 bar working presure	no.	1		ZAR 0.00
	<b>New High Pressure Hydrogen / Carbon Dioxide</b>				
	Supply and install end of use regulator type Teskom 44-2200 Stainless Steel complete with pressure gauge and isolating valve for <b>Hydrogen / Carbon Dioxide Gas suitable for 200 bar working pressure.</b>	no.	1		ZAR 0.00
	Flashback Arrestor Oxygen clean suitable for 200 bar working presure	no.	4		ZAR 0.00
	Globe isolating valve Oxygen clean suitable for 200 bar working presure	no.	4		ZAR 0.00
	Oxygen clean 4 Way Isolating valve suitable for 200 bar working pressure	no.	1		ZAR 0.00
	Oxygen clean Non Return valve suitable for 200 bar working pressure	no.	3		ZAR 0.00
	<b>TOTAL CARRIED FORWARD</b>				ZAR 0.00

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ITEM No.	DESCRIPTION	UNIT	QTY	RATE	TOTAL
	<b>TOTAL CARRIED FORWARD FROM PREVIOUS PAGE</b>				ZAR 0.00
	<b>New High Pressure Hydrogen</b>				
	Supply and install end of use regulator type Teskom 44-2200 Stainless Steel complete with pressure gauge and isolating valve for <b>Hydrogen Gas suitable for 200 bar working pressure.</b>	no.	1		ZAR 0.00
	Flashback Arrestor Oxygen clean suitable for 200 bar working pressure	no.	1		ZAR 0.00
	Globe isolating valve Oxygen clean suitable for 200 bar working pressure	no.	4		ZAR 0.00
	3 way regulating valve Oxygen clean suitable for 200 bar working pressure	no.	2		ZAR 0.00
<b>1.7</b>	<b>Flow Control Regulators</b>				
	Supply and install regulator type Teskom 44-2200 Stainless Steel complete with pressure gauge and isolating valves before and after the regulators for <b>Nitrogen; Hydrogen; Hydrogen / Carbon Dioxide Gas suitable for 200 bar working pressure.</b>	no.	3		ZAR 0.00
<b>1.8</b>	<b>Pipework and Fittings</b>				
	<b>Relocation of existing Hydrogen Manifold</b>				
	Remove existing redundant piping and hand over to the client				
	3/8" 316 Stainless Steel Piping	m	4		ZAR 0.00
	3/8" 316 Stainless Steel Couplers	no.	0		ZAR 0.00
	3/8" 316 Stainless Steel Elbows	no.	6		ZAR 0.00
	3/8" 316 Stainless Steel Tees	no.	0		ZAR 0.00
	7/8" P.V.C. Sleeves	no.	1		ZAR 0.00
	3/8" Pipe Holder Bats	no.	6		ZAR 0.00
	<b>New High Pressure Hydrogen</b>				
	1/4" 316 Stainless Steel Piping	m	52		ZAR 0.00
	1/4" 316 Stainless Steel Elbows	no.	24		ZAR 0.00
	1/4" 316 Stainless Steel Tees	no.	3		ZAR 0.00
	1/4" Pipe Holder Bats	no.	50		ZAR 0.00
	7/8" P.V.C. Sleeves	no.	6		ZAR 0.00
	<b>TOTAL CARRIED FORWARD</b>				ZAR 0.00

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	<b>TOTAL CARRIED FORWARD FROM PREVIOUS PAGE</b>				ZAR 0.00
	<b>New High Pressure Hydrogen / Carbon Dioxide</b>				
	1/4" 316 Stainless Steel Piping	m	52		ZAR 0.00
	1/4" 316 Stainless Steel Elbows	no.	24		ZAR 0.00
	1/4" 316 Stainless Steel Tees	no.	3		ZAR 0.00
	1/4" Pipe Holder Bats	no.	50		ZAR 0.00
	7/8" P.V.C. Sleeves	no.	6		ZAR 0.00
	<b>New High Pressure Nitrogen</b>				
	1/4" 316 Stainless Steel Piping	m	42		ZAR 0.00
	1/4" 316 Stainless Steel Elbows	no.	20		ZAR 0.00
	1/4" 316 Stainless Steel Tees	no.	3		ZAR 0.00
	1/4" Pipe Holder Bats	no.	45		ZAR 0.00
	7/8" P.V.C. Sleeves	no.	6		ZAR 0.00
	<b>Fittings</b>				
	1/4" 316 Stainless Steel Fittings	no.	24		ZAR 0.00
<b>1.9</b>	<b>CABLE TRAY</b>				
	200 x 100 cable tray to be mounted against columns and wall to house new gas mains	m	14		ZAR 0.00
<b>1.10</b>	<b>UPS</b>				
	Supply and install UPS System to facilitate power to solenoid valves, alarm panel.	no.	1		ZAR 0.00
<b>1.11</b>	<b>Upgrade existing alarm panel and system</b>				
	Upgrade existing alarm panel and system to link to solenoid valves, low pressure sensors, new and existing panic buttons, new and existing Hydrogen gas detectors.	no.	1		ZAR 0.00
<b>1.12</b>	<b>In line Pressure switches</b>				
	supply and install 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		ZAR 0.00
<b>1.13</b>	<b>Additional Panic Button</b>				
	Supply and install additional panic button as indicated on the drawing and link to existing panic button and alarm system	item	1		ZAR 0.00
	<b>TOTAL CARRIED FORWARD</b>				ZAR 0.00

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ITEM No.	DESCRIPTION	UNIT	QTY	RATE	TOTAL
	<b>TOTAL CARRIED FORWARD FROM PREVIOUS PAGE</b>				ZAR 0.00
<b>1.14</b>	<b>Additional gas detection sensors</b>				
	Supply and install 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		ZAR 0.00
<b>1.15</b>	<b>Additional 4,5 kg DCP fire extinguishers</b>				
	Supply and install 4,5 kg DCP fire extinguishers at the laboratory as indicated on the drawing	no.	1		ZAR 0.00
<b>1.16</b>	<b>Additional 9 kg DCP fire extinguishers</b>				
	Supply and install 9 kg DCP fire extinguishers at the gasbank as indicated on the drawing	no.	1		ZAR 0.00
<b>1.17</b>	<b>Safety Signage</b>				
	Supply and install new safety signage at the gasbank and at the laboratory as per drawing	item	1		ZAR 0.00
<b>1.18</b>	Pressure testing of laboratory gas installation	item	1		ZAR 0.00
<b>1.19</b>	Testing and Commissioning of laboratory gas installation	item	1		ZAR 0.00
<b>1.20</b>	Operating and maintenance manuals	item	1		ZAR 0.00
<b>1.21</b>	Staff training	item	1		ZAR 0.00
<b>1.22</b>	<b>Builders work</b>				
	All builders work forms part of this contract				
	Excavate in soft soil foundations of 600mm x 250mm deep. Excavated soil, grass and plants to be removed off site, to a legal dumping site.	m3	3		ZAR 0.00
	Pour 30 MPa concrete foundation in trench	m3	3		ZAR 0.00
	Floor slab to match existing concrete floor slab.	m3	2.0		ZAR 0.00
	Brickwork to match existing brickwork. (screen walls)	m2	8.0		ZAR 0.00
	Roof slab to match existing concrete work	m2	0.0		ZAR 0.00
	Steelwork to match existing steelwork	m2	0.0		ZAR 0.00
	<b>All paint products used are to be Plascon Products or approved equal</b>				
	Prepare and spray paint with Plascon Galvogrip and two coats of Plascon Velvaglo or approved equal on steelwork	m2	16.4		ZAR 0.00
	Prepare and spray paint with Plascon Galvogrip and two coats of Plascon Velvaglo or approved equal on brickwork	m2	36		ZAR 0.00
	<b>TOTAL CARRIED FORWARD</b>				ZAR 0.00

## C.S.I.R. Building Number 15

## BILL NO. 1 : Laboratory Gas Installation First Floor

ITEM No.	DESCRIPTION	UNIT	QTY	RATE	TOTAL
	<b>TOTAL CARRIED FORWARD FROM PREVIOUS PAGE</b>				ZAR 0.00
	Make good penetrations through outer wall and paint wall	no	9.0		ZAR 0.00
	Remove all redundant rubble from site and move to legal dumping site.	Item	1		ZAR 0.00
	<b>P&amp;G</b>	Item	1		ZAR 0.00
	<b>SUB TOTAL</b>				ZAR 0.00
<b>1.23</b>	<b>Contingency</b>	10%			ZAR 0.00
	<b>SUB TOTAL</b>				ZAR 0.00
	V.A.T.	15%			ZAR 0.00
	<b>TOTAL CARRIED FORWARD</b>				ZAR 0.00