

# ภาคผนวก ข-31

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การตรวจสอบ



NEW TATTON LIMITED PARTNERSHIP

# Valve Function Test & Calibration Report

Customer: **Linde Thailand Public Co., Ltd.**  
Plant: **HyCO-TAR22**

Job No. **2210-0163.1**  
Report No. **CAL-NTT22-0014**  
Date Entered: **11/29/2022**

Tag No. **17.HV-11001**

|                     |  |          |                |
|---------------------|--|----------|----------------|
| Manufacturer        | SAMSON-VETEC   | S/N      | 43068102       |
| Valve Model         | 73.7R  | Type     | Segment rotary |
| Size x Port x Cv    | 3" x CV 254  | Class    | ANSI 900 RJ    |
| Plug characteristic | LOG 30   | Trim F.  | Un-balanced    |
| Body Material       | A217 WCB   | Trim     | Stellited No.6 |
| Gland Packing       | MFGR's std.  | Gasket   | Graphite       |
| Failure Position    | <input type="radio"/> Fail Closed <input checked="" type="radio"/> Fail Open <input type="radio"/> Fail Hold <input type="radio"/> Other |          |                |
| Actuator Model      | R200   | Maker    | SAMSON-VETEC   |
| Actuator Type       | Spring-Diaphragm   | act.size | -              |
| Spring Range        | 0.4 - 1.2 Bar  | Supply   | 4.0 Bar        |
| Max/Min. Stopper    | None   | Stroke   | 0 - 75 Degree  |
| Positioner maker    | Samson   | Input    | 4 - 20 mA      |
| Model               | 3730-3   | Type     | I/P            |

## Scope Of Work

- ☒ Overhaul body
- ☐ Overhaul actuator
- ☐ Re-gland packing
- ☒ Seat leakage test
- ☒ Body pressure test
- ☒ Calibration
- ☒ Function test



| STD                     | FCI 70-2 CL. IV   | AS FOUND | AS LEFT     |
|-------------------------|-------------------|----------|-------------|
| Seat Leakage Test Table | Test Media        | Air      | Air         |
|                         | Test Designation  | P1       | P1          |
|                         | Test Pressure     | 4.0      | 4.0 Bar     |
|                         | Supply air to Act | 4.0      | 4.0 Bar     |
|                         | Allowance         | 25.67    | 25.67 l/min |
|                         | Actual read       | 50       | 13.00 l/min |
|                         | Test Result       | Failure  | Passed      |

## Performance Testing Table

| Standard Value(s)      |        |         | Reading Data ( % )   |       |      |       |                |       |      |       |
|------------------------|--------|---------|--|-------|------|-------|----------------|-------|------|-------|
| STD                    | Source | Opening | BEFORE   |       |      |       | AFTER(AS Left) |       |      |       |
|                        | ( mA ) | ( % )   | UP   | Error | DOWN | Error | UP             | Error | DOWN | Error |
| 0                      | 4      | 100     | 98.2   | -1.8  | 98.2 | -1.8  | 99.6           | -0.4  | 99.6 | -0.4  |
| 25                     | 8      | 47.4    | 47.2   | -0.2  | 47.2 | -0.2  | 47.9           | 0.5   | 47.2 | -0.2  |
| 50                     | 12     | 20.3    | 20.0   | -0.3  | 20.7 | 0.4   | 20.4           | 0.1   | 19.9 | -0.4  |
| 75                     | 16     | 10.7    | 10.5   | -0.2  | 10.5 | -0.2  | 12.9           | 2.2   | 12.9 | 2.2   |
| 100                    | 20     | 0       | -0.8   | -0.8  | -0.8 | -0.8  | -0.1           | -0.1  | -0.3 | -0.3  |
| Stroke Time (SEC.)     |        |         | Shut-Open  |       | 14.9 |       | Shut-Open      |       | 14.2 |       |
|                        |        |         | Open-Shut  |       | 6.8  |       | Open-Shut      |       | 7.3  |       |
| Starting Point         |        |         | 19.200 mA  |       |      |       | 19.200 mA      |       |      |       |
| Opening Characteristic |        |         | <input checked="" type="checkbox"/> Linear <input type="checkbox"/> Customized |       |      |       |                |       |      |       |
|                        |        |         | <input type="checkbox"/> EQ% <input type="checkbox"/> On-Off                   |       |      |       |                |       |      |       |
|                        |        |         | <input type="checkbox"/> QO  |       |      |       |                |       |      |       |

## Valve Accessories

- ☐ Booster Relay
- ☐ Quick Exhaust
- ☐ Prox./Limit Switches
- ☐ Min./Max.stopper
- ☐ Air Locked Device
- ☐ Feed Back Transmitter
- ☒ Solenoid Valve
- ☐ Speed Controller
- ☐ Switching Valve
- ☐ Handwheel

| Reference Test Tools | Tester | Model | Serial No. | Cert.No. |
|----------------------|--------|-------|------------|----------|
|                      | Fluke  | 789   | 26050104   | E220016  |
|                      | Fluke  | 789   | 29050009   | E210094  |

## Actuator Leak Test

|             |               |             |               |
|-------------|---------------|-------------|---------------|
| Test Media  | Air           | Test Media  | Water         |
| Test Press. | 4.5 Bar       | Test Press. | 156.0 Bar     |
| Period      | 2.0 Minute(s) | Period      | 5.0 Minute(s) |
| Result      | Passed        | Result      | Passed        |

## Body Pressure Test

## Part Replacement Table

| Part name              | Description           | Q'ty  |
|------------------------|-----------------------|-------|
| Gland packing          | 1108-651              | 1 set |
| Retainer/bottom gasket | 1102-053              | 1 set |
| Gland packing          | graphite ring (local) | 4     |
|                        |                       |       |
|                        |                       |       |
|                        |                       |       |
|                        |                       |       |
|                        |                       |       |
|                        |                       |       |

## Work Activities

- ☒ External parts visual check
- ☒ Air tubing/fitting leak check
- ☒ Valve movement & travel check
- ☒ Function check
- ☒ Fail Safe Action check
- ☒ Cable connection tightness check
- ☒ Loop Test
- ☒ Sealed device's cover for waterproof

Result Of Testing

All Function Test are correctly & passed

Note

Feedback Transmitter Table

| Feedback /IOUT Reading ( mA ) |         |          |       |      |       |         |       |      |       | ACCESSORIES | Maker                              | De-energized  | Energized  |
|-------------------------------|---------|----------|-------|------|-------|---------|-------|------|-------|-------------|------------------------------------|---|--|
| IOUT                          |         | AS FOUND |       |      |       | AS LEFT |       |      |       |             | <div>Norgren</div>                 | <div><div><div></div></div> Valve CLOSE</div> <div><div></div></div> Valve OPEN | <div><div><div></div></div> Valve CLOSE</div> <div><div><div></div></div> Valve OPEN</div> |
| STD                           | Command | UP       | Error | DOWN | Error | UP      | Error | DOWN | Error |             | SOV.model                          | From _____<br>To _____  | From _____<br>To _____   |
| 0                             | 4       |          |       |      |       |         |       |      |       |             | <div>8020899</div>                 |   |  |
| 25                            | 8       |          |       |      |       |         |       |      |       |             |                                    |   |  |
| 50                            | 12      |          |       |      |       |         |       |      |       |             | Limit Switches<br>Function Display | Position Close <div><div></div> YES <div><div></div></div> NO</div>             |  |
| 75                            | 16      |          |       |      |       |         |       |      |       |             |                                    | Position Open <div><div></div> YES <div><div></div></div> NO</div>              |  |
| 100                           | 20      |          |       |      |       |         |       |      |       |             |                                    |   |  |

Add recommend for further information

Picture of Inspection



A condition of valve body before clean.



A condition of valve body after clean.



A condition of plug-seat before clean & laping.



A condition of plug-seat are good after clean & laping.



All parts are good before assembly



A new spare parts of gland packing & gasket for replacement on this maintenance period.

# ภาคผนวก ข-32

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เอกสารสอบเทียบ



LINDE HYCO COMPANY LIMITED  
TEST & CALIBRATE REPORT

Work order no. : DATE 1-Jun-23  
PTWC No. : 06177  
Standard Reference : LINDE STANDARD GAS (WELLGROW LAB) NEXT 1-Jul-23  
Certificate No. : 20K390198/19,4403/18

Permissible Error :  $\pm 5$  ppm

CHECKED

Range : 0-300 PPM CO<sub>2</sub>

Tag No. : AT-15001 Model : URAS 26  
Maker : ABB Serial No. : 3.372803.7  
Measured : CO<sub>2</sub> IN N<sub>2</sub>

| Reference   | Reading | Error | Remark      |
|---|---------|-------|-------------|
| <b>Zero Gas</b><br>UHP NITROGEN PURITY> 99.9999% N <sub>2</sub><br>CYLINDER No. 20K390198<br>Expired Date 22 Sep 2023 | 0.00    | 0.00  | 14:30-14:50 |
| <b>Span Gas</b><br>229 PPM CO <sub>2</sub> in N <sub>2</sub><br>CYLINDER No. 4186<br>Expired Date 12-Dec-2026         | 228.0   | 1.00  | 15:00-15:25 |

CALIBRATION

| Reference   | Reading | Error | Remark |
|---|---------|-------|--------|
| <b>Zero Gas</b><br>UHP NITROGEN PURITY> 99.9999% N <sub>2</sub><br>CYLINDER No. 20K390198<br>Expired Date 22 Sep 2023 | 0.00    | 0.00  |        |
| <b>Span Gas</b><br>229 PPM CO <sub>2</sub> in N <sub>2</sub><br>CYLINDER No. 4186<br>Expired Date 12-Dec-2026         | 229.0   | 0.00  |        |

Result



Accepted Note



Not Accepted



Accepted as note



# Certificate Of Analysis

## Special Gases Mixture

## Customer Details

Name:  
Linde HyCO Limited

Address:  
10 Maptaphut Industrial Estate, T. Map Ta Phut,  
A. Muang, Rayong 21150

Customer Tag No.:

## Certificate Details

|                   |                               |                    |               |                |               |
|-------------------|-------------------------------|--------------------|---------------|----------------|---------------|
| Number:           | 3900/22                       | Date of Issue:     | 13-Dec-2022   | Expiry date:   | 12-Dec-2026   |
| Material Details  |                               |                    |               |                |               |
| Production Order: | 90175185                      | Material Code:     | 483100-J-62   | Cylinder No.:  | 4186          |
| Gas content:      | 6.48 M <sup>3</sup> (nominal) | Filling pressure:  | 145.0 bar (g) | Valve:         | CGA 580 BRASS |
| Cylinder Owner:   | LINDE                         | Cylinder Material: | STEEL         | Cylinder Size: | 47 L          |

## Laboratory Report

| Component                     | Normal Concentration | Analysis Result <sup>1</sup> | Uncertainty <sup>2</sup> | Method of Analysis <sup>3</sup> |
|-------------------------------|----------------------|------------------------------|--------------------------|---------------------------------|
| Carbon Dioxide<br>in Nitrogen | 234 ppm              | 229 ppm                      | ± 2% relative            | (1) ACC-MET-01                  |

## Recommend usage condition

Minimum utilization: 5% of actual content or before expire date whichever comes first.  
Storage condition: Keep in well ventilation and secure area.

## Comments

## Note:

- All results expressed in this report are on mole/mole basis, unless otherwise specified.
- The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95%. The measurement of this material is traceable to the SI through the reference gas standard which is traceable to Swiss National Standard of Mass or other recognised national metrology institutes.
- (1)
- (4) E

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Iss:K/2, 15 Oct 2021

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## Analytical Report

客戶名稱  
Customer Name: Linde Thailand

流程編號  
Reference: SG065689

取樣鋼瓶  
Sample Cylinder: 20K390198

報告書號碼  
Report No. HE-11009-0863

氣體成分  
Gas: N2 99.9999%

灌充日期  
Fill Date: 2021/09/22

鋼瓶規格  
Cylinder Type: CGA 580 \_47L

分析日期  
Analysis Date: 2021/09/23

灌充壓力/重量  
Fill Pressure/Weight: 150Kg/Cm2(35°C)

保存期限  
Shelf Life: 2023/09/22

鋼瓶編號  
Cylinder Number: 20K390198

| COMPONENT | SPECIFICATION | CONCENTRATION |
|-----------|---------------|---------------|
| N2        | 99.9999%      | >99.9999%     |
| CO2       | 0.1           | ppm           |
| CO        | 0.1           | ppm           |
| H2        | 0.1           | ppm           |
| H2O       | 0.4           | ppm           |
| O2        | 0.2           | ppm           |
| THC(CH4)  | 0.1           | ppm           |

Analysis Method :

\*GC/FID

\*GC/DID

\*HALO

\*DeltaF