SETSCO SERVICES PTE LTD
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Business Reg. No. 196900269D

TEST REPORT

(This Report is issued subject to the terms & conditions set out below)

Your Ref: - Our Ref: MM-25204/WC/3 date: 29th October 2011

Subject : Witnessing of regulation hydraulic characteristics test on control valves submitted by Lingjack Engineering Works Pte Ltd.

Tested for : LINGJACK ENGINEERING WORKS PTE LTD
No.1 Woodlands Terrace #03-01
Lingjack industrial building
Singapore 738471

Attn: Mr. Kenneth Lim

Date & Place of Test : 28th October 2011 at Lingjack Engineering Works Pte Ltd

Method of Test :

Based on BS EN 1074-5:2000

1) Control valves providing flow regulation function (5.3.2.1)
2) Control valves providing pressure regulation function (5.3.2.2)
3) Mechanical Strength
   a. Resistance to internal pressure of the shell and of all pressure containing components (5.1.1)
   b. Resistance to differential pressure (5.1.2)
4) Leak-tightness to internal pressure (5.2.1.1)

Description of Sample : Two (02) pillars fire hydrant were tested as follows:

S/No.	Sample Reference	Model	Size	Qty
1	Control Valve	C 25-PRV	1"	01
2		DF1	2"	01

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Results :

1) Control Valves Providing Flow Regulation Function
   Refer to Table 1

2) Control Valves Providing PressureRegulation Function
   Refer to Table 2

3) Mechanical Strength
   (Resistance to internal pressure of the shell and of all pressure containing components)
   Refer to Table 3

4) Mechanical Strength Test
   (Resistance to Differential Pressure)
   Refer to Table 4

5) Leak-tightness to internal pressure
   Refer to Table 5

Wang Chao
Testing Officer

MOHAMMAD AZAM
Engineer (Mechanical Testing)

CHEN YU
Senior Engineer (Mechanical Testing)
Mechanical Technology Division

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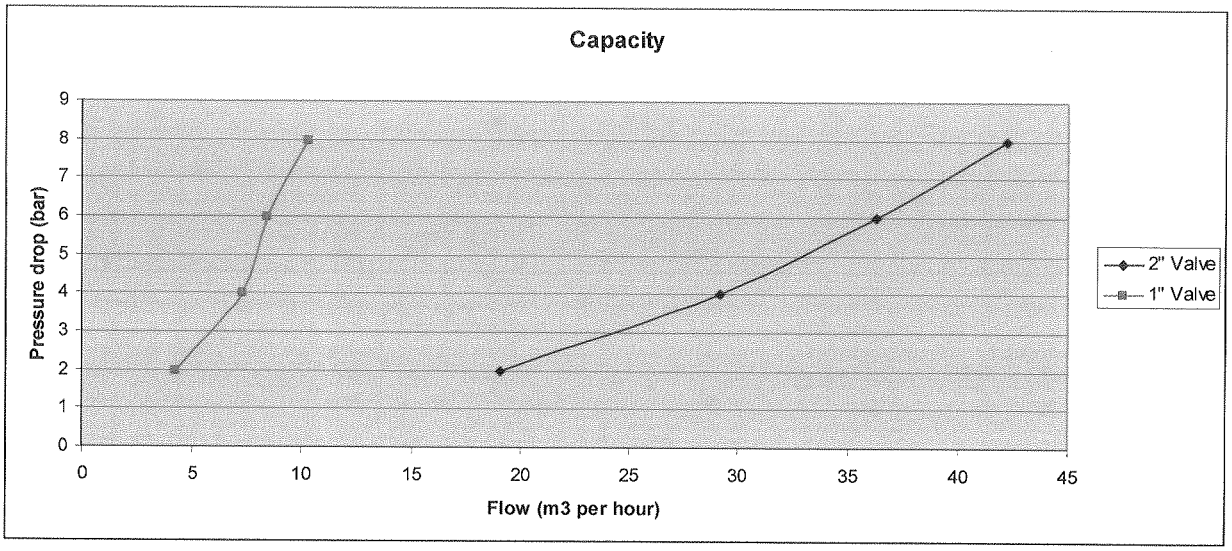
Results:

Table 1: Flow regulation function

Sample Reference	Size	Inlet pressure (bar)	Out let pressure (bar)	Pressure Drop (bar)	Flow rate (l/min)
Control Valve	1"	6	4	2	71
		8	4	4	123
		10	4	6	142
		12	4	8	172
	2"	6	4	2	318
		8	4	4	486
		10	4	6	604
		12	4	8	704



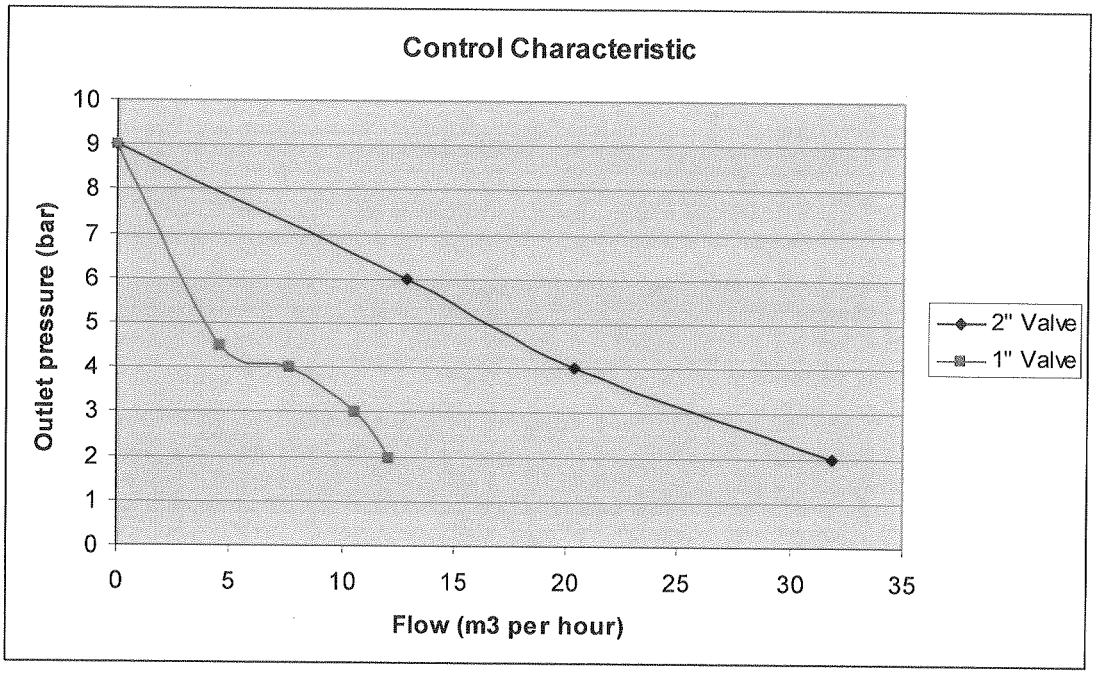
Note:

1) Pressure Gauge (Brand: WiKa, 0~20 bar) Certificate number: NP 1052/11 (Non Singlas Report) dated 10 May 2011
2) Pressure Gauge (Brand: Wika, 0~60 bar) Certificate number: NP 0969/11 (Non Singlas Report) dated 14 Apr 2011
3) The wind speed of the environment is not measured.

Results:

Table 1: Pressure regulation function

Sample Reference	Size	Inlet pressure (bar)	Out let pressure (bar)	Flow rate (l/min)
Control Valve	1"	13	9	0
		13	4.5	76
		13	4	128
		13	3	177
		13	2	202
	2"	13	9	0
		13	6	215
		13	4	340
		13	2	531



Note:
1) Pressure Gauge (Brand: WiKa, 0~20 bar) Certificate number: NP 1052/11 (Non Singlas Report) dated 10 May 2011
2) Pressure Gauge (Brand: Wika, 0~60 bar) Certificate number: NP 0969/11 (Non Singlas Report) dated 14 Apr 2011
3) The wind speed of the environment is not measured.

Results:

Table 3: Mechanical Strength Test
(Resistance to internal pressure of the shell and of all pressure containing components)

Sample Reference	Test Duration (min)	Test Pressure (bar)	Results	BS EN 1074-5: 2000 Requirements
1" Control Valve (PRV PN 16)	10	25	No leakage & defects observed	No visible leakage & defects is permitted
2" Control Valve (PRV PN 16)			No leakage & defects observed	

Table 4: Mechanical Strength Test
(Resistance to Differential Pressure)

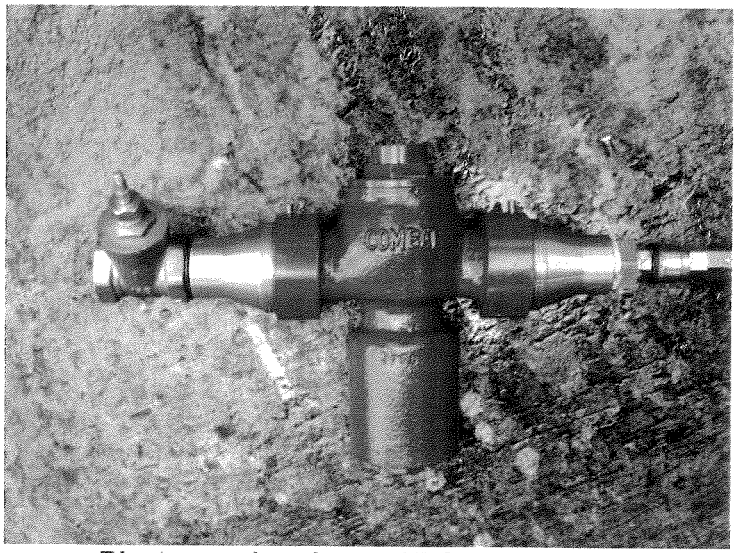
Sample Reference		Inlet Test Pressure (bar)	Results	BS EN 1074-5: 2000 Requirements
1" Control Valve (PRV PN 16)	Obturator in Closed Position	35	No defects observed	Shall show no damage on the valves
2" Control Valve (PRV PN 16)			No defects observed	

Table 5: Leak-tightness to internal pressure

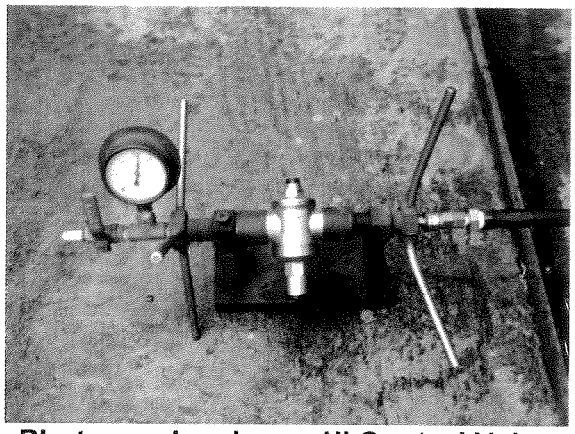
Sample Reference	Test Duration (min)	Test Pressure (bar)	Results	BS EN 1074-5: 2000 Requirements
1" Control Valve (PRV PN 16)	10	25	No leakage	Leak-tight
2" Control Valve (PRV PN 16)			No leakage	

Note: Pressure Gauge (MIGIAHITA - 0 to 300 kg/cm^2)
Certificate No. NP 0972/11
The calibration report attached in Appendix is a non-Singlas report.
The torque required to close the obturator was not measured.

Appendix



Photographs shows 2" Control Valve



Photographs shows 1" Control Valve

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Appendix

NORTHLAB PTE LTD
No. 27 Woodlands Ind. Park E1, #02-08, Hiangkie Ind. Building,
Singapore 757718. Tel: (65) 6367 0800 Fax: (65) 6367 9367
Email: northlab.sg@northlab.biz Co. Rego. No: 199606127Z
An ISO 9001, API Spec Q1, ISO TS 29001 & US Navy Certified Organisation

Certificate of Calibration

Cert. No.	: NP 1052/11	*Job No.*	: C 0947/11
Date of Issue	: 10-May-11	*Page*	: 1 of 1

Customer	: LINGJACK ENGINEERING WORKS PTE LTD NO 1 Woodlands Terrace #03-01 Lingjack Industrial Building Singapore 738471	*Date Received* *Date Calibrated* *Recommended Due Date* *Ambient Temperature* *Relative Humidity*	: 04-May-11 : 06-May-11 : 06-May-12 : 20±2°C : 55±10% r.h.
Instrument	: PRESSURE GAUGE	*Serial No.* *(Tag / ID No.)*	: --- : ----
Manufacturer *Model No.*	: WIKA : ---	*Range*	: 0 ~ 20 bar

NorthLab's organisation and practices are derived from ISO/IEC 17025. It therefore meets the relevant requirements of ISO 9001 when acting as the supplier providing test / calibration results. The described instrument has been checked and calibrated at **NorthLab** under the ambient conditions stated above.

METHOD OF CALIBRATION

1. The method of calibration is as per method no. P17 in NLQM/001/10 of the Quality Manual.

	Standard instrument used	S/N	Traceability	Due Date
1	Pneumatic Pressure Calibrator	110	NMC Singapore	15-Oct-11

RESULTS OF CALIBRATION

APPLIED EQUIVALENT VALUE	*INSTRUMENT READING (bar)*							
	INCREASING				*DECREASING*			
	Before Adj.		*After Adj.*		*Before Adj.*		*After Adj.*	
(bar)	*Rdg*	*Error*	*Rdg*	*Error*	*Rdg*	*Error*	*Rdg*	*Error*
0.000	0.00	0.000	---	---	0.00	0.000	---	---
5.000	5.00	0.000	---	---	5.00	0.000	---	---
10.000	10.10	0.100	---	---	10.10	0.100	---	---
15.000	15.00	0.000	---	---	15.00	0.000	---	---
20.000	20.00	0.000	---	---	20.00	0.000	---	---

1. Accuracy of the instrument is within ± 1% of full scale.
2. The expanded uncertainty of measurement is ± 0.029 bar estimated at a level of confidence of approximately 95% with a coverage factor k = 2.

REMARKS / DEVIATIONS IF ANY

1. The recalibration interval should be determined based on the user's requirements.
2. The user should determine the suitability of the instrument for its intended use.

N. Palaniappan
Calibration Officer

M. Muthiah
Approved Signatory

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Pressure Gauge Calibration Certificate

Appendix

NORTHLAB PTE LTD
No. 27 Woodlands Ind. Park E1, #02-08, Hiaagkie Ind. Building,
Singapore 757718. Tel: (65) 6367 0800 Fax: (65) 6367 0367
Email: northlab.sg@northlab.biz Co. Regn. No: 199606127Z
An ISO 9001, API Spec Q1, ISO TS 29001 & US Navy Certified Organisation

Certificate of Calibration

Cert. No.	: NP 0969/11	*Job No.*	: C 0766/11
Date of Issue	: 14-Apr-11	*Page*	: 1 of 1

Customer	: LINGJACK ENGINEERING WORKS PTE LTD NO 1 Woodlands Terrace #03-01 Lingjack Industrial Building Singapore 738471	*Date Received* *Date Calibrated* *Recommended Due Date* *Ambient Temperature* *Relative Humidity*	: 07-Apr-11 : 13-Apr-11 : 13-Apr-12 : 20±2°C : 55±10% r.h.
Instrument	: PRESSURE GAUGE	*Serial No.* *(Tag / ID No.)*	: 202654-9-26 : --- PG/038/09
Manufacturer *Model No.*	: WIKA : ---	*Range*	: 0 ~ 60 bar

NorthLab's organisation and practices are derived from ISO/IEC 17025. It therefore meets the relevant requirements of ISO 9001 when acting as the supplier providing test / calibration results. The described instrument has been checked and calibrated at **NorthLab** under the ambient conditions stated above.

METHOD OF CALIBRATION

1. The method of calibration is as per method no. P03 in NLQM/001/10 of the Quality Manual.

	Standard instrument used	S/N	Traceability	Due Date
1	Oil Deadweight Pressure Tester	26412	NMC Singapore	29-May-14

RESULTS OF CALIBRATION

APPLIED EQUIVALENT VALUE	*INSTRUMENT READING (bar)*							
	INCREASING				*DECREASING*			
	Before Adj.		*After Adj.*		*Before Adj.*		*After Adj.*	
(bar)	*Rdg*	*Error*	*Rdg*	*Error*	*Rdg*	*Error*	*Rdg*	*Error*
0.00	0.0	0.00	---	---	0.0	0.00	---	---
9.97	10.0	0.03	---	---	10.2	0.23	---	---
19.95	20.0	0.05	---	---	20.2	0.25	---	---
29.92	30.0	0.08	---	---	30.2	0.28	---	---
39.89	40.0	0.11	---	---	40.2	0.31	---	---
59.84	60.0	0.16	---	---	60.0	0.16	---	---

1. Accuracy of the instrument is within ± 1% of full scale.
2. The expanded uncertainty of measurement is ± 0.061 bar estimated at a level of confidence of approximately 95% with a coverage factor k = 2.

REMARKS / DEVIATIONS IF ANY

1. The recalibration interval should be determined based on the user's requirements.
2. The user should determine the suitability of the instrument for its intended use.
3. The pressure medium used is distilled water.

14/4/2011

N. Palanimppan
Calibration Officer

M. Muthiah
Approved Signatory

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Pressure Gauge Calibration Certificate

Appendix

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VERNON MORRIS

TAKES THE FLOW AND PRESSURE

DIGITAL FLOW GAUGE CALIBRATION CERTIFICATE

Customer: **J. D Fire Limited**

Serial Number: **Size 2 1/2 "**

Reference: VM 20025

Paddlewheel Ref No: S Steel

Digital Display Serial No: 0913045

Certificate of conformity: KEMA No.Ex-98.E.1873 X

Calibration Mode: **Litres per minute**

Accuracy: ± 1% F.S.D.

Static Assembly: Gun Metal

Range: **0-140mhd** Serial Number: **109948**

Test Specification: BS EN 837-1 1.6%

Tested against: G23113/1.M71 (Traceable to National Standards.)
We hereby certify that the above Digital Flow Gauge has been tested and conforms to the manufacturers specifications and that the Digital Readout has been calibrated with the correct detail.

Date: 16/04/2009 **Signed:** _____ **For Vernon Morris Co.Ltd.**

Vernon Morris & Co. Ltd.
Chester Road . Bretton . Chester CH4 0DH Tel: (01244) 660794 2 lines
SALES 0 SERVICE 0 SPARES
Fax: (01244) 661291

Flow Meter Calibration Certificate