TEST REPORT

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

SETSCO
Setsco Services Pte Ltd
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www.setsco.com
Business Reg. No. 196900269D

Date: 05th July 2024

Your Ref: - Our Ref: MM-8500320387/MA

Subject : Witnessing of Dimensional Measurement, Pressure & Flow Characteristics Test on Non-Controllable Two Way Pillar Hydrant submitted by Lingjack Engineering Works Pte Ltd on 04th July 2024.

Tested for : **LINGJACK ENGINEERING WORKS PTE LTD**
No.1 Woodlands Terrace #03-01
Lingjack industrial building
Singapore 738471
Attn: Mr. Liaw Zhu Yik

Date & Place of Test : 04th July 2024 at Lingjack Engineering Works Pte Ltd
(1, Woodlands Terrace, Lingjack Industrial Building, Singapore 738471)

Method of Test : Based on BS EN 14384: 2005
1) Dimensions (Client's Requirement & BS EN 1092-2 : 1997)
2) Flow Characteristics
3) Leaktightness
4) Mechanical Strength

Description of Sample : One (01) unit of Non-Controllable Two Way Pillar Hydrant was tested as follows:

S/No.	Sample Reference	Brand	Model No.	Size	Emboss Marking	Qty
1	Non-Controllable Two Way Pillar Hydrant	COMBAT	PH-100	DN 100 (inlet) DN 65 (outlet)	COMBAT BS-750 DIA 100	01

Results :

1) Dimensions
Refer to Table 1

2) Flow Characteristics Test
Refer to Table 2

3) Leaktightness Test
Refer to Table 3

4) Mechanical Strength Test
Refer to Table 4

MOHAMMAD AZAM
Testing Officer

CHEN YU
Manager (Mechanical Testing)
Mechanical Technology Division

Note: For any statement of conformity stated in this test report, SETSCO shall adopt the Simple Acceptance as the decision rule in evaluating conformance to specification or standard.

Results:

Table 1a: General Dimension Measurement

Test Method	Sample Ref: Non-Controllable Two Way Pillar Hydrant Size: DN100	Client's Requirements
A (mm)	465	Min. 445.0 Max. 485.0
B (mm)	608	Min. 600.0 Max. 620.0
C (mm)	101.6	Nom. 100.0

Note: Refer to Appendix A

Table 1b: Flange Dimension Measurement

Test Method		Sample Ref: Non-Controllable Two Way Pillar Hydrant Size: DN100	BS EN 1092-2: 1997 Requirements
D (mm)		219.9	Nom. 220
K (mm)		179.9	Nom. 180
L (mm)		18.5	Min. 19 Max. 20.5
Bolts	Number	8	Nom. 8 Nos
	Size	M16	Nom. M16
Flange Thickness (mm)	C	20.9	Min. 16 Max. 23

Note: Refer to Appendix B

Table 2: Flow characteristics (on 1 Outlet)

Sample Reference	P_1, Inlet Pressure (bar)	P_2, Outlet Pressure (bar)	Q, Flow rate (l/m)
Non-Controllable Two Way Pillar Hydrant	1.8	0.9	1080

Note:
1) Inlet Pressure Gauge (Brand: BD SENSORS, 0~200 bar) Certificate number: BLP2305013-2S.
2) Outlet Pressure Gauge (Brand: CAPRI, 0~4 bar) Certificate number: SN-272530/70/01.
3) Flow Gauge (Brand: TSI, Model: EMF-300E, Serial Number 1922) Certificate number: ASN-23-4764 (Non-Singlas Report) .

Table 3: Leaktightness Test (Shell Test)

Sample Reference	Test Duration (min)	Test Pressure (bar)	Results	BS EN 14384: 2005 Requirements
Non-Controllable Two Way Pillar Hydrant	10	25	No leakage	Shall be no sign of leakage past the valve

Results:

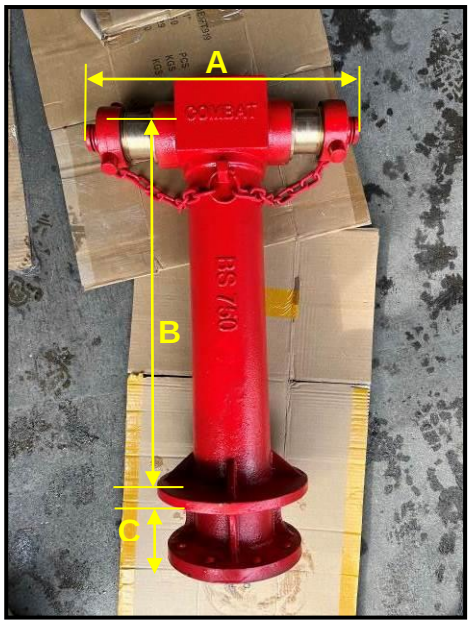
Table 4: Mechanical Strength Test

Sample Reference	Results	BS EN 14384: 2005 Requirements
Non-Controllable Two Way Pillar Hydrant	No defects observed	Shall show no sign of defects

Note:

1) Pressure Gauge (Brand: BD SENSORS, 0~200 bar) Certificate number: BLP2305013-2S.

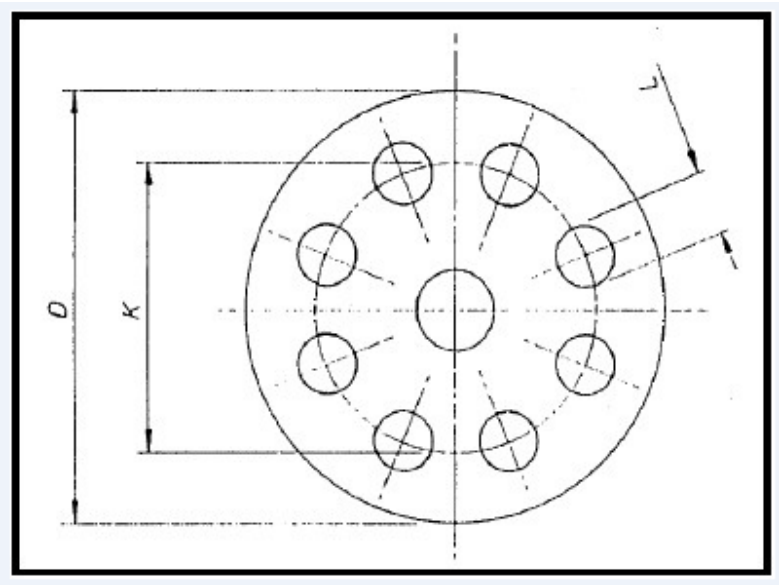
Appendix A:



Photograph 1 shows Pillar Fire Hydrant tested

Photograph 2 shows Pillar Hydrant under Flow Characteristic Test

Appendix B:



BESTLABS SINGAPORE PTE LTD.

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Company Reg no. 201728718W
GST no. 201728718W

calibration Certificate

ilac-MRA Accredited Laboratory SAC-SINGLAS LA-2017-0666-C

CERTIFICATE NO. : BLP2305013-2S

SUBMITTED TO :
Lingjack Engineering Works Pte Ltd
No.1 Woodlands Terrace
#03-01
Singapore 738471

REFERENCE NO. : BSO-23-005013

RECEIVED DATE : 17-Jul-2023

ISSUED DATE : 17-Jul-2023

Bestlabs organization and practices have been duly accredited and are compliant to the requirements of ISO/IEC 17025;the laboratory accreditation standard. Our Quality Management System ensures its compatibility with the requirements of ISO 9001:2015.
The reference measurement standards used are traceable to the International System of Units (SI) through National Metrology Centre, (NMC,SINGAPORE) and/or other National Standards.
The results reported herein have been performed in accordance with the terms of accreditation under the Singapore Accreditation Council.

TRUMENT	: **DIGITAL PRESSURE GAUGE**		
MANUFACTURER	: BD SENSORS	**AMB. TEMPERATURE**	: (20 ± 1) °C
MODEL NO.	: BAROLI 05	**RELATIVE HUMIDITY**	: (55 ± 10) % relative humidity
SERIAL NO.	: 10865174	**CALIBRATED DATE**	: 17-Jul-2023
RANGE	: (0~200) bar	**DUE DATE**	: 16-Jul-2024
TAG NO.	: LJG-032	-	: -
PART NO.	: -	-	: -
LOCATION	: -	-	: -
CALIBRATION AT	: BLS Laboratory	-	: -

MEASUREMENT TRACEABILITY

REFERENCE STANDARDS	CERTIFICATE NO.	SERIAL NO.	TAG NO.	CAL. DATE	DUE DATE
PRESSURE CALIBRATOR	23-C117634	211H11080009	BS 1511	27-Feb-2023	26-Feb-2024

METHOD OF CALIBRATION: BSM 01,ISSUE 04,REV 1 DATED JUL 2020.

NOTES:

- The results of the calibration are given on the attached following pages.
- The expanded uncertainty of measurement associated with the calibration is estimated at a confidence level of approximately 95%.
- No adjustment was done unless otherwise stated.
- The user should determine the suitability of the instrument for its intended use.
- The reports shall not be reproduced except in full,without written approval by management representative of BESTLABS SINGAPORE PTE LTD.

R RAMESH | TECHNICAL MANAGER
CALIBRATION OFFICER

B REDHY | CTO
APPROVING OFFICER

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Calibration Report No . : SN - 272530 / 70 / 01

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

Your Ref : SN - 218970 / 218726 Our Ref : SN - 8500272530 / GSK / 70 / 01

Date : 30/07/2023
Page : 1 of 1

CALIBRATION REPORT ON PRESSURE GAUGE

Issued To : SETSCO SERVICES PTE LTD
(MECHANICAL TESTING SECTION)
531 BUKIT BATOK STREET 23
SINGAPORE 659547

Description	:	PRESSURE GAUGE	**Ambient Temperature**	:	20 ± 2 °C
Manufacturer	:	CAPRI	**Relative Humidity**	:	55 ± 10 %
Serial No.	:	GU 47	**Date Received**	:	21 July 2023
Nominal Gauge Size	:	63 (mm)	**Receiving Condition**	:	Satisfactory
Range	:	0 - 4 (bar)	**Date of Calibration**	:	28 July 2023
Scale Interval	:	1.0 (bar)	**Recommended Due**	:	28 July 2024
Calibration Location	:	SETSCO SERVICES PTE LTD , MECHANICAL CALIBRATION LABORATORY . The instrument was calibrated under the conditions stated above .			

Method of Calibration

The method of calibration is generally stated in SETSCO Procedure MTD / CAL - 05 : 2022 and BS EN 837 - 1 : 1998 as a guide . The true method was used to effect the calibration .

Reference Instrument Traceability : NMC SINGAPORE , NPL , NVLAP , PTB , NIST , etc .

The following reference instrument used for the calibration are traceable to National or Inter - National standards through recognized metrology institutes .

No.	Description	Serial No.	Calibration Certificate	Calibration Date	Due Date
1 .	DIGITAL PRESSURE GAUGE	211H22110007	CM - 270768 / 30 / 01	04 / 07 /2023	04 / 01 /2024

As Found Results
Specification : ± 1.6 % F.S

Applied Pressure (bar)	Indicated Pressure (bar)			
	Increasing		Decreasing	
	Mean Reading	Error	Mean Reading	Error
0.00	-	-	-	-
0.80	0.79	-0.01	0.81	0.01
1.60	1.59	-0.01	1.61	0.01
2.40	2.39	-0.01	2.41	0.01
3.20	3.19	-0.01	3.21	0.01
4.00	3.99	-0.01	-	-

Accuracy of the pressure instrument was found within ± 1.6% of the maximum scale value .

Expanded Uncertainty = 0.03 (bar) Coverage : k - factor = 2.090

The measured values were observed to be within tolerance at the calibrated points when the measurement of uncertainty is taken into account .

The expanded uncertainty of measurement associated with the calibration is at a confidence level of approximately 95% .

Remarks :

1. If the pressure instrument is dismantled , or subject to major repairs or adjustment , or if there is any reason to doubt the accuracy of its results, it shall be re - verified .
2. The user should determine the suitability of the instrument for its intended use .
3. No adjustment was made on the instrument .

REVIEWED BY
Name: Chen Yu
Date : 4/ 8/ 2023

GANESAN KARTHIKEYAN
Calibration Officer

RAJ KUMAR
Principal Engineer (Calibration & Measurement)
Mechanical Technology Division

ATLANTIC SOLUTION PTE LTD

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Tel: +65 6339 0461 I Fax: +65 6339 2796 I Email: info@atlanticsolution.com.sg
Website: www.atlanticsolution.com.sg

CALIBRATION CERTIFICATE

CLIENT	: **LINGJACK ENGINEERING WORKS PTE LTD**	**CERTIFICATE NUMBER**	: ASN-23-4764
	01 Woodland Terrace ,	**ISSUE DATE**	: 26-Sep-23
	Lingjack Industrial Building	**W/O NUMBER**	: AWO-23-2250
	Singapore 738471	**DATE RECEIVED**	: 21-Sep-23

INSTRUMENT	: FLOWMETER	**CALIBRATION DATE**	: 26-Sep-23
MAKER	: TSI	**DUE DATE**	: 26-Sep-24
MODEL NO	: EMF-300E	**STATUS**	: As Found
SERIAL NO	: 1922	**AMBIENT TEMPERATURE**	: 23±5°C
TAG NO	: FLOWPOD 3000 / LJG-018	**RELATIVE HUMIDITY**	: 55±10%
		PAGE NO	: 1 of 1

METHOD OF CALIBRATION

The calibration method was carried out according to In-House Technical Calibration Procedure AS-TM-M13 as a guide.

REFERENCE EQUIPMENTS USED

The calibration was carried out with reference to the following calibration and measurement standards which are traceable to International system of units (SI) and/or to units of measurement realised at the National Metrology Centre (NMC), Singapore or other recognized national metrology institutes

REFERENCE EQUIPMENT	S/NO	ISSUE DATE
MAGNETIC FLOWMETER	EBI-22120011001	14-DEC-22

CALIBRATION RESULTS

REFERENCE READINGS	INDICATED INSTRUMENTS READINGS	ERROR
	Before adjustment	
l/min	l/min	l/min
199.52	200	0.48
249.44	250	0.56
499.31	500	0.69
699.47	700	0.53
999.57	1000	0.43

REMARKS

1. The user should determine the suitability of the instrument for its intended use.
2. The recalibration interval should be determind based on customer's requirement.
3. The instrument has been calibrated at the ambient conditions stated above.
4. No adjustment done.

CALIBRATED BY
JATISETIA

ATLANTIC SOLUTION PTE LTD 201308082H

APPROVED BY
S.J.PAUL