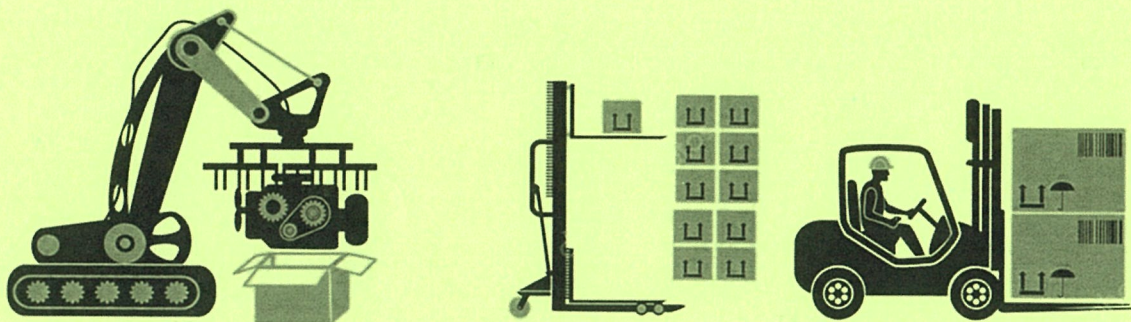


ภาคผนวก ง

เอกสารสอบเทียบเครื่องมือที่ใช้ในการตรวจวิเคราะห์ (Calibration)



ตารางการสอบเทียบเครื่องมือที่ใช้ในการตรวจวัดและวิเคราะห์ (ต่อ)

| Item | Description | Parameter | List of Equipment | Equipment No. | Calibration | Next Calibration |
|------|---------------------|-----------------|----------------------------------------|-----------------|-------------|------------------|
| 2. | Ambient Air (Cont.) | TSP | ORIFICE TRANSFER STANDARD/Tisch | S/N 0068 | 19/11/2022 | November 2024 |
| | | | High Volume Air Sampler/TET | S/N TSP-30 | 01/08/2022 | August 2023 |
| | | | High Volume Air Sampler/TET | S/N TSP-35 | 01/08/2022 | August 2023 |
| | | | High Volume Air Sampler/TET | S/N TSP-39 | 01/08/2022 | August 2023 |
| | | | High Volume Air Sampler/TET | S/N TSP-42 | 01/08/2022 | August 2023 |
| | | PM-10 | Electronic Balance/METTLER TOLEDO | S/N 1116392227 | 11/04/2023 | April 2024 |
| | | | ORIFICE TRANSFER STANDARD/Tisch | S/N 0068 | 19/11/2022 | November 2024 |
| | | | High Volume Air Sampler/TET | S/N PM10-2 | 01/08/2022 | August 2023 |
| | | | High Volume Air Sampler/TET | S/N PM10-11 | 01/08/2022 | August 2023 |
| | | | High Volume Air Sampler/TET | S/N PM10-24 | 01/08/2022 | August 2023 |
| | | SO ₂ | High Volume Air Sampler/TET | S/N PM10-26 | 01/08/2022 | August 2023 |
| | | | Electronic Balance/METTLER TOLEDO | S/N 1116392227 | 11/04/2023 | April 2024 |
| | | | Personal Air Sampler/Giant | S/N TET 001 | 13/05/2023 | June 2023 |
| | | | Personal Air Sampler/Giant | S/N TET 002 | 13/05/2023 | June 2023 |
| | | | Personal Air Sampler/Giant | S/N TET 003 | 13/05/2023 | June 2023 |
| | | | Personal Air Sampler/Giant | S/N TET 004 | 13/05/2023 | June 2023 |
| | | NO ₂ | Spectrophotometer/PerkinElmer | S/N 365K9042909 | 01/11/2022 | November 2023 |
| | | | CERTIFICATE OF ANALYSIS/Linde | S/N A009625K | 18/08/2021 | August 2023 |
| | | | NO _x Analyzer/API 200E | S/N 1732 | 10/05/2023 | November 2023 |
| | | | NO _x Analyzer/API 200E | S/N 393 | 10/05/2023 | November 2023 |
| | | | NO _x Analyzer/API 200A | S/N 777 | 10/05/2023 | November 2023 |
| | | CO | NO _x Analyzer/Teledyne 200E | S/N 2789 | 12/05/2023 | November 2023 |
| | | | Personal Air Sampler/Gilian | S/N 20111203067 | 13/05/2023 | June 2023 |
| | | | Personal Air Sampler/Gilian | S/N 20120103055 | 13/05/2023 | June 2023 |
| | | | Personal Air Sampler/Gilian | S/N 20120103069 | 13/05/2023 | June 2023 |
| | | | Personal Air Sampler/Gilian | S/N 20120103064 | 13/05/2023 | June 2023 |
| | | | CO Analyzer/API 300 | S/N 1068 | 12/05/2023 | November 2023 |

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TET

Thai Environmental Technic Limited
บริษัท เทคนิคสิ่งแวดล้อมไทย จำกัด

ตารางการสอบเทียบเครื่องมือที่ใช้ในการตรวจวัดและวิเคราะห์

| Item | Description | Parameter | List of Equipment | Equipment No. | Calibration | Next Calibration |
|------|-------------|------------------------------------|------------------------------------|-----------------|---------------|------------------|
| 1. | Stack Air | Particulate | Dry Gas Meter/SK25 EX | S/N 1173 | 14/02/2023 | February 2024 |
| | | | Dry Gas Meter/SK25 EX | S/N 604 | 14/02/2023 | February 2024 |
| | | | Dry Gas Meter/SK25 EX | S/N 1317 | 14/02/2023 | February 2024 |
| | | | Digital Barometer/PHB-318 | S/N AL42127 | 04/11/2022 | November 2023 |
| | | | Digital Barometer/PHB-318 | S/N B011410 | 25/05/2023 | May 2024 |
| | | | Digital Barometer/PHB-318 | S/N B011413 | 13/03/2023 | May 2024 |
| | | | Digital Thermometer/DP-52 | S/N L411636 | 03-13/03/2023 | May 2024 |
| | | | Digital Thermometer/DP-52 | S/N L392059 | 06-09/09/2022 | September 2023 |
| | | | Digital Thermometer/DP-52 | S/N L392058 | 10-14/11/2022 | November 2023 |
| | | | Electronic Balance/METTLER TOLEDO | S/N 1116392227 | 11/04/2023 | April 2024 |
| | | NO _x as NO ₂ | Gas Analyzer (E-instrument)/4400-S | S/N 4101 | 07/01/2023 | January 2024 |
| | | | Gas Analyzer (E-instrument)/4400-S | S/N 4102 | 07/01/2023 | January 2024 |
| | | | Gas Analyzer (E-instrument)/4500-S | S/N 2178 | 07/01/2023 | January 2024 |
| | | HF | Personal Air Sampler/Gilian | S/N 20111001071 | 13/05/2023 | June 2023 |
| | | | Personal Air Sampler/Gilian | S/N 20111203067 | 13/05/2023 | June 2023 |
| | | NaOH | Ion Chromatograph/ICS-1100 | S/N 10010987 | 30/03/2023 | March 2024 |
| | | | Personal Air Sampler/Gilian | S/N 20140505072 | 13/05/2023 | June 2023 |
| | | | Personal Air Sampler/Gilian | S/N 20111203066 | 13/05/2023 | June 2023 |
| | | | Personal Air Sampler/Gilian | S/N 20120103069 | 13/05/2023 | June 2023 |
| | | | Personal Air Sampler/Gilian | S/N 20151003003 | 12/06/2023 | July 2023 |
| | | H ₂ SO ₄ | Personal Air Sampler/Gilian | S/N 20151102081 | 12/06/2023 | July 2023 |
| | | | Dry Gas Meter/SK25 EX | S/N 1317 | 14/02/2023 | February 2024 |
| | | | Digital Barometer/PHB-318 | S/N AL42127 | 04/11/2022 | November 2023 |
| | | O ₂ , CO | Digital Thermometer/DP-52 | S/N L392059 | 06-09/09/2022 | September 2023 |
| | | | Gas Analyzer (E-instrument)/4400-S | S/N 4101 | 07/01/2023 | January 2024 |
| | | Xylene | Gas Analyzer (E-instrument)/4400-S | S/N 4102 | 07/01/2023 | January 2024 |
| | | | Personal Air Sampler/Gilian | S/N 20151003003 | 14/06/2023 | July 2023 |
| | | | Personal Air Sampler/Gilian | S/N 20140505029 | 23/06/2023 | July 2023 |
| | | | Personal Air Sampler/Gilian | S/N 20151003049 | 23/06/2023 | July 2023 |
| | | | Gas Chromatograph/GC78908 | S/N CN16343040 | 26/09/2022 | September 2023 |

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ตารางการสอบเทียบเครื่องมือที่ใช้ในการตรวจวัดและวิเคราะห์ (ต่อ)

| Item | Description | Parameter | List of Equipment | Equipment No. | Calibration | Next Calibration |
|------|-------------|------------------|------------------------------------------------------------|---------------------|-------------|------------------|
| 4. | Wastewater | pH | pH Meter/Horiba | S/N B06D0012 | 11/07/2022 | July 2023 |
| | | Temperature | pH Meter (Temperature)/Horiba | S/N B06D0012 | 11/07/2022 | July 2023 |
| | | SS | Electronic Balance/METTLER TOLEDO | S/N 1116392227 | 11/04/2023 | April 2024 |
| | | TDS | Electronic Balance/METTLER TOLEDO | S/N 1116392227 | 11/04/2023 | April 2024 |
| | | BOD | BOD Incubator | ID/N TET.LAB.BOD 05 | 11/04/2023 | April 2024 |
| | | Sulfate | Spectrophotometer/PerkinElmer | S/N 365K9042909 | 01/11/2022 | November 2023 |
| | | Sulfide | Spectrophotometer/PerkinElmer | S/N 365K9042909 | 01/11/2022 | November 2023 |
| | | Cyanide | Spectrophotometer/PerkinElmer | S/N 365K9042909 | 01/11/2022 | November 2023 |
| | | Formaldehyde | Spectrophotometer/PerkinElmer | S/N 365K9042909 | 01/11/2022 | November 2023 |
| | | Phenol | Spectrophotometer/PerkinElmer | S/N 365K9042909 | 01/11/2022 | November 2023 |
| | | Oil & Grease | Electronic Balance/METTLER TOLEDO | S/N 1116392227 | 11/04/2023 | April 2024 |
| | | Cr ⁶ | Spectrophotometer/PerkinElmer | S/N 365K9042909 | 01/11/2022 | November 2023 |
| | | Cr ³⁺ | Spectrophotometer/PerkinElmer | S/N 365K9042909 | 01/11/2022 | November 2023 |
| | | | ICP394/PerkinElmer/OPTIMA8000 | S/N 078N1310024C | 03/04/2023 | October 2023 |
| | | Al, Ba | ICP394/PerkinElmer/OPTIMA8000 | S/N 078N1310024C | 03/04/2023 | October 2023 |
| | | Cd | ICP394/PerkinElmer/OPTIMA8000 | S/N 078N1310024C | 03/04/2023 | October 2023 |
| | | Co | ICP394/PerkinElmer/OPTIMA8000 | S/N 078N1310024C | 03/04/2023 | October 2023 |
| | | Cu, Pb | ICP394/PerkinElmer/OPTIMA8000 | S/N 078N1310024C | 03/04/2023 | October 2023 |
| | | Mn, Ni | ICP394/PerkinElmer/OPTIMA8000 | S/N 078N1310024C | 03/04/2023 | October 2023 |
| | | Fe, Zn | ICP394/PerkinElmer/OPTIMA8000 | S/N 078N1310024C | 03/04/2023 | October 2023 |
| | | As, Se | Atomic Absorption Spectrophotometer Model/AAAnalyst 100 | S/N 040S0110503 | 30/03/2023 | September 2023 |
| | | Hg | Atomic Absorption Spectrophotometer Model/AAAnalyst 100 | S/N 040S0110503 | 30/03/2023 | September 2023 |

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Thai Environmental Technic Limited
บริษัท เทคนิคสิ่งแวดล้อมไทย จำกัด

ตารางการสอบเทียบเครื่องมือที่ใช้ในการตรวจวัดและวิเคราะห์ (ต่อ)

| Item | Description | Parameter | List of Equipment | Equipment No. | Calibration | Next Calibration |
|------|---------------------|--------------------------------|--------------------------------------------------|------------------|-------------|------------------|
| 2. | Ambient Air (Cont.) | WS & WD | Wind speed and wind direction/Weather Wizard III | S/N LE10919AA62 | 16/06/2022 | June 2023 |
| | | | Wind speed and wind direction/Weather Wizard III | S/N WC40105A43 | 16/06/2022 | June 2023 |
| | | | Wind speed and wind direction/Weather Wizard II | S/N WC50309B03 | 16/09/2022 | September 2023 |
| | | | Wind speed and wind direction/Vantag VUE/6250EU | S/N E110124A077 | 19/10/2022 | October 2023 |
| 3. | Working Air | Total Dust | Personal Air Sampler/Gilian | S/N 20080703013 | 05/05/2023 | June 2023 |
| | | | Personal Air Sampler/Gilian | S/N 20080703019 | 05/05/2023 | June 2023 |
| | | | Personal Air Sampler/Gilian | S/N 20111203058 | 05/05/2023 | June 2023 |
| | | | Electronic Balance/XP 205 | S/N 1129273885 | 11/04/2023 | April 2024 |
| | | Al | Personal Air Sampler/Gilian | S/N 20111203066 | 05/05/2023 | June 2023 |
| | | | ICP394/PerkinElmer/OPTIMA8000 | S/N 078N1310024C | 03/04/2023 | October 2023 |
| | | HF | Personal Air Sampler/Gilian | S/N 20120103069 | 05/05/2023 | June 2023 |
| | | NaOH | Personal Air Sampler/Gilian | S/N 101158 | 05/05/2023 | June 2023 |
| | | H ₂ SO ₄ | Personal Air Sampler/Gilian | S/N 101151 | 05/05/2023 | June 2023 |
| | | NH ₃ | Ion Chromatograph/ICS-1100 | S/N 10010987 | 30/03/2023 | March 2024 |
| | | | Personal Air Sampler/Gilian | S/N 101149 | 05/05/2023 | June 2023 |
| | | Xylene | Spectrophotometer/PerkinElmer | S/N 365K9042909 | 01/11/2022 | November 2023 |
| | | | Personal Air Sampler/Gilian | S/N 20140505013 | 05/05/2023 | June 2023 |
| | | Toluene | Gas Chromatograph/GC7890B | S/N CN16343040 | 26/09/2022 | September 2023 |
| | | | Personal Air Sampler/Gilian | S/N 20140505013 | 05/05/2023 | June 2023 |
| | | Benzene | Gas Chromatograph/GC7890B | S/N CN16343040 | 26/09/2022 | September 2023 |
| | | | Personal Air Sampler/Gilian | S/N 20140505013 | 05/05/2023 | June 2023 |
| | | | Gas Chromatograph/GC7890B | S/N CN16343040 | 26/09/2022 | September 2023 |

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Thai Environmental Technic Limited
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ตารางการสอบเทียบเครื่องมือที่ใช้ในการตรวจวัดและวิเคราะห์ (ต่อ)

| Item | Description | Parameter | List of Equipment | Equipment No. | Calibration | Next Calibration |
|------|--------------------------------|-----------|---------------------------------------|---------------|-------------|------------------|
| 5. | Sound Level | Leq 24 hr | Sound Level Calibrator/TENMARS TM-100 | S/N 181203570 | 16/01/2023 | January 2024 |
| | | | Integrated Sound Level/ACO TYPE 6226 | S/N 100098 | 25/04/2023 | 31/05/2023 |
| | | | Integrated Sound Level/ACO TYPE 6226 | S/N 130127 | 25/04/2023 | 31/05/2023 |
| | | | Integrated Sound Level/ACO TYPE 6226 | S/N 160095 | 25/04/2023 | 31/05/2023 |
| | | | Integrated Sound Level/ACO TYPE 6226 | S/N 160097 | 25/04/2023 | 31/05/2023 |
| 6. | Occupational Safety and Health | Leq 8 hr | Sound Level Calibrator/TENMARS TM-100 | S/N 181203570 | 16/01/2023 | January 2024 |
| | | | Integrated Sound Level/ACO TYPE 6226 | S/N 110099 | 23/03/2023 | 30/04/2023 |
| | | | Integrated Sound Level/ACO TYPE 6226 | S/N 110106 | 23/03/2023 | 30/04/2023 |
| | | | Integrated Sound Level/ACO TYPE 6226 | S/N 130129 | 23/03/2023 | 30/04/2023 |
| | | | Integrated Sound Level/ACO TYPE 6236 | S/N 112029 | 23/03/2023 | 30/04/2023 |
| | | | Integrated Sound Level/ACO TYPE 6226 | S/N 160099 | 23/03/2023 | 30/04/2023 |
| | | | Integrated Sound Level/ACO TYPE 6226 | S/N 100102 | 24/05/2023 | 30/06/2023 |
| | | | Integrated Sound Level/ACO TYPE 6226 | S/N 160216 | 24/05/2023 | 30/06/2023 |
| | | | Integrated Sound Level/ACO TYPE 6236 | S/N 222038 | 24/05/2023 | 30/06/2023 |
| | | | Integrated Sound Level/ACO TYPE 6236 | S/N 222248 | 24/05/2023 | 30/06/2023 |
| | | | Integrated Sound Level/SCARLET/ST-11D | S/N 820390 | 24/05/2023 | 30/06/2023 |
| | | | Integrated Sound Level/SCARLET/ST-11D | S/N 820877 | 24/05/2023 | 30/06/2023 |
| | | Heat | Liquid in Glass Thermometer/ AMA | S/N 1851321 | 18/11/2022 | November 2023 |
| | | | Liquid in Glass Thermometer/ AMA | S/N 1851322 | 18/11/2022 | November 2023 |
| | | | Liquid in Glass Thermometer/ AMA | S/N 1851349 | 18/11/2022 | November 2023 |
| | | | Liquid in Glass Thermometer/ AMA | S/N 1851353 | 11/02/2023 | February 2024 |
| | | | Liquid in Glass Thermometer/ AMA | S/N 1851354 | 11/02/2023 | February 2024 |
| | | | Liquid in Glass Thermometer/ AMA | S/N 1851362 | 11/02/2023 | February 2024 |



Thai Environmental Technic Limited
บริษัท เทคนิคสิ่งแวดล้อมไทย จำกัด



THAI ENVIRONMENTAL TECHNIC LIMITED
บริษัท เทคโนโลยีสิ่งแวดล้อมไทย จำกัด

CONTROL UNIT CALIBRATION

(Metric units , mm)

| | | | | |
|--------------------|-----------|------------------------------|-----------|---------|
| Date | 14-Feb-23 | Initial | Final | Average |
| | | 758.40 | 758.50 | 758.45 |
| | | Barometric press, Pb | | |
| | | mmHg | | |
| Dry Gas Meter Data | | Reference Dry Gas Meter Data | | |
| Console No. | M50-06 | Serial No. | 913428 | |
| Metering System ID | | Model. | S-110 | |
| DGM Number | 604 | Correction factor(Yr) | 0.997 | |
| DGM Model | SK25EX | Last Calibration Data | 30-May-22 | |

| Orifice manometer setting ΔH mm H ₂ O | Ref . DMG Volume V_r Liters | DGM Volume V_m Liters | Temperature (° C) | | | Time min | DGM Correction factor (Y) | $\Delta H @$ mm H ₂ O |
|-------------------------------------------------------------------|----------------------------------------|----------------------------------|---------------------|---------------|--------|-------------|---------------------------------|-------------------------------------|
| | | | Ref | Dry Gas Meter | | | | |
| | | | | Inlet T_i | Outlet | | | |
| | | | | | T_r | T_o | | |
| 15.00 | 100.00 | 99.97 | 27.00 | 27.00 | 28.00 | 27.50 | 0.9975 | 46.2024 |
| 25.00 | 100.00 | 99.85 | 27.00 | 27.00 | 28.00 | 27.50 | 0.9977 | 46.1896 |
| 50.00 | 100.00 | 99.82 | 27.00 | 27.00 | 28.00 | 27.50 | 0.9956 | 46.4448 |
| 80.00 | 100.00 | 100.20 | 27.00 | 27.00 | 28.00 | 27.50 | 0.9890 | 46.5882 |
| 100.00 | 100.00 | 100.40 | 27.00 | 27.00 | 28.00 | 27.50 | 0.9851 | 46.5246 |

| | | |
|------------------------|-----------|---------|
| Average | 0.9930 | 46.3899 |
| Dued Date of Calibrate | 14-Feb-24 | |

Calibrated by: Yds

Approved: Piyada B

Note: For Calibration Factor Y, the ratio of the reading of the calibration meter to the dry gas meter, acceptable tolerance of individual values from the average is ± 0.02 .
Note: For $\Delta H @$, Orifice pressure differential that equates to 0.75cfm (0.0212m³/min) at standard temperature and pressure, acceptable tolerance of individual values from the average is ± 0.2 inches (5.1mm)H₂O.



THAI ENVIRONMENTAL TECHNIC LIMITED
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CONTROL UNIT CALIBRATION

(Metric units , mm)

| | | | | |
|--------------------|-----------|------------------------------|-----------|---------|
| Date | 14-Feb-23 | Initial | Final | Average |
| | | 758.3 | 758.4 | 758.4 |
| | | Barometric press, Pb | | |
| | | mmHg | | |
| Dry Gas Meter Data | | Reference Dry Gas Meter Data | | |
| Console No. | M50-05 | Serial No. | 913428 | |
| Metering System ID | | Model. | S-110 | |
| DGM Number | 1173 | Correction factor(Yr) | 0.997 | |
| DGM Model | SK25EX | Last Calibration Data | 30-May-22 | |

| Orifice manometer setting ΔH mm H ₂ O | Ref . DMG Volume V_r Liters | DGM Volume V_m Liters | Temperature (° C) | | | | Time min | DGM Correction factor (Y) | $\Delta H @$ mm H ₂ O | |
|-------------------------------------------------------------------|----------------------------------------|----------------------------------|---------------------|---------------|--------------|-------|-------------|---------------------------------|-------------------------------------|-------|
| | | | Ref | Dry Gas Meter | | | | | | T_m |
| | | | | Inlet T_i | Outlet T_o | | | | | |
| | | | | | Avg | T_m | | | | |
| 15.00 | 100.00 | 98.96 | 27.00 | 27.00 | 28.00 | 27.50 | 8.20 | 1.0077 | 46.3214 | |
| 25.00 | 100.00 | 98.97 | 27.00 | 27.00 | 28.00 | 27.50 | 6.36 | 1.0066 | 46.4876 | |
| 50.00 | 100.00 | 99.70 | 27.00 | 27.00 | 28.00 | 27.50 | 4.51 | 0.9968 | 46.8657 | |
| 80.00 | 100.00 | 99.97 | 27.00 | 27.00 | 28.00 | 27.50 | 3.54 | 0.9913 | 46.3323 | |
| 100.00 | 100.00 | 99.05 | 27.00 | 27.00 | 28.00 | 27.50 | 3.15 | 0.9986 | 45.9455 | |

| | | |
|------------------------|-----------|---------|
| Average | 1.0002 | 46.3905 |
| Dued Date of Calibrate | 14-Feb-24 | |

Calibrated by: Yds

Approved: Piyada B

Note: For Calibration Factor Y, the ratio of the reading of the calibration meter to the dry gas meter, acceptable tolerance of individual values from the average is ± 0.02 .
Note: For $\Delta H @$, Orifice pressure differential that equates to 0.75cfm (0.0212m³/min) at standard temperature and pressure, acceptable tolerance of individual values from the average is ± 0.2 inches (5.1mm)H₂O.



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
53/44 PATTANAKARN ROAD SOI 18, SUANLUANG, BANGKOK 10250
TEL. 0-2717-3000-24 FAX. 0-2715-9484



THAI ENVIRONMENTAL TECHNIC LIMITED
บริษัท เทคโนโลยีสิ่งแวดล้อมไทย จำกัด

Certificate of Calibration

Certificate No.: 22P0302
Page: 1 of 2

Equipment: Humidity/Barometer/Temp.
Manufacturer: Lutron
Model: PHB-318
Serial No.: AI-4612Z
Condition As-Received: Used Item
Received Date: 03 November 2022
Calibration Date: 04 November 2022
Reference: 2211-0150WSC
Submitted by: Thai Environmental Technic Limited
1/6 Soi Ramkhamhaeng 145, Khwaeng/Khet Saphan Sung,
Bangkok 10240

This certificate may not be reproduced other than in full,
except with the prior written approval of the head of
Corporate Services 3: Equipment Calibration and Testing Services.

Humidity/Barometer/Temp.
Lutron
PHB-318
AI-4612Z
NO.2
Used Item
03 November 2022
04 November 2022
2211-0150WSC
Thai Environmental Technic Limited
1/6 Soi Ramkhamhaeng 145, Khwaeng/Khet Saphan Sung,
Bangkok 10240

Ambient Temperature: $(23 \pm 2) ^\circ\text{C}$
Relative Humidity: $(50 \pm 15) \%$
Atmospheric Pressure: 1012 mbar

Procedure used: The calibration was conducted by direct comparison method against Pressure Measuring Instruments
Standard according to in-house calibration procedure CP-P10, using "DKO-R 6-1; Calibration of Pressure
Gauges, Edition 03/2014" as a guidelines.

Condition of this result of calibration

1.Reference standards instruments:

1) Standard Barometer
Model: DPH42
Serial No.: 1422505046
Certificate No.: MP-0076-22
Due Date: 02 May 2023

2.This instrument was installed in horizontal orientation and center of connector was used as the reference level.

3.This result of calibration was made on requested at the point specified by customer.

4.Scale and conversion factor is: 1 kPa = 7.50062 mmHg

5.This result of calibration instrument was in absolute pressure.

6.This instrument was used clean air as pressure media.

7.The certificate is valid only to the item calibrated on date and place of calibration.

8.This Certification is traceable to the International System of Unit maintained at:-
National Institute of Metrology Thailand (NIMT)

Calibrated by: Nopparat Phongam
Issue Date: 07 November 2022

Approved Signatory: Atapol P.
[] Phalinee Prabpai
[] Sura Suwanmasri
[x] Atapol Panurach

B 0301559



THAI ENVIRONMENTAL TECHNIC LIMITED
บริษัท เทคโนโลยีสิ่งแวดล้อมไทย จำกัด

CONTROL UNIT CALIBRATION

(Metric units , mm)

Date: 14-Feb-23
Initial: 758.2 Final: 758.1 Average: 758.2 mmHg
Barometric press, Pb
Dry Gas Meter Data
Console No.: M50-07 Reference Dry Gas Meter Data
Serial No.: 913428
Metering System ID
Model: S-110
DGM Number
1317
Correction factor(Yr): 0.997
DGM Model
SK25EX
Last Calibration Date
30-May-22

| Orifice manometer setting ΔH mm H ₂ O | Ref. DMG Volume V _r Liters | DGM Volume V _m Liters | Temperature (°C) | | | Time min | DGM Correction factor (Y) | $\Delta H @$ mm H ₂ O | |
|-------------------------------------------------------------------|------------------------------------------------|-------------------------------------------|------------------|----------------------|--------------------------|-------------|---------------------------------|-------------------------------------|-----------------------|
| | | | Ref | Dry Gas Meter | | | | | |
| | | | | Inlet T _i | Outlet T _o | | | | Avg T _m |
| | | | | | | | | | |
| 15.00 | 100.00 | 100.90 | 27.00 | 27.00 | 28.00 | 27.50 | 8.19 | 0.9883 | 46.2207 |
| 25.00 | 100.00 | 100.20 | 27.00 | 27.00 | 28.00 | 27.50 | 6.33 | 0.9943 | 46.0622 |
| 50.00 | 100.00 | 100.20 | 27.00 | 27.00 | 28.00 | 27.50 | 4.47 | 0.9919 | 46.0502 |
| 80.00 | 100.00 | 100.02 | 27.00 | 27.00 | 28.00 | 27.50 | 3.53 | 0.9908 | 46.0831 |
| 100.00 | 100.00 | 100.32 | 27.00 | 27.00 | 28.00 | 27.50 | 3.17 | 0.9859 | 46.5432 |

Average: 0.9902
Dued Date of Calibrate: 14-Feb-24

Calibrated by: yphs
Approved: Piyada B.

Note: For Calibration Factor Y, the ratio of the reading of the calibration meter to the dry gas meter, acceptable tolerance of individual values from the average is ± 0.02 .
Note: For $\Delta H @$, Orifice pressure differential that equates to 0.75cm (0.0212m) (mm) at standard temperature and pressure, acceptable tolerance of individual values from the average is ± 0.2 inches (5.1mmHg).

Thai Environmental Technic Limited 1/6 Soi Ramkhamhaeng 145 Khwaeng/Khet Saphan Sung Bangkok 10240 Thailand
Tel: +66(0)3373-7799(Auto) Fax: +66(0)3373-7979 admin@et1995.com www.et1995.com



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
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TEL. 0-2717-3000-24 FAX. 0-2719-9484



CALIBRATION 1688

Certificate of Calibration

Certificate No.: 23P1687
Page: 1 of 2

Equipment:

Digital Barometer

Manufacturer:

Lutron

Model:

PHB-318

Serial No.:

B011410

ID No.:

No.4

Condition As-Received:

Used Item

Received Date:

24 May 2023

Calibration Date:

25 May 2023

Reference:

2305-0815WSC

Ambient Temperature:

(23 ± 2) °C

Relative Humidity:

(50 ± 15) %

Atmospheric Pressure:

1006 mbar

Submitted by: That Environmental Technic Limited

1/6 Soi Ramkhamhaeng 145, Khwaeng/Khet Saphan Sung,
Bangkok 10240

Procedure used:

The calibration was conducted by direct comparison method against Pressure Measuring Instruments Standard according to in-house calibration procedure GP-P10, using "DKD-R 6-1 ; Calibration of Pressure Gauges, Edition 03/2014 " as a guidelines.

Condition of this result of calibration

1.Reference standards instruments :

Instrument

Model

Serial No.

Certificate No.

Due Date

1) Standard Barometer

DP142

1422505046

MP-0094-23

03 May 2024

2.This result of calibration was made on requested at the point specified by customer.

3.Scale and conversion factor is 1 kPa = 7.50062 mmHg

4.This result of calibration instrument was in absolute pressure.

5.This instrument was used clean air as pressure media.

6.This result of calibration was calibrated while opening the plug to vent the atmospheric pressure.

7.The certificate is valid only to the item calibrated on date and place of calibration.

8.This Certification is traceable to the International System of Unit maintained through-

-National Institute of Metrology Thailand (NIMT)

Calibrated by: Sukkan Khankaew
Issue Date: 26 May 2023

Approved Signatory: *Attapol P.*
[] Phalinee Prabpai
[] Sura Suwannasri
[x] Attapol Panurach

B 0315718



Cert.No.: 22P3532
Page: 2 of 2

Result of calibration:- Without adjustment

Range: 730 mmHg to 790 mmHg

Function:- Absolute Pressure Measurement

Resolution: 0.1 mmHg

Increasing Pressure

| Applied Pressure (mmHg) | 729.90 | 739.90 | 749.89 | 759.89 | 769.89 | 779.89 | 789.89 |
|-------------------------|--------|--------|--------|--------|--------|--------|--------|
| UUC* Indication (mmHg) | 729.4 | 739.4 | 749.4 | 759.4 | 769.4 | 779.4 | 789.4 |
| Error (mmHg) | -0.50 | -0.50 | -0.49 | -0.49 | -0.49 | -0.49 | -0.49 |

Decreasing Pressure

| Applied Pressure (mmHg) | 769.89 | 779.89 | 789.89 | 799.89 | 749.89 | 739.90 | 729.90 |
|-------------------------|--------|--------|--------|--------|--------|--------|--------|
| UUC* Indication (mmHg) | 769.4 | 779.4 | 789.4 | 799.4 | 749.4 | 739.4 | 729.4 |
| Error (mmHg) | -0.49 | -0.49 | -0.49 | -0.49 | -0.49 | -0.50 | -0.50 |

The uncertainty of measurement was ± 0.23 mmHg

*UUC = Unit Under Calibration

The reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor $k = 2$, providing a level of confidence of approximately 95 %.

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Attapol P.

a 1133640



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
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NSC-TB1-713.1725
CALIBRATION 0018

Certificate of Calibration

Certificate No.: 23P791
Page: 1 of 2

Equipment: Humidity/Barometer/Temp.
Manufacturer: Lutron
Model: PHB-318
Serial No.: B011413
ID No.: NO.6
Condition As-Received: Used Item
Received Date: 03 March 2023
Calibration Date: 13 March 2023
Reference: 2303-0118DSC
Ambient Temperature: $(23 \pm 2) ^\circ\text{C}$
Relative Humidity: $(50 \pm 15) \%$
Atmospheric Pressure: 1010 mbar
Submitted by: Thai Environmental Technic Limited
1/6 Soi Ramkhamhaeng 145, Khwaeng/Khet Saphan Sung,
Bangkok 10240

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except with the prior written approval of the head of
Corporate Services 3: Equipment Calibration and Testing Services.

Procedure used: The calibration was conducted by direct comparison method against Pressure Measuring Instruments
Standard according to in-house calibration procedure CP-P10, using "DKO-R 6-1; Calibration of Pressure
Gauges, Edition 03/2014." as a guidelines.

Condition of this result of calibration

1. Reference standards instruments:

| Instrument | Model | Serial No. | Certificate No. | Due Date |
|-----------------------|--------|------------|-----------------|-------------|
| 1) Standard Barometer | DPI142 | 1422505046 | MP-0076-22 | 02 May 2023 |

2. This result of calibration was made on requested at the point specified by customer.

3. Scale and conversion factor is 1 kPa = 7.50062 mmHg

4. This result of calibration instrument was in absolute pressure.

5. This instrument was used clean air as pressure media.

6. This instrument was installed in vertical orientation and center of the device was used as the reference level.

7. The certificate is valid only to the item calibrated on date and place of calibration.

8. This Certification is traceable to the International System of Unit maintained at-

-National Institute of Metrology Thailand (NIMT)

Calibrated by: Suksan Khankaew
Issue Date: 14 March 2023

Approved Signatory: Attapol P.
[] Phalinee Prabpaijal
[] Sura Suwanmasri
[x] Attapol Panurach

B 0310698



Cert.No.: 23P1667
Page: 2 of 2

Result of calibration:- Without adjustment
Function:- Absolute Pressure Measurement
Range: 730 mmHg to 770 mmHg
Resolution: 0.1 mmHg

| Increasing Pressure | | | | | |
|-------------------------|--------|--------|--------|--------|--------|
| Applied Pressure (mmHg) | 729.90 | 739.90 | 749.89 | 759.89 | 769.89 |
| UUC* Indication (mmHg) | 730.6 | 740.6 | 750.6 | 760.6 | 770.6 |
| Error (mmHg) | 0.70 | 0.70 | 0.71 | 0.71 | 0.71 |

| Decreasing Pressure | | | | | |
|-------------------------|--------|--------|--------|--------|--------|
| Applied Pressure (mmHg) | 769.89 | 759.89 | 749.89 | 739.90 | 729.90 |
| UUC* Indication (mmHg) | 770.6 | 760.6 | 750.6 | 740.6 | 730.6 |
| Error (mmHg) | 0.71 | 0.71 | 0.71 | 0.70 | 0.70 |

The uncertainty of measurement was ± 0.23 mmHg

* UUC = Unit Under Calibration

The reported uncertainty of measurement was based on a standard uncertainty multiplied
by a coverage factor $k = 2$, providing a level of confidence of approximately 95 %.

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Attapol P.

a 1163290



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
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ISO 17025
CALIBRATION 008

Certificate of Calibration

Certificate No. : 23T438
Page : 1 of 2

Equipment : Digital Thermometer With Sensor
Manufacturer : Digicon
Model : DP-52
Serial No. : I 411636
ID No. : No.11
Condition As-Received: Used Item
Received Date: 17 February 2023
Calibration Date: 03 March 2023
Reference: 2302-0659DSC
Ambient Temperature: (25 ± 3) °C
Relative Humidity: (50 ± 20) %

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Corporate Services 3: Equipment Calibration and Testing Services.

Submitted by: Thai Environmental Technic Limited

1/6 Soi Ramkhamhaeng 145, Khwaeng/Khet Saphan Sung,
Bangkok 10240

Procedure used: Calibration were conducted using in-house calibration procedure CP-T01 according to comparison with
Industrial Platinum Resistance Thermometer (IPRT) into liquid bath temperature controller and comparison
with Standard Thermocouple (Type RS) into high temperature furnace.
The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standards instruments :

| Instrument | Model | Serial No. | Certificate No. | Due Date |
|-----------------------------------------------|-------|------------|-----------------|-------------|
| 1) Black Stack Thermometer | 1560 | 8C454 | 221616 | 23 May 2023 |
| 2) PRT Scanner Module | 2562 | A01303 | 221616 | 23 May 2023 |
| 3) Industrial PRT Probe | 5627A | 979442 | 221616 | 23 May 2023 |
| 4) Digital Thermometer | 1529 | A48760 | 221089 | 09 Sep 2023 |
| 5) Industrial Platinum Resistance Thermometer | 5627 | 824302 | 221089 | 09 Sep 2023 |
| 6) Digital Multimeter | 2700 | 4016315 | 22E3264 | 05 Oct 2023 |
| 7) Thermocouple Type S | TCS | TCS-002 | TT-0125-22 | 28 Oct 2023 |

2. The certificate is valid only to the item calibrated on date and place of calibration.

3. This Certification is traceable to the International System of Unit maintained at:-

-National Institute of Metrology Thailand (NIMT)

Calibrated by : Silthinnon Poornal
Issue Date : 17 March 2023

Approved Signatory :
[] Phalinee Prabpaipal
[] Chalchawan Khunpilleuk
[] Wanlop Larpkum

B 0310263



Cert.No.: 23P791
Page: 2 of 2

Result of calibration:- Without adjustment
Function:- Absolute Pressure Measurement
Range: 740 mmHg to 760 mmHg
Resolution: 0.1 mmHg

| Increasing Pressure | 739.50 | 749.89 | 759.89 | 769.89 | 779.89 |
|-------------------------|--------|--------|--------|--------|--------|
| Applied Pressure (mmHg) | 739.50 | 749.89 | 759.89 | 769.89 | 779.89 |
| UUC* Indication (mmHg) | 740.5 | 750.5 | 760.5 | 770.5 | 780.5 |
| Error (mmHg) | 0.70 | 0.71 | 0.61 | 0.61 | 0.61 |

| Decreasing Pressure | 779.89 | 769.89 | 759.89 | 749.89 | 739.50 |
|-------------------------|--------|--------|--------|--------|--------|
| Applied Pressure (mmHg) | 779.89 | 769.89 | 759.89 | 749.89 | 739.50 |
| UUC* Indication (mmHg) | 780.5 | 770.5 | 760.5 | 750.5 | 740.6 |
| Error (mmHg) | 0.61 | 0.61 | 0.61 | 0.61 | 0.70 |

The uncertainty of measurement was ± 0.23 mmHg

* UUC = Unit Under Calibration

The reported uncertainty of measurement was based on a standard uncertainty multiplied
by a coverage factor $k = 2$, providing a level of confidence of approximately 95 %.

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Att:pol P.

a 1152199



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
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TEL. 0-2717-3000-24 FAX. 0-2719-9481



CALIBRATION 808

Certificate of Calibration

Certificate No. : 22T1804
Page : 1 of 2

Equipment : Digital Thermometer With Sensor
Manufacturer : Digicon
Model : DP-52
Serial No. : I392059
ID No. : No.9
Condition As-Received: Used Item
Received Date: 26 August 2022
Calibration Date: 06 September 2022
Reference: 2206-0934DSC
Ambient Temperature: (25 ± 3) °C
Relative Humidity: (50 ± 20) %
Submitted by: Thai Environmental Technic Limited
1/6 Soi Ramkhamhaeng 145, Khwaeng/Khet Saphan Sung,
Bangkok 10240

Procedure used: Calibration were conducted using in-house calibration procedure CP-T01 according to comparison with Platinum Resistance Thermometer (PRT) and Industrial Platinum Resistance Thermometer (IPRT) into liquid bath temperature controller and comparison with Standard Thermocouple (Type R/S) into high temperature furnace.

The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standards instruments :

| Instrument | Model | Serial No. | Certificate No. | Due Date |
|-----------------------------------------------|-----------|------------|-----------------|-------------|
| 1) Black Slack Thermometer | 1560 | 8C454 | 221616 | 23 May 2023 |
| 2) PRT Scanner Module | 2562 | A01303 | 221616 | 23 May 2023 |
| 3) Industrial Platinum Resistance Thermometer | 5927 | 739433 | 221616 | 23 May 2023 |
| 4) Digital Thermometer | 1529-R | B19520 | 221635 | 11 Jul 2023 |
| 5) Platinum Resistance Thermometer | 935-14-95 | 261589/2 | 221635 | 11 Jul 2023 |
| 6) Digital Multimeter | 2700 | 4016315 | EE-0106-21 | 14 Oct 2022 |
| 7) Standard Thermocouple Probe (Type S) | TCS | TCS-001 | TT-0114-21 | 08 Dec 2022 |

2. The certificate is valid only to the item calibrated on date and place of calibration.

3. This Certification is traceable to the International System of Unit maintained at-

-National Institute of Metrology Thailand (NIMT)

Calibrated by : Yossapon Poljorn
Issue Date : 15 September 2022

Approved Signatory :
[] Phalinee Prabpai
[] Chatchawan Khunpluek
[x] Wanlop Larpum

B 0296767



Cert. No.: 23T438
Page: 2 of 2

Result of Calibration:-

Without Adjustment

Function: Temperature measurement for Channel T1

This equipment was connected with Thermocouple Type K S/N. 11005002 ID No. NO.11

Dimension of probe : Diameter 8 mm., Length 1030 mm. Sheath material : Stainless Steel

| Immersion Depth (mm.) | Standard Temperature (°C) | UUC* Reading (°C) | Error (°C) | Uncertainty of Measurement (±°C) |
|-----------------------|---------------------------|-------------------|------------|----------------------------------|
| 180 | 200.0053 | 200.3 | 0.2947 | 0.74 |
| 180 | 400.0062 | 399.7 | -0.3062 | 1.4 |
| 150 | 600.00 | 600.5 | 0.5000 | 3.1 |

UUC* : Unit Under Calibration

The reported uncertainty of measurement was based on standard uncertainty multiplied by a coverage factor $k = 2$, providing a level of confidence of approximately 95%.

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REG-NEA
REG-TER-1517255
CALIBRATION 0008

Certificate of Calibration

Certificate No.: 2272110
Page: 1 of 2

Equipment: Digital Thermometer With Sensor
Manufacturer: Digicon
Model: DP-52
Serial No.: 1392058
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ID No.: No.8
Condition As-Received: Used Item
Received Date: 03 November 2022
Calibration Date: 10 November 2022 to 14 November 2022
Reference: 2211-0150WSC
Submitted by: Thai Environmental Technic Limited
Ambient Temperature: $(25 \pm 3) ^\circ\text{C}$
Relative Humidity: $(50 \pm 20) \%$
1/6 Soi Ramkhamhaeng 145, Kluwaeng/Khet Saphan Sung, Bangkok 10240

Procedure used: Calibration were conducted using in-house calibration procedure CP-T01 according to comparison with Industrial Platinum Resistance Thermometer (IPRT) into liquid bath temperature controller and comparison with Standard Thermocouple (Type R/S) into high temperature furnace.
The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standards instruments:

| Instrument | Model | Serial No. | Certificate No. | Due Date |
|-----------------------------------------------|---------|------------|-----------------|-------------|
| 1) Black Stack Thermometer | 1580 | 8C454 | 221616 | 23 May 2023 |
| 2) PRT Scanner Module | 2582 | A01303 | 221616 | 23 May 2023 |
| 3) Industrial Platinum Resistance Thermometer | 5627 | 739433 | 221616 | 23 May 2023 |
| 4) Digital Thermometer | 1529 | A4B760 | 221089 | 09 Sep 2023 |
| 5) Industrial Platinum Resistance Thermometer | 5627 | 824302 | 221089 | 09 Sep 2023 |
| 6) Standard Thermocouple Probe (Type S) | 5650-20 | 9569 | TT-004B-22 | 18 May 2023 |
| 7) Digital Multimeter | 2700 | 4016315 | 22E3264 | 05 Oct 2023 |

2. The certificate is valid only to the item calibrated on date and place of calibration.

3. This Certification is traceable to the International System of Unit maintained at-

-National Institute of Metrology Thailand (NIMT)

Calibrated by: Salaporn Mulkammas
Issue Date: 21 November 2022

Approved Signatory:

[] Phalinee Prabpalae
[] Chatchawan Khunpluek
[x] Wanlop Larpkum

B 0302530



Cert. No.: 22T1604
Page.: 2 of 2

Result of Calibration:-

Without Adjustment
Temperature measurement for Channel T1

This equipment was connected with Thermocouple Type K ID No. 9
Dimension of probe: Diameter 8 mm., Length 1030 mm. Sheath material: Stainless Steel

| Immersion Depth (mm.) | Standard Temperature ($^{\circ}\text{C}$) | UUC* Reading ($^{\circ}\text{C}$) | Error ($^{\circ}\text{C}$) | Uncertainty of Measurement ($\pm^{\circ}\text{C}$) |
|-----------------------|---------------------------------------------|-------------------------------------|------------------------------|------------------------------------------------------|
| 180 | 200.0029 | 200.3 | 0.2971 | 0.73 |
| 180 | 400.0034 | 399.6 | -0.4034 | 1.4 |
| 180 | 599.92 | 600.8 | 0.88 | 3.1 |

UUC*: Unit Under Calibration

The reported uncertainty of measurement was based on standard uncertainty multiplied by a coverage factor $k = 2$, providing a level of confidence of approximately 95%.

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TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
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HSC-T&T
CALIBRATION 8008

Cert.No.: 23MM160
Page.: 1 of 3

Certificate of Calibration

Equipment : Electronic Balance
Manufacturer : Mettler Toledo
Model : AB204
Serial No. : 1116392227
ID No. : TET.LAB.BAL01

Submitted by :
That Environmental Technic Limited
1/6 Soi Ramkhamhaeng 145,
Khwaeng/Khet Saphan Sung,
Bangkok 10240

Location : Balance Room

Received order : 10 April 2023
Calibration Date : 11 April 2023
Ambient Temperature : 15 °C to 40 °C
Relative Humidity : 30 % to 90 %

Calibrated by : Khit Rutlanaprapachai

Approved by :
Approved Signatory

() Pornthippa Tameyakul
() Malee Butkruea
() Suwit Injai

Issue Date : 25 April 2023

The Uncertainties are for a confidence probability of approximately 95 %

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Approval of the head of Corporate Services 3 : Equipment Calibration and Testing Services.

A 0053464



Cert. No.: 22T2110
Page.: 2 of 2

Result of Calibration:-

Without Adjustment
Function: Temperature measurement for Channel T1

This equipment was connected with Thermocouple Type K ID No. I.392058/T1
Dimension of probe : Diameter. 8. mm., Length. 1028. mm. Sheath material : Stainless Steel.

| Immersion | Standard | UUC* | Reading | Error | Uncertainty |
|-----------|-------------|------|---------|--------|----------------|
| Depth | Temperature | | (°C) | (°C) | of Measurement |
| (mm.) | (°C) | | | | (±°C) |
| 180 | 199.9996 | | 200.9 | 0.9004 | 0.73 |
| 180 | 400.0039 | | 400.5 | 0.4961 | 1.4 |
| 180 | 600.01 | | 601.3 | 1.29 | 3.1 |

UUC* : Unit Under Calibration

The reported uncertainty of measurement was based on standard uncertainty multiplied
by a coverage factor $k = 2$, providing a level of confidence of approximately 95%.

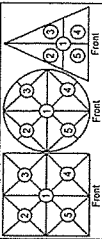
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a 1136865



Equipment : Electronic Balance
Condition As-Received : Used Item
Reference : 2304-0146OC-12

Cert.No.: 23MM160
Page: 3 of 3



2. Effect of off center loading

A mass of 100 g was placed to various position on the pan.
The weighing machine reading error obtained is given in the table

| Position 1 (g) | Position 2 (g) | Position 3 (g) | Position 4 (g) | Position 5 (g) | Maximum difference between off-center and central loading (g) |
|-------------------|-------------------|-------------------|-------------------|-------------------|---------------------------------------------------------------------|
| -0.0002 | -0.0002 | -0.0003 | -0.0003 | -0.0002 | 0.0001 |

3. Departure from nominal value

| Applied Weight (g) | Balance | | Measurement | | Coverage Factor (k) |
|-----------------------|----------------|-------------------|-----------------------|--|---------------------------|
| | Reading (g) | Correction (g) | Uncertainty (± mg) | | |
| Unload | 0.0000 | 0.0000 | 0.14 | | 2.11 |
| 0.01 | 0.0100 | 0.0000 | 0.14 | | 2.11 |
| 0.1 | 0.1001 | -0.0001 | 0.14 | | 2.11 |
| 0.5 | 0.5000 | 0.0000 | 0.14 | | 2.11 |
| 1 | 1.0001 | -0.0001 | 0.14 | | 2.11 |
| 5 | 5.0000 | 0.0000 | 0.14 | | 2.11 |
| 10 | 9.9999 | +0.0001 | 0.14 | | 2.11 |
| 25 | 24.9998 | +0.0002 | 0.15 | | 2.07 |
| 50 | 49.9998 | +0.0002 | 0.16 | | 2.05 |
| 100 | 99.9999 | +0.0001 | 0.18 | | 2.00 |
| 200 | 200.0000 | 0.0000 | 0.29 | | 2.00 |

The reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor k , providing a level of confidence of approximately 95 %.

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Equipment : Electronic Balance
Condition As-Received : Used Item
Reference : 2304-0146OC-12

Cert.No.: 23MM160
Page: 2 of 3

Procedure used :-

Calibration were conducted using in-house calibration procedure CP-OB01 according to direct measurement method against standard weight.

Condition of this result of calibration

1. Reference standard instruments:-

- 1) Standard Weight Set (E2) Model 15884 Serial No. 24053 ID No. 70RC007 Test report No. MM-0010-22 Due date 20 Jan 2024
2. This certificate is valid only to the item calibrated on date and place of calibration.
3. This result of calibration was made on requested at the point specified by customer.
4. This certificate is not certified for any commercial transaction.
5. This certification is traceable to the International System of Unit.

Result of calibration () Without Adjustment (*) After Adjustment by External Calibration

Range capacity : 0 g to 210 g Resolution 0.0001 g

Before Adjustment :

| Applied Weight (g) | Balance | | Measurement | | Coverage Factor (k) |
|-----------------------|----------------|-------------------|-----------------------|--|---------------------------|
| | Reading (g) | Correction (g) | Uncertainty (± mg) | | |
| 100 | 99.9982 | +0.0018 | 0.18 | | 2.00 |
| 200 | 199.9965 | +0.0035 | 0.29 | | 2.00 |

After Adjustment :

1. Determination of the standard deviation of weighing machine (n = 10)

| Applied Weight (g) | Standard Deviation of Reading (g) |
|-----------------------|--------------------------------------|
| 100 | 0.00007 |
| 200 | 0.00007 |

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a 1158499



Thai Environmental Technic Limited
บริษัท เทคโนโลยีสิ่งแวดล้อมไทย จำกัด

Portable Gas Calibration Report

Manufacturer : B-instruments
Instrument Model : 4400S
Instrument serial no. : 4102
Instrument ID : 6

Date of Calibration: 7-Jan-23
Ambient Condition
Temperature (23±5 °C) : 25.0 °C
Humidity (55±15 % RH) : 50.0 % RH
Barometer (mmHg) : 760.0 mmHg

Standard gas References

| Standard gas | Cylinder No. | Traceability | Due date |
|-----------------------------------|--------------|--------------|------------------|
| Oxygen (O ₂) | 27906 | Linde | August 4, 2023 |
| Nitric Oxide(NO) | D025806 | Linde | August 18, 2023 |
| | D824524 | Linde | August 22, 2025 |
| Sulfer Dioxide (SO ₂) | D824500 | Linde | October 11, 2024 |
| | D271305 | Linde | October 11, 2024 |
| Carbon Monoxide(CO) | D824500 | Linde | October 11, 2024 |
| | D271305 | Linde | October 11, 2024 |

Calibration Results

| Parameter | Standard gas | Reading | Actual Error | Test Limit | Results |
|-----------------------|--------------|---------|--------------|--------------------------------------------------------------|---------|
| O ₂ (%vol) | 0.0 | 0.0 | 0.0 | ±0.2 % vol | PASS |
| | 13.9 | 13.9 | 0.0 | | |
| NO (ppm) | 0.0 | 0.0 | 0.0 | | PASS |
| | 199.0 | 200.0 | 1.0 | | |
| | 392.0 | 393.0 | 1.0 | | |
| SO ₂ (ppm) | 0.0 | 0.0 | 0.0 | ±5.0 ppm 0...100 ppm ±5% measured Value 101...5000 ppm | PASS |
| | 406.0 | 405.0 | -1.0 | | |
| | 804.0 | 803.0 | -1.0 | | |
| CO (ppm) | 0.0 | 0.0 | 0.0 | | PASS |
| | 404.0 | 405.0 | 1.0 | | |
| | 793.0 | 792.0 | -1.0 | | |

Calibrate by: Jdins Approved by: Piyachai B



Thai Environmental Technic Limited
บริษัท เทคโนโลยีสิ่งแวดล้อมไทย จำกัด

Portable Gas Calibration Report

Manufacturer : B-instruments
Instrument Model : 4400S
Instrument serial no. : 4101
Instrument ID : 5

Date of Calibration: 7-Jan-23
Ambient Condition
Temperature (23±5 °C) : 25.0 °C
Humidity (55±15 % RH) : 50.0 % RH
Barometer (mmHg) : 760.0 mmHg

Standard gas References

| Standard gas | Cylinder No. | Traceability | Due date |
|-----------------------------------|--------------|--------------|------------------|
| Oxygen (O ₂) | 27906 | Linde | August 4, 2023 |
| Nitric Oxide(NO) | D025806 | Linde | August 18, 2023 |
| | D824524 | Linde | August 22, 2025 |
| Sulfer Dioxide (SO ₂) | D824500 | Linde | October 11, 2024 |
| | D271305 | Linde | October 11, 2024 |
| Carbon Monoxide(CO) | D824500 | Linde | October 11, 2024 |
| | D271305 | Linde | October 11, 2024 |

Calibration Results

| Parameter | Standard gas | Reading | Actual Error | Test Limit | Results |
|-----------------------|--------------|---------|--------------|--------------------------------------------------------------|---------|
| O ₂ (%vol) | 0.0 | 0.0 | 0.0 | ±0.2 % vol | PASS |
| | 13.9 | 13.9 | 0.0 | | |
| NO (ppm) | 0.0 | 0.0 | 0.0 | | PASS |
| | 199.0 | 194.0 | -5.0 | | |
| | 392.0 | 395.0 | 3.0 | | |
| SO ₂ (ppm) | 0.0 | 0.0 | 0.0 | ±5.0 ppm 0...100 ppm ±5% measured Value 101...5000 ppm | PASS |
| | 406.0 | 407.0 | 1.0 | | |
| | 804.0 | 805.0 | 1.0 | | |
| CO (ppm) | 0.0 | 0.0 | 0.0 | | PASS |
| | 404.0 | 406.0 | 2.0 | | |
| | 793.0 | 797.0 | 4.0 | | |

Calibrate by: Jdins Approved by: Piyachai B



Thai Environmental Technic Limited
บริษัท เทคโนโลยีสิ่งแวดล้อมไทย จำกัด

Portable Gas Calibration Report

Manufacturer : E-Instruments
Instrument Model : 4500-S
Instrument serial no. : 2178
Instrument ID : 8

Date of Calibration: 7-Jan-23
Ambient Condition
Temperature (23±5 °C) : 25.0 °C
Humidity (55±15 % RH) : 50.0 % RH
Barometer (mmHg) : 760.0 mmHg

Standard gas References

| Standard gas | Cylinder No. | Traceability | Due date |
|-----------------------------------|--------------|--------------|------------------|
| Oxygen (O ₂) | 27906 | Linde | August 4, 2023 |
| Nitric Oxide(NO) | D025806 | Linde | August 18, 2023 |
| | D824524 | Linde | August 22, 2025 |
| Sulfur Dioxide (SO ₂) | D824500 | Linde | October-11, 2024 |
| | D271305 | Linde | October 11, 2024 |
| Carbon Monoxide(CO) | D824500 | Linde | October 11, 2024 |
| | D271305 | Linde | October 11, 2024 |

Calibration Results

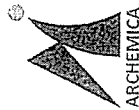
| Parameter | Standard gas | Reading | Actual Error | Test Limit | Results |
|-----------------------|--------------|---------|--------------|----------------------------------------------------------------|---------|
| O ₂ (%vol) | 0.0 | 0.0 | 0.0 | ±0.2 % vol | PASS |
| | 13.9 | 13.9 | 0.0 | | |
| NO (ppm) | 0.0 | 0.0 | 0.0 | | PASS |
| | 199.0 | 201.0 | 2.0 | | |
| | 392.0 | 395.0 | 3.0 | | |
| SO ₂ (ppm) | 0.0 | 0.0 | 0.0 | ±5.0 ppm 0...100 ppm ±5% measured Value 101.....5000 ppm | PASS |
| | 405.0 | 405.0 | -1.0 | | |
| | 804.0 | 802.0 | -2.0 | | |
| CO (ppm) | 0.0 | 0.0 | 0.0 | | PASS |
| | 404.0 | 404.0 | 0.0 | | |
| | 793.0 | 794.0 | 1.0 | | |

Calibrate by:

Approved by:

Piyacha B

Thai Environmental Technic Limited 1/6 Soi Ramkhamhaeng 145 Khwaeng/Khet Saphan Sung Bangkok 10240 Thailand
• Tel : +66(0)2373-7799(Auto) Fax : +66(0)2373-79 79 • admin@tet1995.com • www.tet1995.com



Certificate of Calibration

ICS-1100 : Anion (ID#377)

This certificate is to verify that instrument below are calibrated

by Archemica Lab Co.,Ltd.

ICS-1100 S/N : 10010987

AS-DV S/N : 10010912

for

Thai Environmental Technic Co., Ltd



Operator Signature: N. N. N. Date : Mar 30, 2023

(Mr. Nutdanai Laekhwan)

Application Chemist



Dionex Ion Chromatography
Preventive Maintenance Report

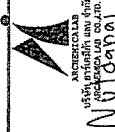
| Customer Organization | Name/Department |
|----------------------------------------------------|-----------------|
| Thai Environmental Technic Co., Ltd (1st Contract) | Khun.Ketsarin |
| Engineer | Date |
| Mr.Nutdanai Laekhwan | 30-Mar-2023 |

Instrument Detail

| Instrument Model | Application |
|-----------------------|---------------|
| ICS-1100 (ID#377) | Anion |
| Instrument components | Serial Number |
| ICS-1100 | 10010987 |
| AS-DV | 10010912 |
| | |
| | |
| | |

Consumable Detail

| Columns | Guard Columns | Suppressors | Concentrators | Etc. |
|---------|---------------|-------------|---------------|------|
| AS22 | AG22 | AERS 500 | - | - |
| | | | | |
| | | | | |
| | | | | |
| Remark: | | | | |



Perform By
Archimedes Lab Co.,Ltd

Archimedes Lab

30-3-23

Date

Customer

Date

PM

Preventive Maintenance
Check List

CM OQ

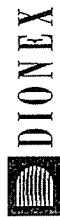
Chromeleon Operation Qualification



Checklist ICS Preventive Maintenance

General ICS Maintenance Checklist

| Item | Description | Result | | Recommended replacement | N.A. |
|------|------------------------------------------------------------------------------------------------------------------|-------------------------------------|--------------------------|------------------------------------|------------------------------------------------------|
| | | Check | Fail | | |
| 1 | Power line 220 Vac | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Check | <input type="checkbox"/> |
| 2 | Pneumatic Line | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Check | <input type="checkbox"/> |
| 3 | Pressure outlet 80-100 psi | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Check | <input type="checkbox"/> |
| 4 | Barbed fitting and tee fitting | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Check | <input type="checkbox"/> |
| 5 | Crimped and blocked tubing | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Check | <input type="checkbox"/> |
| 6 | Check Rheodyne Valve for Leak <ul style="list-style-type: none">• Stator face• Rotor Seal | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Every 12 months Every 12 months | <input type="checkbox"/> <input type="checkbox"/> |
| 7 | Slider valve for leak | <input type="checkbox"/> | <input type="checkbox"/> | - | <input checked="" type="checkbox"/> |
| 8 | Inspect slider | <input type="checkbox"/> | <input type="checkbox"/> | - | <input checked="" type="checkbox"/> |
| 9 | Inspect port face | <input type="checkbox"/> | <input type="checkbox"/> | - | <input checked="" type="checkbox"/> |
| 10 | Inspect pressure bolt | <input type="checkbox"/> | <input type="checkbox"/> | - | <input checked="" type="checkbox"/> |
| 11 | Inspect fitting and ferrule | <input type="checkbox"/> | <input type="checkbox"/> | - | <input checked="" type="checkbox"/> |
| 12 | Suppressor for leak | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Check | <input type="checkbox"/> |
| 13 | Cell for leak | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Check | <input type="checkbox"/> |
| 14 | Electronic cable connected | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Check | <input type="checkbox"/> |
| 15 | Column selection valve for leak | <input type="checkbox"/> | <input type="checkbox"/> | - | <input checked="" type="checkbox"/> |
| 16 | Inspect all fitting and line | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Check | <input type="checkbox"/> |
| 17 | Check Eluent reservoir | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Check | <input type="checkbox"/> |
| 18 | Inspect cap o-ring | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Check | <input type="checkbox"/> |
| 19 | Inspect air for leak | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Check | <input type="checkbox"/> |
| 20 | Pump Piston Rinse Seal | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Every 6 months | <input type="checkbox"/> |
| 21 | Piston Seals | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Every 6 months | <input type="checkbox"/> |
| 22 | Pump Lubricate | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Check&Lubricate | <input type="checkbox"/> |
| 23 | Front panel test | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Check | <input type="checkbox"/> |
| 24 | Low limit alarm | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Check | <input type="checkbox"/> |
| 25 | Hi limit alarm | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Check | <input type="checkbox"/> |
| 26 | Conductivity electronic test 150-1.1 uS | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Check | <input type="checkbox"/> |
| 27 | Check noise for suppressor (pk to pk <0.005US) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Check | <input type="checkbox"/> |
| 28 | Check column <ul style="list-style-type: none">• Check bed support | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Every 6 months | <input type="checkbox"/> |
| 29 | Check pump | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Check | <input type="checkbox"/> |
| 30 | Check suppressor | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Check | <input type="checkbox"/> |
| 31 | Check cell | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Check | <input type="checkbox"/> |
| 32 | Check leak sensor | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Check | <input type="checkbox"/> |
| 33 | Flow rate | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Check | <input type="checkbox"/> |
| 34 | System pressure | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Check | <input type="checkbox"/> |
| 35 | Detector background | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Check | <input type="checkbox"/> |

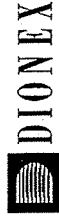


Chromeleon Operational Qualification, Part 1

Verification of Selected Results

Calibration Type: LOI
Integration Type: Area
Standard Method: External
Calibration Mode: Total
Auto Recalibrate: ON

| Report Variable | Peak Name | Status |
|--------------------|----------------|--------|
| Offset (c0) | n.a. | ok |
| | n.a. | ok |
| | n.a. | ok |
| Slope (c1) | Methylparabene | ok |
| | Ethylparabene | ok |
| | Propylparabene | ok |
| Correlation Coeff. | Methylparabene | ok |
| | Ethylparabene | ok |
| | Propylparabene | ok |
| Variance | Methylparabene | ok |
| | Ethylparabene | ok |
| | Propylparabene | ok |
| Std. Deviation | Methylparabene | ok |
| | Ethylparabene | ok |
| | Propylparabene | ok |
| Rel. Std. Dev. | Methylparabene | ok |
| | Ethylparabene | ok |
| | Propylparabene | ok |
| Variance Coeff. | Methylparabene | ok |
| | Ethylparabene | ok |
| | Propylparabene | ok |



Chromeleon Operational Qualification

General Information

Computer Name (Server): NS
Computer Name (Client): TET
Version Number: 6.80 SR8 Build 2623 (156243)
Operator: Mr. Nutdanai Laekhwan

General System Suitability Test: *Test passed*

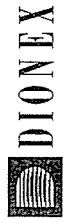
Comparison Formats:

| | | |
|-----------------------------------------------------------------------------|--------------------------------------------------|--------|
| All Parameters: (Exceptions see below) | Significant Digits: (They must match exactly) | 10 |
| Time Related Frac. Coll. Parameters: [The parameters are marked with *]] | Max. Deviation: | 0.02 s |



ผู้แทนบริษัทฯ
Nutdanai 30-3-23
Operator's Signature // Date

Reviewer's Signature // Date



Chromleon Operational Qualification, Part 1

Verification of Selected Results

| Report Variable | Peak Name | Status |
|--------------------------|----------------|--------|
| Theoretical Plates (EP) | Methylparabene | ok |
| | Ethylparabene | ok |
| | Propylparabene | ok |
| Theoretical Plates (USP) | Methylparabene | ok |
| | Ethylparabene | ok |
| | Propylparabene | ok |
| Theoretical Plates (JP) | Methylparabene | ok |
| | Ethylparabene | ok |
| | Propylparabene | ok |

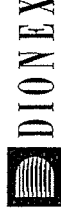
Test Result:

Passed

Reviewer's Signature // Date

Operator's Signature // Date

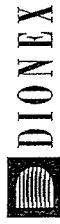

Nutanai 30-3-23



Chromleon Operational Qualification, Part 1

Verification of Selected Results

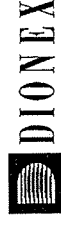
| Report Variable | Peak Name | Status |
|-------------------------|----------------|--------|
| Calibration Point X | Methylparabene | ok |
| | Ethylparabene | ok |
| | Propylparabene | ok |
| Calibration Point Y | Methylparabene | ok |
| | Ethylparabene | ok |
| | Propylparabene | ok |
| Amount [ng] | Methylparabene | ok |
| | Ethylparabene | ok |
| | Propylparabene | ok |
| Resolution (EP) | Methylparabene | ok |
| | Ethylparabene | ok |
| Resolution (USP) | Methylparabene | ok |
| | Ethylparabene | ok |
| Peak Asymmetry (EP/USP) | Methylparabene | ok |
| | Ethylparabene | ok |
| | Propylparabene | ok |
| Peak Asymmetry (AIA) | Methylparabene | ok |
| | Ethylparabene | ok |
| | Propylparabene | ok |



Chromeleon Operational Qualification, Part 2

Most Frequently Used Parameters: Comparison with Expected Results

| Variable Category | Report Variable | Peak Name | Status |
|-------------------|--------------------|----------------|--------|
| Peak Results | Ret.Dev.(abs) | Methylparabene | ok |
| | Ret.Dev.(abs) | Ethylparabene | ok |
| | Ret.Dev.(abs) | Propylparabene | ok |
| | Ret.Dev.(rel) | Methylparabene | ok |
| | Ret.Dev.(rel) | Ethylparabene | ok |
| | Ret.Dev.(rel) | Propylparabene | ok |
| | Area | Methylparabene | ok |
| | Area | Ethylparabene | ok |
| | Area | Propylparabene | ok |
| | Rel.Area (Total) | Methylparabene | ok |
| | Rel.Area (Total) | Ethylparabene | ok |
| | Rel.Area (Total) | Propylparabene | ok |
| | Height | Methylparabene | ok |
| | Height | Ethylparabene | ok |
| Peak Results | Rel.Height (Total) | Propylparabene | ok |
| | Rel.Height (Total) | Methylparabene | ok |
| | Rel.Height (Total) | Ethylparabene | ok |
| | Amount | Propylparabene | ok |
| | Amount | Methylparabene | ok |
| | Amount | Ethylparabene | ok |
| | Concentration | Propylparabene | ok |
| | Concentration | Methylparabene | ok |
| | Concentration | Ethylparabene | ok |
| | Rel.Amount | Propylparabene | ok |
| | Rel.Amount | Methylparabene | ok |
| | Rel.Amount | Ethylparabene | ok |
| | Peak Width (0%) | Propylparabene | ok |
| | Peak Width (0%) | Methylparabene | ok |
| | Peak Width (0%) | Ethylparabene | ok |
| | Peak Width (5%) | Propylparabene | ok |
| | Peak Width (5%) | Methylparabene | ok |
| | Peak Width (5%) | Ethylparabene | ok |
| | Peak Width (10%) | Propylparabene | ok |
| | Peak Width (10%) | Methylparabene | ok |
| | Peak Width (10%) | Ethylparabene | ok |
| | Peak Width (10%) | Propylparabene | ok |

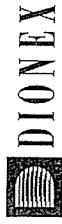


Chromeleon Operational Qualification, Part 2

Most Frequently Used Parameters: Comparison with Expected Results

Calibration Type: LOFF
Integration Type: Area
Standard Method: External
Calibration Mode: Total
Auto Recalibrate: ON

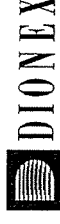
| Variable Category | Report Variable | Peak Name | Status |
|-------------------|-----------------------|----------------|--------|
| Sample | No. | | ok |
| | Name | | ok |
| | Sample Type | | ok |
| | Position | | ok |
| | Status | | ok |
| | Inj.Vol. | | ok |
| | Dil.Fac. | | ok |
| | Weight | | ok |
| | Amount | | ok |
| | Program | | ok |
| | Quantification Method | | ok |
| | Channel | | ok |
| | No. of Peaks | | ok |
| | Start Time | | ok |
| Chromatogram | Signal Min. | | ok |
| | Signal Max. | | ok |
| | Signal Dimension | | ok |
| | Noise 2.1-2.3 | | ok |
| | No. | Methylparabene | ok |
| | No. | Ethylparabene | ok |
| | No. | Propylparabene | ok |
| | Peak Name | Methylparabene | ok |
| | Peak Name | Ethylparabene | ok |
| | Peak Name | Propylparabene | ok |
| | Ret.Time | Methylparabene | ok |
| | Ret.Time | Ethylparabene | ok |
| | Ret.Time | Propylparabene | ok |
| | Ret.Time | Propylparabene | ok |
| Peak Results | No. | | ok |
| | No. | | ok |
| | Peak Name | Methylparabene | ok |
| | Peak Name | Ethylparabene | ok |
| | Peak Name | Propylparabene | ok |
| | Ret.Time | Methylparabene | ok |
| | Ret.Time | Ethylparabene | ok |
| | Ret.Time | Propylparabene | ok |
| | Ret.Time | Propylparabene | ok |
| | Ret.Time | Propylparabene | ok |
| | Ret.Time | Propylparabene | ok |
| | Ret.Time | Propylparabene | ok |
| | Ret.Time | Propylparabene | ok |
| | Ret.Time | Propylparabene | ok |
| | Ret.Time | Propylparabene | ok |



Chromeleon Operational Qualification, Part 2

Most Frequently Used Parameters: Comparison with Expected Results

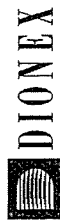
| Variable Category | Report Variable | Peak Name | Status |
|-------------------|-------------------------|----------------|--------|
| Peak Results | Asymmetry(AIA) | Methylparabene | ok |
| | Asymmetry(AIA) | Ethylparabene | ok |
| | Asymmetry(AIA) | Propylparabene | ok |
| | Theoretical Plates(EP) | Methylparabene | ok |
| | Theoretical Plates(EP) | Ethylparabene | ok |
| | Theoretical Plates(EP) | Propylparabene | ok |
| | Theoretical Plates(USP) | Methylparabene | ok |
| | Theoretical Plates(USP) | Ethylparabene | ok |
| | Theoretical Plates(USP) | Propylparabene | ok |
| | Theoretical Plates(JP) | Methylparabene | ok |
| | Theoretical Plates(JP) | Ethylparabene | ok |
| | Theoretical Plates(JP) | Propylparabene | ok |
| Peak Calibration | Cal.Mode | Methylparabene | ok |
| | Cal.Mode | Ethylparabene | ok |
| | Cal.Mode | Propylparabene | ok |
| | Auto.Recal. | Methylparabene | ok |
| | Auto.Recal. | Ethylparabene | ok |
| | Auto.Recal. | Propylparabene | ok |
| | Cal.Type | Methylparabene | ok |
| | Cal.Type | Ethylparabene | ok |
| | Cal.Type | Propylparabene | ok |
| | Weights | Methylparabene | ok |
| | Weights | Ethylparabene | ok |
| | Weights | Propylparabene | ok |
| | Offset | Methylparabene | ok |
| | Offset | Ethylparabene | ok |
| | Offset | Propylparabene | ok |
| | Slope | Methylparabene | ok |
| | Slope | Ethylparabene | ok |
| | Slope | Propylparabene | ok |
| | RF-Value | Methylparabene | ok |
| | RF-Value | Ethylparabene | ok |
| | RF-Value | Propylparabene | ok |
| | No. of Points | Methylparabene | ok |
| | No. of Points | Ethylparabene | ok |
| | No. of Points | Propylparabene | ok |
| | No. of Points | Ethylparabene | ok |



Chromeleon Operational Qualification, Part 2

Most Frequently Used Parameters: Comparison with Expected Results

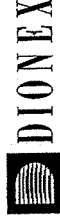
| Variable Category | Report Variable | Peak Name | Status |
|-------------------|---------------------|----------------|--------|
| Peak Results | Peak Width (50%) | Methylparabene | ok |
| | Peak Width (50%) | Ethylparabene | ok |
| | Peak Width (50%) | Propylparabene | ok |
| | Left Width (0%) | Methylparabene | ok |
| | Left Width (0%) | Ethylparabene | ok |
| | Left Width (0%) | Propylparabene | ok |
| | Right Width (0%) | Methylparabene | ok |
| | Right Width (0%) | Ethylparabene | ok |
| | Right Width (0%) | Propylparabene | ok |
| | Peak Start | Methylparabene | ok |
| | Peak Start | Ethylparabene | ok |
| | Peak Start | Propylparabene | ok |
| | Peak Stop | Methylparabene | ok |
| | Peak Stop | Ethylparabene | ok |
| | Peak Stop | Propylparabene | ok |
| | Peak Start Value | Methylparabene | ok |
| | Peak Start Value | Ethylparabene | ok |
| | Peak Start Value | Propylparabene | ok |
| | Peak Stop Value | Methylparabene | ok |
| | Peak Stop Value | Ethylparabene | ok |
| | Peak Stop Value | Propylparabene | ok |
| | BL-Value Peak Start | Methylparabene | ok |
| | BL-Value Peak Start | Ethylparabene | ok |
| | BL-Value Peak Stop | Propylparabene | ok |
| | BL-Value Peak Stop | Methylparabene | ok |
| | BL-Value Peak Stop | Ethylparabene | ok |
| | Type | Propylparabene | ok |
| | Type | Methylparabene | ok |
| | Type | Ethylparabene | ok |
| | Resolution(EP) | Propylparabene | ok |
| | Resolution(EP) | Ethylparabene | ok |
| | Resolution(USP) | Methylparabene | ok |
| | Resolution(USP) | Ethylparabene | ok |
| | Asymmetry(EP) | Methylparabene | ok |
| | Asymmetry(EP) | Ethylparabene | ok |
| | Asymmetry(EP) | Propylparabene | ok |



Chromeleon Operational Qualification, Part 2

Most Frequently Used Parameters: Comparison with Expected Results

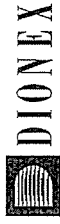
| Variable Category | Report Variable | Peak Name | Status |
|-------------------|--------------------------|----------------|--------|
| Peak Calibration | Residual for Cal.Point X | Methylparabene | ok |
| | Residual for Cal.Point X | Ethylparabene | ok |
| | Residual for Cal.Point X | Propylparabene | ok |
| | Calibration Point Status | Methylparabene | ok |
| | Calibration Point Status | Ethylparabene | ok |
| | Calibration Point Status | Propylparabene | ok |
| | Amount | Methylparabene | ok |
| | Amount | Ethylparabene | ok |
| | Amount | Propylparabene | ok |
| | Peak Tab. Cal.Type | Methylparabene | ok |
| Peak Table | Peak Tab. Peak Type | Methylparabene | ok |
| | Peak Tab. Left Limit | Methylparabene | ok |
| | Peak Tab. Right Limit | Methylparabene | ok |
| | Peak Tab. Group | Methylparabene | ok |
| | Peak Tab. Resp.Factor | Methylparabene | ok |
| | Peak Tab. Amount | Methylparabene | ok |
| | Peak Tab. Amnt.Dim | Methylparabene | ok |



Chromeleon Operational Qualification, Part 2

Most Frequently Used Parameters: Comparison with Expected Results

| Variable Category | Report Variable | Peak Name | Status |
|-------------------|-------------------------|----------------|--------|
| Peak Calibration | No. of Points | Propylparabene | ok |
| | No. of Points(disabled) | Methylparabene | ok |
| | No. of Points(disabled) | Ethylparabene | ok |
| | No. of Points(disabled) | Propylparabene | ok |
| | Variance | Methylparabene | ok |
| | Variance | Ethylparabene | ok |
| | Var.Coeff | Propylparabene | ok |
| | Var.Coeff | Methylparabene | ok |
| | Var.Coeff | Ethylparabene | ok |
| | Std.Dev. | Propylparabene | ok |
| | Std.Dev. | Methylparabene | ok |
| | Std.Dev. | Ethylparabene | ok |
| | Rel.Std.Dev. | Propylparabene | ok |
| | Rel.Std.Dev. | Methylparabene | ok |
| | Rel.Std.Dev. | Ethylparabene | ok |
| | Corr.Coeff. | Propylparabene | ok |
| | Corr.Coeff. | Methylparabene | ok |
| | Corr.Coeff. | Ethylparabene | ok |
| | Coeff.Det. | Propylparabene | ok |
| | Coeff.Det. | Methylparabene | ok |
| | Coeff.Det. | Ethylparabene | ok |
| | Adj. Coeff.Det. | Propylparabene | ok |
| | Adj. Coeff.Det. | Methylparabene | ok |
| | Adj. Coeff.Det. | Ethylparabene | ok |
| | X | Propylparabene | ok |
| | X | Ethylparabene | ok |
| | X | Propylparabene | ok |
| | Y | Methylparabene | ok |
| | Y | Ethylparabene | ok |
| | W | Propylparabene | ok |
| | W | Methylparabene | ok |
| | W | Ethylparabene | ok |
| | F(X) | Propylparabene | ok |
| | F(X) | Methylparabene | ok |
| | F(X) | Ethylparabene | ok |
| | F(X) | Propylparabene | ok |



Chromeleon Operational Qualification, Part 3

Post-Acquisition Steps: Comparison with Expected Results

Calibration Type: LOff
Integration Type: Area
Standard Method: External
Calibration Mode: Total
Auto Recalibrate: ON

| Channel Name | Report Variable | Peak Name | Status |
|-----------------------------------------------------------------------------------|---------------------|----------------|--------|
| Extract UV Channel: EXT230NM | Area | Methylparabene | ok |
| | Area | Ethylparabene | ok |
| | Area | Propylparabene | ok |
| | Height | Methylparabene | ok |
| | Height | Ethylparabene | ok |
| | Height | Propylparabene | ok |
| | Base Peak Width | Methylparabene | ok |
| | Base Peak Width | Ethylparabene | ok |
| | Base Peak Width | Propylparabene | ok |
| | Base Peak Width | Propylparabene | ok |
| EXT250NM | Area | Methylparabene | ok |
| | Area | Ethylparabene | ok |
| | Area | Propylparabene | ok |
| | Height | Methylparabene | ok |
| | Height | Ethylparabene | ok |
| | Height | Propylparabene | ok |
| | Base Peak Width | Methylparabene | ok |
| | Base Peak Width | Ethylparabene | ok |
| | Base Peak Width | Propylparabene | ok |
| | Base Peak Width | Propylparabene | ok |
| Smooth Data: UV_VIS_1_MA_005_001 UV_VIS_1_OL_051_001 EXT290NM_SG_005_010 | Noise (1.9-2.4 min) | | ok |
| | Noise (1.9-2.4 min) | | ok |
| | Noise (1.9-2.4 min) | | ok |



Chromeleon Operational Qualification, Part 2

Most Frequently Used Parameters: Comparison with Expected Results

| Variable Category | Report Variable | Peak Name | Status |
|-------------------|-----------------|----------------|--------|
| Peak Purity | PPI | Methylparabene | ok |
| | PPI | Ethylparabene | ok |
| | PPI | Propylparabene | ok |
| | RSD PPI | Methylparabene | ok |
| | RSD PPI | Ethylparabene | ok |
| | RSD PPI | Propylparabene | ok |
| | Match | Methylparabene | ok |
| | Match | Ethylparabene | ok |
| | Match | Propylparabene | ok |
| | Match | Propylparabene | ok |
| Rel.Max at | RSD Match | Methylparabene | ok |
| | RSD Match | Ethylparabene | ok |
| | RSD Match | Propylparabene | ok |
| | Rel.Max at | Methylparabene | ok |
| | Rel.Max at | Ethylparabene | ok |
| | Rel.Max at | Propylparabene | ok |
| | Rel.Max at | Propylparabene | ok |
| | Rel.Max at | Propylparabene | ok |
| | Rel.Max at | Propylparabene | ok |
| | Rel.Max at | Propylparabene | ok |

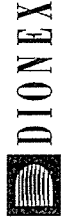
Test Result:

Passed



N. U. Dhanai 30-3-23
Operator's Signature // Date

Reviewer's Signature // Date




Chromeleon Operational Qualification, Part 4

System Suitability Test: Comparison with Expected Results

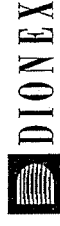
Calibration Type: LOF
Integration Type: Area
Standard Method: External
Calibration Mode: Total
Auto Recalibrate: ON

| Variable Category | Report Variable | Status |
|-------------------|---------------------------------------|--------|
| SST | Test No. | ok |
| | Test Name | ok |
| | Sample Condition | ok |
| | Sample Condition Result | ok |
| | Test Condition | ok |
| | Peak Condition | ok |
| | Aggregate Condition | ok |
| | Compare Operator | ok |
| | Compare Value | ok |
| | Result of Compare Value | ok |
| | Channel | ok |
| | Aggregated Samples | ok |
| | List of Aggr. Smp. | ok |
| | Result List for Aggr. Smp. | ok |
| | Result of Test Condition or Aggregate | ok |
| | N.A. | ok |
| | Test Result | ok |
| | Fail-Action | ok |

Test Result: Passed


Nutritional 30-3-23
Operator's Signature // Date

Reviewer's Signature // Date




Chromeleon Operational Qualification, Part 3

Post-Acquisition Steps: Comparison with Expected Results

| Channel Name | Report Variable | Peak Name | Status |
|---------------------------|-----------------|----------------|--------|
| Arith. Comb. of Channels: | | | |
| ADD_UV_VIS_1_UV_VIS_1 | Area | Methylparabene | ok |
| ADD_UV_VIS_1_UV_VIS_1 | Area | Ethylparabene | ok |
| ADD_UV_VIS_1_UV_VIS_1 | Area | Propylparabene | ok |
| MUL_UV_VIS_1_UV_VIS_1 | Area | Methylparabene | ok |
| MUL_UV_VIS_1_UV_VIS_1 | Area | Ethylparabene | ok |
| MUL_UV_VIS_1_UV_VIS_1 | Area | Propylparabene | ok |

Test Result: Passed


Nutritional 30-3-23
Operator's Signature // Date

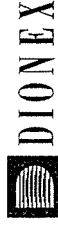
Reviewer's Signature // Date

PQ

Performance Qualification

Seq: TET12nd Con 30-Mar-23\CM_OQ 30-3-2023\CM_OQ
Smp: Parabenes

Page 15 of 15
RunTime: 30/3/23 11:05:39 AM




Chromleon Operational Qualification, Part 5

Fraction Collection: Comparison with Expected Results

Calibration Type: LOff
Integration Type: Area
Standard Method: External
Calibration Mode: Total
Auto Recalibrate: ON

| Variable Category | Report Variable | Status |
|-------------------|---------------------|--------|
| Fraction Report | Fract. No. | ok |
| | Fract. Starttime *) | ok |
| | Fract. Endtime *) | ok |
| | No. of Tubes | ok |
| | Position | ok |
| Tube Report | Peak Name | ok |
| | No. of Peaks | ok |
| | Position | ok |
| | Tube Starttime *) | ok |
| | Tube Endtime *) | ok |
| | Max. Tube Volume | ok |
| | Peak Name | ok |
| | No. of Peaks | ok |
| | Fract. No. | ok |
| | Fract. Starttime *) | ok |
| | Fract. Endtime *) | ok |
| | No. of Tubes | ok |
| | No. of Peaks | ok |

Test Result: Passed


DIONEX CORPORATION
10000 WESTERN AVENUE
FREMONT, CA 94555
NUTANOI 30-3-23
Operator's Signature / Date

• **Limits**

| Test | Customized Limits | Dionex Recommended Limits |
|-------------------------------------------|-------------------|---------------------------|
| ICS-1100 Conductivity Noise (nS) | <= 2.0 | <= 2.0 |
| ICS-1100 Conductivity Drift (nS/hr) | <= 20 | <= 20 |
| Injector Precision (Area %RSD) | <= 1.0 | <= 1.0 |
| Injector Carryover (Area %) | <= 0.1 | <= 0.1 |
| ICS-1100 Detector Linearity (Corr.) | >= 0.999 | >= 0.999 |
| ICS-1100 Detector Linearity (%RSD) | <= 5.0 | <= 5.0 |
| ICS-1100 Pump Flow Rate Accuracy (mL/min) | <= 0.05 | <= 0.05 |
| ICS-1100 Pump Flow Rate Precision (%RSD) | <= 2.0 | <= 2.0 |

• **Additional Information**

| | | | |
|-------------------|----------------------------------------------------|--------------------------------|-------------|
| Customer/Company: | Khun-Ketsarin / Thai Environmental Technic Co.,Ltd | Date: | 30-Mar-2023 |
| Qualification | Mr. Nutdanai / Archemica | Period between Qualifications: | 6 months |
| Executor/Company: | | Next Qualification: | Sep-2023 |

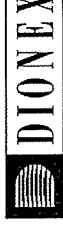
Customer Signature Date
Chromeleon (G) DIONEX 2011
Version 6.80 SR8 Build 2623 (156243)

Customer Signature Date
Chromeleon (G) DIONEX 2011
Version 6.80 SR8 Build 2623 (156243)



Nutdanai 30-3-23

Customer Signature Date
Chromeleon (G) DIONEX 2011
Version 6.80 SR8 Build 2623 (156243)



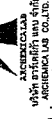
Performance Qualification Rev. 6.10

• **Instruments**

| Instrument Name | Model | Supplier | Serial Number | Moduleware Version |
|------------------|------------------------------|----------|---------------|--------------------|
| Pump | ICS-1100 | Dionex | 10010987 | 1.1.0 |
| Detector | ICS-1100 | Dionex | 10010987 | 1.1.0 |
| Autosampler | AS-DV | Dionex | 10010912 | 1.5.0 |
| Eluent Generator | EG40 with n.a. | Dionex | 10010987 | 1.1.0 |
| Chromeleon | 6.80 SR8 Build 2623 (156243) | Dionex | 16347 | n.a. |

• **Accessories**

| Name | Description | Lot / Serial | Exp. Date |
|-------------------------|---------------------------------------|--------------|-----------------|
| Backpressure Tubing | 0.13 mm (0.005") ID PEEK, 13 m (512") | n.a. | n.a. |
| Blank | Water | n.a. | n.a. |
| Sample 1 | Nitrate, 5 ppm | Thermo | 220701 Jul-2023 |
| Sample 2 | Nitrate, 10 ppm | Thermo | 220701 Jul-2023 |
| Sample 3 | Nitrate, 25 ppm | Thermo | 220701 Jul-2023 |
| Sample 4 | Nitrate, 50 ppm | Thermo | 220701 Jul-2023 |
| Sample 5 | Nitrate, 100 ppm | Thermo | 220701 Jul-2023 |
| Sample 6 | Nitrate, 1000 ppm | Thermo | 220701 Jul-2023 |
| Eluent | Water | Water | n.a. |
| Autosampler Reservoir A | Water | Water | n.a. |
| Balance | Mettler Toledo | AB204 | 1116392227 n.a. |
| Temperature Probe | - | - | - |
| IC Validation Test Box | - | - | - |
| Ammeter / Multimeter | - | - | - |



Nutdanai 30-3-23

Customer Signature Date
Chromeleon (G) DIONEX 2011
Version 6.80 SR8 Build 2623 (156243)

Customer Signature Date
Chromeleon (G) DIONEX 2011
Version 6.80 SR8 Build 2623 (156243)

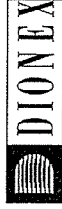
Customer Signature Date
Chromeleon (G) DIONEX 2011
Version 6.80 SR8 Build 2623 (156243)

• Data for detector noise

| Segment number | Noise, nS |
|----------------|-----------|
| 1 | 1.21 |
| 2 | 0.68 |
| 3 | 1.38 |
| 4 | 0.93 |
| 5 | 1.02 |
| 6 | 0.78 |
| 7 | 0.59 |
| 8 | 0.20 |
| 9 | 0.55 |
| 10 | 0.47 |
| 11 | 0.55 |
| 12 | 0.44 |
| 13 | 0.57 |
| 14 | 0.23 |
| 15 | 0.30 |
| 16 | 0.45 |
| 17 | 0.19 |
| 18 | 3.55 |
| 19 | 3.84 |
| 20 | 3.45 |
| Average, nS | 1.1 |
| Limit, nS | 2.0 |
| Result | PASS |

• Data for detector drift

| 20 Minute drift, nS | Drift, nS/hr | Limit, nS/hr | Result |
|---------------------|--------------|--------------|--------|
| 5.4 | 16.2 | 20.0 | PASS |



Performance Qualification Rev. 6.10

Detector Noise and Drift:

• Instruments

| Instrument Name | Model | Supplier | Serial Number | Moduleware Version |
|------------------|----------------|----------|---------------|--------------------|
| Pump | ICS-1100 | Dionex | 10010887 | 1.1.0 |
| Detector | ICS-1100 | Dionex | 10010887 | 1.1.0 |
| Autosampler | AS-DV | Dionex | 01234567 | 1.5.0 |
| Eluent Generator | EG40 with n.a. | Dionex | 10010887 | 1.1.0 |

• Accessories

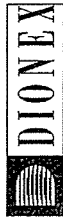
| Name | Description | Lot / Serial |
|---------------------|---------------------------------------|--------------|
| Backpressure Tubing | 0.13 mm (0.005") ID PEEK, 13 m (512") | n.a. |
| Eluent | Water | n.a. |

• Additional Information

| | | | |
|------------------------------------|----------------------------------------------------|---------------------|-------------|
| Customer/Company: | Khun.Ketsarin / Thai Environmental Technic Co.,Ltd | Date: | 30-Mar-2023 |
| Qualification Executor/Company: | Mr. Nutdanai / Arche mica | Next Qualification: | Sep-2023 |

• Test Results Summary

| Test | Result |
|-------------------------------------|--------|
| ICS-1100 Conductivity Noise (nS) | PASS |
| ICS-1100 Conductivity Drift (nS/hr) | PASS |



Performance Qualification Rev. 6.10

Injector Precision:

• Instruments

| Instrument Name | Model | Supplier | Serial Number | Moduleware Version |
|------------------|----------------|----------|---------------|--------------------|
| Pump | ICS-1100 | Dionex | 10010987 | 1.1.0 |
| Detector | ICS-1100 | Dionex | 10010987 | 1.1.0 |
| Autosampler | AS-DV | Dionex | 10010912 | 1.5.0 |
| Eluent Generator | EG40 with n.a. | Dionex | 10010987 | 1.1.0 |

• Accessories

| Name | Description | Lot / Serial |
|---------------------|---------------------------------------|--------------|
| Backpressure Tubing | 0.13 mm (0.005") ID PEEK, 13 m (512") | n.a. |
| Sample 4 | Nitrate, 50 ppm | 220701 |
| Eluent | Water | n.a. |


• Additional Information

| | | | |
|------------------------------------|----------------------------------------------------|---------------------|-------------|
| Customer/Company: | Khun.Ketsarin / Thal Environmental Technic Co.,Ltd | Date: | 30-Mar-2023 |
| Qualification Executor/Company: | Mr. Nutdanai / Archemica | Next Qualification: | Sep-2023 |

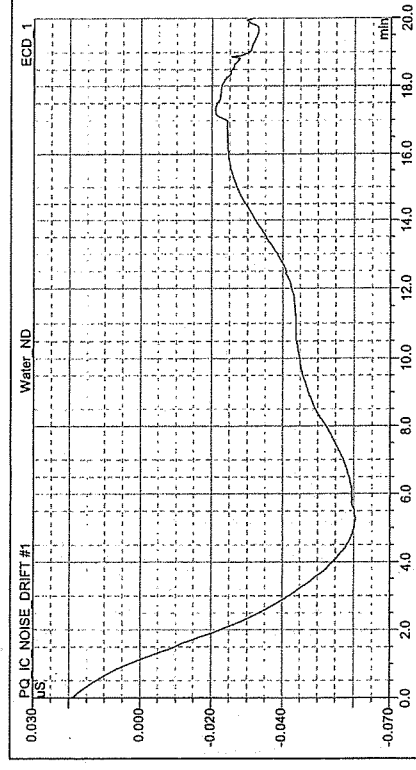
• Test Results Summary

| Test | Result |
|--------------------------------|--------|
| Injector Precision (Area %RSD) | PASS |


Customer Signature _____ Date _____
Chromelcon (c) DIONEX 2011
Version 6.80 SR8 Build 2623 (156243)

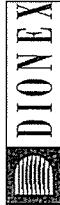

Archemica Lab Co., Ltd.
Nutdanai 30-3-23
Executor Signature _____ Date _____
OQ_PQ_Integrated Validation / Injector Precision
Printed: 30/3/2023 1:23 PM

• Chromatogram of Detector Noise and Drift



Customer Signature _____ Date _____
Chromelcon (c) DIONEX 2011
Version 6.80 SR8 Build 2623 (156243)


Archemica Lab Co., Ltd.
Nutdanai 30-3-23
Executor Signature _____ Date _____
OQ_PQ_Integrated Validation / Detector Noise and Drift
Printed: 30/3/2023 1:23 PM



Performance Qualification Rev. 6.10

Injector Carryover:

• Instruments

| Instrument Name | Model | Supplier | Serial Number | Moduleware Version |
|------------------|----------------|----------|---------------|--------------------|
| Pump | ICS-1100 | Dionex | 10010987 | 1. 1. 0 |
| Detector | ICS-1100 | Dionex | 10010987 | 1. 1. 0 |
| Autosampler | AS-DV | Dionex | 10010912 | 1. 5. 0 |
| Eluent Generator | EG40 with n.a. | Dionex | 10010987 | 1. 1. 0 |

• Accessories

| Name | Description | Lot / Serial |
|---------------------|---------------------------------------|--------------|
| Backpressure Tubing | 0.13 mm (0.005") ID PEEK, 13 m (512") | n.a. |
| Sample 6 | Nitrate, 1000 ppm | 220701 |
| Blank | Water | n.a. |
| Eluent | Water | n.a. |


• Additional Information

| | | | |
|-------------------|----------------------------------------------------|---------------------|-------------|
| Customer/Company: | Khun.Ketsarin / Thai Environmental Technic Co.,Ltd | Date: | 30-Mar-2023 |
| Qualification | Mr. Nutdanai / Archechemia | Next Qualification: | Sep-2023 |

• Test Results Summary

| Test | Result |
|-----------------------------|--------|
| Injector Carryover (Area %) | PASS |

Customer Signature _____ Date _____
Chroneleon (c) DIONEX 2011
Version 6.80 SR8 Build 2623 (155243)



ARCHICHEMIA
บริษัท อีเคมียู เอช จำกัด
ARCHEMIA CO.,LTD.
Nutdanai 30-3-23
Executor Signature _____ Date _____

OQ_PQ_Integrated_Validation / Injector Carryover
Printed: 30/3/2023 1:23 PM

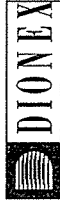
• Data for Injector Precision test

| Name | Area uS*min Nitrate ECD_1 |
|------------------|------------------------------------|
| Inj Precision_1 | 3.148 |
| Inj Precision_2 | 3.199 |
| Inj Precision_3 | 3.210 |
| Inj Precision_4 | 3.200 |
| Inj Precision_5 | 3.209 |
| Inj Precision_6 | 3.237 |
| Inj Precision_7 | 3.221 |
| Inj Precision_8 | 3.208 |
| Inj Precision_9 | 3.202 |
| Inj Precision_10 | 3.202 |
| Average: | 3.204 |
| Std. Dev: | 0.023 |
| % RSD: | 0.7 |
| Limit (%) | 1.0 |
| Result: | PASS |

Customer Signature _____ Date _____
Chroneleon (c) DIONEX 2011
Version 6.80 SR8 Build 2623 (155243)


ARCHICHEMIA
บริษัท อีเคมียู เอช จำกัด
ARCHEMIA CO.,LTD.
Nutdanai 30-3-23
Executor Signature _____ Date _____

OQ_PQ_Integrated_Validation / Injector Precision
Printed: 30/3/2023 1:23 PM



Performance Qualification Rev. 6.10

Detector Linearity:

• Instruments:

| Instrument Name | Model | Supplier | Serial Number | Module/ware Version |
|------------------|----------------|----------|---------------|---------------------|
| Pump | ICS-1100 | Dionex | 10010987 | 1.1.0 |
| Detector | ICS-1100 | Dionex | 10010987 | 1.1.0 |
| Autosampler | AS-DV | Dionex | 10010912 | 1.5.0 |
| Eluent Generator | EG40 with n.a. | Dionex | 10010987 | 1.1.0 |

• Accessories

| Name | Description | Lot / Serial |
|---------------------|---------------------------------------|--------------|
| Backpressure Tubing | 0.13 mm (0.005") ID PEEK, 13 m (512") | n.a. |
| Sample 1 | Nitrate, 5 ppm | 220701 |
| Sample 2 | Nitrate, 10 ppm | 220701 |
| Sample 3 | Nitrate, 25 ppm | 220701 |
| Sample 4 | Nitrate, 50 ppm | 220701 |
| Sample 5 | Nitrate, 100 ppm | 220701 |
| Eluent | Water | n.a. |

• Additional Information

| | | | |
|-------------------|----------------------------------------------------|---------------------|-------------|
| Customer/Company: | Khun.Ketsarin / Thai Environmental Technic Co.,LTD | Date: | 30-Mar-2023 |
| Qualification | Mr. Nuidanai / Archemica | Next Qualification: | Sep-2023 |

• Test Results Summary

| Test | Result |
|-------------------------------------|--------|
| ICS-1100 Detector Linearity (Corr.) | PASS |
| ICS-1100 Detector Linearity (%RSD) | PASS |

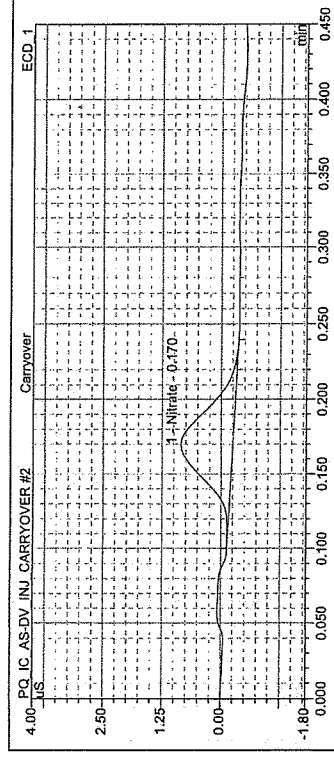
Customer Signature _____ Date _____
Chromelcon (c) DIONEX 2011
Version 6.80 SR8 Build 2623 (156243)

Signature _____ Date 30-3-23
Executor Signature

OQ_PO_Integrated_Validation / Detector Linearity
Printed: 30/3/2023 1:23 PM



• Chromatogram for Carryover test



• Data for Carryover test

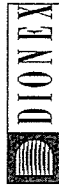
| Name | Ret. Time (detected) min | Nitrate | Area uS*min |
|----------------|--------------------------|--------------|-------------|
| High Level | 0.17 | ECD_1 | 63.377 |
| Carryover | 0.17 | ECD_1 | 0.057 |
| Water | 0.18 | Not Detected | 0.137 |
| Carryover (%): | | | 0.100 |
| Limit (%): | | | PASS |

Customer Signature _____ Date _____
Chromelcon (c) DIONEX 2011
Version 6.80 SR8 Build 2623 (156243)

Signature _____ Date 30-3-23
Executor Signature

OQ_PO_Integrated_Validation / Injector Carryover
Printed: 30/3/2023 1:23 PM





Performance Qualification Rev. 6.10

Pump Flow Rate Accuracy and Precision Test:

Instruments

| Instrument Name | Model | Supplier | Serial Number | Moduleware Version |
|------------------|----------------|----------|---------------|--------------------|
| Pump | ICS-1100 | Dionex | 10010987 | 1.1.0 |
| Detector | ICS-1100 | Dionex | 10010987 | 1.1.0 |
| Autosampler | AS-DV | Dionex | 10010912 | 1.5.0 |
| Eluent Generator | EG40 with n.a. | Dionex | 10010987 | 1.1.0 |

Accessories

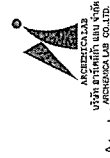
| Name | Description | Lot / Serial |
|---------------------|---------------------------------------|---------------------------|
| Backpressure Tubing | 0.13 mm (0.005") ID PEEK, 13 m (512") | n.a. |
| Eluent | Water | n.a. |
| Balance | AB 204 | Mettler Toledo 1116392227 |

Additional Information

| | | | |
|-------------------|-------------------------------------------------|---------------------|-------------|
| Customer/Company: | Khun.Ketsarin / Thai Environmental Technic Co., | Date: | 30-Mar-2023 |
| Qualification | Mr. Nutdanai / Archemica | Next Qualification: | Sep-2023 |

Test Results Summary

| Test | Result |
|-------------------------------------------|--------|
| ICS-1100 Pump Flow Rate Accuracy (mL/min) | PASS |
| ICS-1100 Pump Flow Rate Precision (%RSD) | PASS |



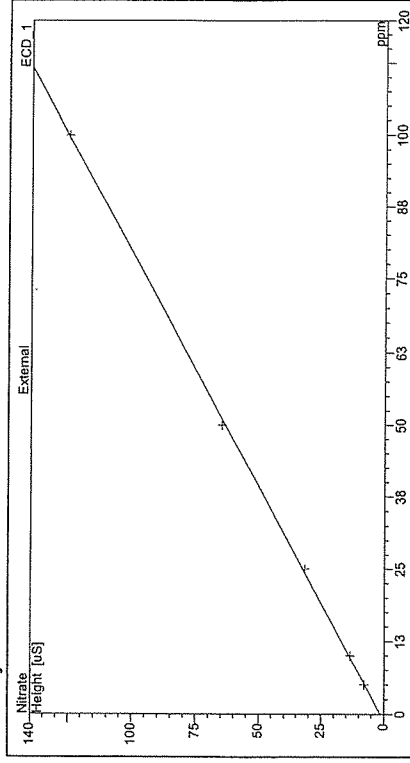
ผู้ดำเนินการทดสอบ
Nutdanai 30-3-23
Executor Signature

Customer Signature Date
Chromelon (c) DIONEX 2011
Version 6.80 SR8 Build 2623 (156243)
OQ_PQ Integrated Validation / Pump Flow Rate
Printed: 30/3/2023 1:23 PM

Data for Detector Linearity

| Name | Amount ppm Nitrate ECD_1 | Height uS Nitrate ECD_1 |
|----------------------|--------------------------|-------------------------|
| Detector linearity_1 | 5.000 | 7.936 |
| Detector linearity_2 | 10.000 | 13.479 |
| Detector linearity_3 | 25.000 | 31.576 |
| Detector linearity_4 | 50.000 | 64.733 |
| Detector linearity_5 | 100.000 | 124.951 |

Linearity Plot



| Calibration Type | Number of Points | Offset | Slope |
|------------------|------------------|--------|-------|
| LOff | 5 | 1.435 | 1.239 |

| | | |
|------------|-------------------------|-------|
| Linearity: | Correlation Coefficient | % RSD |
| Limit: | 1.000 | 2.0 |
| Result: | 0.999 | 5.0 |
| | PASS | PASS |



ผู้ดำเนินการทดสอบ
Nutdanai 30-3-23
Executor Signature

Customer Signature Date
Chromelon (c) DIONEX 2011
Version 6.80 SR8 Build 2623 (156243)
OQ_PQ Integrated Validation / Detector Linearity
Printed: 30/3/2023 1:23 PM

Certificate

Certificate of Standards and Instruments for Qualification

Sequence: PQ_IC_FLOW_RATE
Sample: Water_FR

Page 2 of 2
Date: 30/3/2023

• Data for Pump Flow Rate Accuracy and Precision Test

| | |
|--------------------------|----|
| Ambient Temperature (°C) | 25 |
|--------------------------|----|

| Segment | Measured Eluent Weight (g) | Calculated Eluent Flow Rate (mL/min) | Deviation from 1.00 mL/min | Limit (mL/min) | Result |
|---------|----------------------------|--------------------------------------|----------------------------|----------------|--------|
| 0 | 116.822 | - | - | - | - |
| 1 | 121.665 | 0.971 | 0.029 | 0.05 | PASS |
| 2 | 126.569 | 0.982 | 0.018 | 0.05 | PASS |
| 3 | 131.426 | 0.976 | 0.024 | 0.05 | PASS |
| 4 | 136.279 | 0.973 | 0.027 | 0.05 | PASS |
| 5 | 141.140 | 0.975 | 0.025 | 0.05 | PASS |

| | |
|--------------------|-------|
| Average | 0.976 |
| Standard Deviation | 0.004 |
| % RSD | 0.4 |
| Limit (%) | 2.0 |
| Result | PASS |



Nutanai 30-3-23

Customer Signature
Chomdeon (c) DIONEX 2011
Version 6.80 SR8 Build 2623 (156243)

Executive Signature
OQ_PQ_Integrated Validation / Pump Flow Rate
Printed: 30/3/2023 1:23 PM

Certificate of Analysis

Exceller Separations Through
Better Chemistry

Dionex Nitrate OQ/PQ IC Standards Kit (Set of 6)

Product Number 060254
Certificate of Analysis

Lot Number 220701

Expiration of Certification
July 2023

The Dionex Nitrate Standard was developed to aid the analysis of anions by Ion Chromatography (IC). The single-ion standard was prepared by the dissolution of high-purity salt in ≥ 18.2 megohm deionized water, which was tested by IC for ionic contaminants. The bottle label states the nominal concentration value of the ionic component for informational purposes only. The actual ion concentration value was determined by Ion Chromatography. The IC system was standardized using the National Institute of Standards & Technology (NIST) Standard Reference Material, SRM 3185 (Nitrate Standard Solution). Actual concentration values determined for the single-ion is listed below.

Dionex Nitrate Standard

| Vial # | Concentration (mg/L) |
|--------|-------------------------|
| 1 | 5.02 \pm 0.02 |
| 2 | 9.86 \pm 0.05 |
| 3 | 25.02 \pm 0.11 |
| 4 | 50.54 \pm 0.29 |
| 5 | 100.0 \pm 1 |
| 6 | 1014 \pm 5 |



The concentration value is based a proven reliable method of analysis. The estimated uncertainties are two standard deviations of the concentration value. The concentration value is warranted to be stable for one year from the date of manufacture.

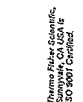
The preparation and analyses of the Dionex Nitrate Standard was performed with extreme care by Thermo Scientific Corporation Consumables Manufacturing Department in Sunnyvale California.

Document No. 078690-01 20-Dec-2011

thermoscientific.com/dionex

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Thermo Fisher Scientific
1228 Third Way
PO Box 3003
Foster City, CA 94038-3003
(408) 737-0700



thermo
scientific

Certificate of Completion

This certifies that

Nutdanai Laekhwan

Has successfully completed

IC Installation, Maintenance and Troubleshooting Service Training

Valid Certificate no expire date:

Sep/28/2022



Issued electronically and
approved by:

TFS - Learning Management
System, Training Mentoring,
and Certification Group
tmc.training@thermofisher.com

Introduction

Customer Information

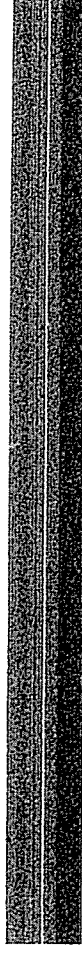
- Customers should provide all necessary operating supplies upon request of the engineer.
- A customer representative should be available to the engineer while performing the preventive maintenance procedures.
- Any parts, not included in the Parts Lists section of this document, are not part of the recommended Preventive Maintenance service, nor are they included in the price of this service.
- If a system requires the use of extra or special procedures and/or parts for the maintenance service, then these must be ordered separately and charged as a repair, which may incur additional costs.

Important Customer Web Links

- For more information about **Agilent Technologies services**, please visit our website using the following URL: <http://www.agilent.com/en-us/products/crosslab-instrument-services/service-repair>
- The **Agilent Community** is an excellent place to get answers, collaborate with others about applications and Agilent products, and find in-depth documents and videos relevant to Agilent technologies. Visit <https://community.agilent.com/welcome>.
- To access **Agilent University**, visit <http://www.agilent.com/crosslab/university/> to learn about training options, which include online, classroom and onsite delivery. A training specialist can work directly with you to help determine your best options.
- A useful **Agilent Resource Center** web page is available, which includes short videos on maintenance, quick lists of consumables for new instruments, and other valuable information. Check out the Resource Page here: <https://www.agilent.com/en-us/agilentresources>.
- Need technical support, FAQs, supplies? – visit our **Support Home page** <http://www.agilent.com/search/support>.
- **Videos** about specific preparation requirements for your instrument can be found by searching the **Agilent YouTube** channel at <https://www.youtube.com/user/agilent>.
- **7890B Manuals** are also available on Agilent.com:
 - **Safety** https://www.agilent.com/cs/library/usermanuals/public/7890B_Safety.pdf
 - **Installation and First Startup** https://www.agilent.com/cs/library/usermanuals/Public/7890B_Installation.pdf
 - **Operation Manual** https://www.agilent.com/cs/library/usermanuals/Public/7890B_Operation.pdf
 - **Maintaining Your GC** https://www.agilent.com/cs/library/usermanuals/public/G3430-90062%207890B_Maintaining%20Guide.pdf



Agilent CrossLab Start Up Services Agilent 7890 Gas Chromatograph Preventive Maintenance Checklist



Agilent Preventive Maintenance provides factory recommended service for your analytical instruments to assure reliable operation and the accuracy of your results.

Delivered by highly trained and certified service engineers using genuine Agilent parts and supplies, Agilent Preventive Maintenance provides everything you need to reduce unplanned downtime and keep your systems operating at their peak. This checklist will be completed at the end of the service and provided to you as a record of the preventive maintenance activities.



System Information

- ☒ Check this box if an instrument configuration report is attached instead of completing the table below.

| | | |
|-------------------------------------|----------|------------|
| Instrument System Name and ID | GC7890 B | CN16343040 |
| Instrument System Site and Location | TET | Laboratory |

| List System Component Product Numbers | List the Serial Numbers of each Component |
|---------------------------------------|-------------------------------------------|
| 1. G3440P | CN16343040 |
| 2. G4613A | CN16350082 |
| 3. G4614A | CN16400014 |
| 4. | |
| 5. | |
| 6. | |
| 7. | |
| 8. | |
| 9. | |
| 10. | |

Preparation

- ☒ Discuss any specific issues with the customer before starting.
- ☒ Review the instrument logbook for recorded problems and comments.
- ☒ Save instrument control settings before starting the procedure.
- ☒ Perform a general inspection of the system for cleanliness.
- ☒ Check for proper installation of parts, assemblies, sensors etc.
- ☒ Check system for required installation of components, settings as defined by current Service Notes.
- ☒ Check for required firmware updates and verify with customers if they would like them installed.
- ☒ Before starting the following procedures, record the Detector Signal Output(s) in the results table. If the GC is turned OFF or in a service mode, comparing the detector outputs before and after the service is not possible.

Service Engineer's Responsibilities

- Contact the customer and ensure that all necessary supplies are available before the preventive maintenance visit.
- Only select those pages that relate to the system or module being serviced.
- Complete empty fields with the relevant information.
- Complete the relevant checkboxes in the checklist using either a "X" or tick mark "✓".
- Check "Section not applicable" check boxes to indicate services/tasks not delivered, as appropriate.
- Complete the Preventive Maintenance service in the order of the tasks listed.
- Complete the Service Review section together with the customer.
- Complete the fields for page numbers at the foot of each selected page
- Complete the total number of pages field in the Service Completion section
- Ask the customer to sign the Service Completion section including the customer's and your signature.

Additional Instruction Notes

- Check for any active service notes for this unit. If there are any applicable "Safety" or "Modification Recommended" Service notes, plan to implement the changes on this unit before doing any qualification service.
- Do not implement firmware updates, unless you get approval from the customer and are sure that they are compatible with the instrument control software.

ALS Maintenance

- ☐ Section NOT applicable
- ☒ Check all cabling and configuration settings between GC, tray, and injectors.
- ☒ Vacuum or remove any dust, especially around fans.
- ☒ Check operation of all fans.
- ☒ Check syringe for smooth plunger operation.
- ☒ Check for smooth operation of the needle support – clean if necessary

Restore Instrument

- ☒ Restore the normal operating conditions or customer method using the Data System.
- ☒ Purge the system with carrier flow for 15 minutes
- ☒ Bake out the system, then restore the normal operating conditions
- ☒ After equilibration, check and record the post PM detector signal output values. Results should be similar or lower than the detector outputs recorded prior to PM.
- ☒ Perform a chemical checkout. If this is a routine PM, inject the customer's sample using the ALS if applicable. This will act as a final checkout of both the ALS and the GC.

Note: If the PM Service is performed prior to a qualification service, then use the qualification procedure as a guide for final instrument set up and checkout.

Preventive Maintenance Procedure

Clean and inspect GC

- ☒ Unplug power cord from the power source.
- ☒ Open GC covers and vacuum/remove any dust/debris. Pay particular attention to cooling fans.
- ☒ Inspect internal connectors for proper contact and placement.
- ☒ Reconnect Power to the GC. Power the GC on and verify the power on self-test passed.
- ☒ Verify oven motor spins freely and turns on with the oven door closed; off when the door is opened.
- ☒ Verify operation of all other fans – the inlet and EPC cooling fans.
- ☒ Verify oven intake/outlet flap assembly is operating smoothly while heating and cooling the oven

Inlet and detector consumable replacement

- ☒ For the inlets installed, perform inlet maintenance as defined in the 7890 manual – "Maintaining Your GC" – for the inlet(s) installed.
- ☒ Replace the split vent trap cartridge filter on units with these inlets: Split/Splitless Capillary (SSL), Multi-Mode Inlet (MMI), Programmed Temperature Vaporizer (PTV), Volatiles Interface (VI).
- ☒ If the inlet system is used in Split Mode with viscous samples, inspect and clean the split vent tube on the inlet and flush or replace the tubing between the inlet and the split vent trap.
- ☒ If the GC includes a Flame Ionization Detector (FID), replace the jet. If the ignitor shows any buildup of sample or corrosion, replace the ignitor. Examine the FID collector and castle assemblies for contamination – clean as necessary.

Zero Sensors and Leak test

- ☒ Zero all pressure sensors per the procedure in the 7890 "Advanced User Guide".
- ☒ Perform inlet pressure decay test(s) as defined in the 7890 "Troubleshooting Manual". If the PM is done in preparation for an Operational Qualification, then the pressure decay test defined within that protocol can be used for the PM.
- ☒ Record if test passed or failed in the results table.

7890 Parts List Table

The following kits are recommended for capillary and purged packed inlets. If this is a general PM and the customer has a preferred set of consumables, you may use the customer's consumables.

| Part description | Part number | Product or model# where used | Quantity consumed |
|----------------------------------------------------------------------------------------|-------------|------------------------------|-------------------|
| SSL Capillary Inlet PM kit, Splitless | 5188-6497 | 7890A/B | 1 |
| SSL Capillary Inlet PM kit, split | 5188-6496 | 7890A/B | 1 |
| SSL Capillary Ultra Inert Inlet Gold Seal with Washer | 5190-6144 | 7890A/B | N/A |
| SSL Capillary Ultra Inert Inlet Splitless Liner - Single taper with Glass Wool | 5190-2293 | 7890A/B | N/A |
| SSL Capillary Ultra Inert Inlet Low Pressure Drop Split Liner - with Glass Wool | 5190-2295 | 7890A/B | N/A |
| PP Inlet PM kit | 5188-6498 | 7890A/B | N/A |
| Split vent trap PM kit, single cartridge (for MM, PTV & VI) | 5188-6495 | 7890A/B | N/A |
| MM Cleaning Kit | G1531-60620 | 7890A/B | N/A |
| PTV Septumless Head Rebuild Kit | 5182-9747 | 7890A/B | N/A |
| PTV Septumless Head Teflon Guide | 5182-9748 | 7890A/B | N/A |
| Ignitor (glow plug) assembly with O-ring | 19231-60680 | 7890A/B | 1 |
| FID Collector Rebuild/Cleaning Kit | G1531-67000 | 7890A/B | N/A |
| Standard .011-inch FID Jet for capillary FID base | G1531-80560 | 7890A/B | N/A |
| High Temperature .018-inch FID Jet for capillary FID base | G1531-80620 | 7890A/B | N/A |
| Standard .018 inch FID Jet for packed column with packed FID base | 18710-20119 | 7890A/B | N/A |
| Standard .011-inch FID Jet for capillary column with packed/adaptable FID base | 19244-80560 | 7890A/B | N/A |
| High Temperature .018-inch FID Jet for capillary column with packed/adaptable FID base | 19244-80620 | 7890A/B | N/A |
| NPD Jet, universal fit, .011-inch ID | G1534-80580 | 7890A/B | N/A |
| NPD Jet, universal fit, .011-inch ID Extended tip | G1534-80590 | 7890A/B | N/A |
| SSL Capillary Ultra Inert Inlet Gold Seal with Washer | 5190-6144 | 7890A/B | N/A |
| SSL Capillary Ultra Inert Inlet Splitless Liner - Single taper with Glass Wool | 5190-2293 | 7890A/B | N/A |
| **FID Collector Replacement Kit, if needed | G1531-67001 | 7890A/B | N/A |

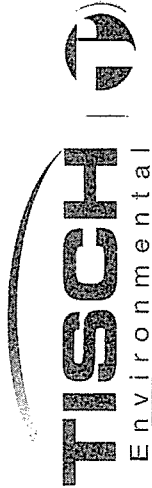
Signature Page

Service Review

- ☐ Attach available reports/printouts of all tests to this documentation.
- ☒ Record the Preventive Maintenance service activity in the customer's records/logbook.
- ☒ Update/reset instrument maintenance counters as appropriate.
- ☒ Affix the PM sticker to the system or instrument logbook based on the customer's request.
- ☒ Complete the Service Engineer Comments section if there are additional comments.
- ☒ Review with the customer this service, parts replaced, and test results obtained.
- ☒ If the instrument firmware was updated, record the details of the change in the Service Engineer's Comments box or if necessary, in the customer's IQ records.
- ☒ Supply the customer with a copy of the Smart Alerts flyer.
- ☐ Describe Smart Alerts to the customer.
- ☐ Install Smart Alerts if requested.

7890 GC Test Results Table

| Detector Signal Outputs | Before PM Service | After PM Service |
|---------------------------------|------------------------------|----------------------------|
| Front detector output | N/A | N/A |
| Back detector output | N/A | N/A |
| AUX detector output | N/A | N/A |
| Pressure decay test | Expected test result Pass | Actual test result Pass |
| Front inlet pressure decay test | Pass | Pass |
| Back inlet pressure decay test | Pass | Pass |



Certificate of Calibration

| | | | | | |
|-------------------------------|--|------------------------|--|-----------------|--|
| Cal. Date: November 19, 2021 | | Rootsmeier S/N: 438320 | | Ta: 29.4 °K | |
| Operator: Jim Tisch | | | | Pa: 763.5 mm Hg | |
| Calibration Model #: TE-5025A | | Calibrator S/N: 0068 | | | |

| Run | Vol. Init (m3) | Vol. Final (m3) | ΔVol. (m3) | ΔTime (min) | ΔP (mm Hg) | ΔH (in H2O) |
|-----|----------------|-----------------|------------|-------------|------------|-------------|
| 1 | 1 | 2 | 1 | 1.4160 | 3.2 | 2.00 |
| 2 | 3 | 4 | 1 | 0.9970 | 6.4 | 4.00 |
| 3 | 5 | 6 | 1 | 0.8890 | 7.8 | 5.00 |
| 4 | 7 | 8 | 1 | 0.8490 | 8.7 | 5.50 |
| 5 | 9 | 10 | 1 | 0.6990 | 12.8 | 8.00 |

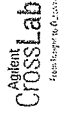
| Data Tabulation | | | |
|-----------------|-----------------------------------------|------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|
| Vstd (m3) | Qstd (x-axis) | $\sqrt{\Delta H \left(\frac{Pa}{Pstd} \right) \left(\frac{Tstd}{Ta} \right)}$ (y-axis) | $\sqrt{\Delta H \left(\frac{Pa}{Pstd} \right) \left(\frac{Tstd}{Ta} \right)}$ (y-axis) |
| 1.0140 | 0.7161 | 1.4271 | 0.9958 |
| 1.0098 | 1.0128 | 2.0182 | 0.9916 |
| 1.0079 | 1.1337 | 2.2564 | 0.9898 |
| 1.0067 | 1.1858 | 2.3666 | 0.9886 |
| 1.0012 | 1.4324 | 2.8542 | 0.9832 |
| QSTD | m= 1.99331 b= -0.00049 r= 0.99999 | QA | m= 1.24818 b= -0.00030 r= 0.99999 |

| Calculations | |
|--------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| Vstd=ΔVol((Pa-ΔP)/Pstd)(Tstd/Ta) | Va=ΔVol((Pa-ΔP)/Pa) |
| Qstd=Vstd/ΔTime | Qa=Va/ΔTime |
| For subsequent flow rate calculations: | |
| Qstd= 1/m $\left(\sqrt{\Delta H \left(\frac{Pa}{Pstd} \right) \left(\frac{Tstd}{Ta} \right)} - b \right)$ | Qa= 1/m $\left(\sqrt{\Delta H \left(\frac{Pa}{Pstd} \right) \left(\frac{Tstd}{Ta} \right)} - b \right)$ |

| | |
|-------------------------------------------|--------------------------------------------------|
| Tstd: 298.15 °K | RECALIBRATION |
| Pstd: 760 mm Hg | US EPA recommends annual recalibration per 1998 |
| Key | 40 Code of Federal Regulations Part 50 to 51, |
| ΔH: calibrator manometer reading (in H2O) | Appendix B to Part 50, Reference Method for the |
| ΔP: rootsmeier manometer reading (mm Hg) | Determination of Suspended Particulate Matter in |
| Ta: actual absolute temperature (°K) | the Atmosphere, 9.2.17, page 30 |
| Pa: actual barometric pressure (mm Hg) | |
| b: Intercept | |
| m: slope | |

Tisch Environmental, Inc.
145 South Miami Avenue
Village of Cleves, OH 45002
www.tisch-env.com
TOLL FREE: (877)263-7610
FAX: (513)467-9009

Agilent 7899 GC Preventive Maintenance Checklist



Service Engineer Comments

If there are any specific points you wish to note as part of performing the service or other items of interest for the customer, please write include them in this box.

Need to condition ICD for high baseline.
and injection Hexane..

Service Completion

| | | | |
|----------------------------------------|-------------|------------------------|-------------|
| Service request number | 6007612466 | Date service completed | 26 Sep 2022 |
| Agilent signature | [Signature] | Customer signature | [Signature] |
| Total number of pages in this document | | 9 pages | |

Revision: 2.01, issued: September 15, 2021
Agile Document Number: D0013618
DE number: 44166.7597222222
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Thai Environmental Technic Limited
บริษัท เทคโนโลยีสิ่งแวดล้อมไทย จำกัด

High Volume TSP&PM-10 Calibration Report

Location : Thai Environmental Tech
ITEM : TSP
Site ID : Bangkok
Serial No : (No.35)
Date : 1-Aug-22
Calibrate By : Papat

Site Conditions

Barometric Pressure (mm Hg) : 760.00
Temperature (°C) : 25.0
Corrected Pressure (mm Hg) : 760.0
Average Press. (mm Hg) : 754.5
Temperature (deg K) : 298.0
Corrected Average (mm Hg) :
Average Temp (°C) : 32.8
Average Temp (Deg K) :

Calibration Orifice

Make : Tisch
Model : TE-5025A
Serial# : 0068
Qstd Slope : 1.99331
Qstd Intercept : -0.00049
Calibration Due Date : 19-Nov-22

Calibration Information

| Plate or Test # | ORIFICE (in H ₂ O) | Qstd (m3/min) | Indicate (CFM) | IC (corrected) | Linear Regression Slope : 33.6180 Intercept : 1.8901 Corr. Coeff : 0.9934 |
|-----------------|-------------------------------|---------------|----------------|----------------|------------------------------------------------------------------------------------|
| 1 | 12.20 | 1.753 | 60.0 | 60.00 | |
| 2 | 9.80 | 1.571 | 54.0 | 54.00 | |
| 3 | 7.40 | 1.365 | 50.0 | 50.00 | |
| 4 | 5.00 | 1.122 | 40.0 | 40.00 | |
| 5 | 3.00 | 0.869 | 30.0 | 30.00 | |

Calculations

$$Qstd = 1/m[\sqrt{(H_2O(Pa/Pstd)(Tstd/Ta))}] - b$$
$$IC = [1/\sqrt{(Pa/Pstd)(Tstd/Ta)}]$$

Qstd = standard flow rate
IC = corrected chart response
I = actual chart response

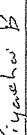
m = calibrator Qstd slope
b = calibrator Qstd intercept
Ta = actual temperature during calibration (deg K)
Pa = actual pressure during calibration (mm Hg)
Tstd = 298 deg K

Pstd = 760 mm Hg

For subsequent calculation of sampler flow:
 $1/m[(1/\sqrt{(298/Tav)(Pav/760)})] - b$

NOTE: Ensure calibration orifice has been certified within 12 months of use

Calibrate By : 

Approve By : 



Thai Environmental Technic Limited
บริษัท เทคโนโลยีสิ่งแวดล้อมไทย จำกัด

High Volume TSP&PM-10 Calibration Report

Location : Thai Environmental Tech
ITEM : TSP
Site ID : Bangkok
Serial No : (No.30)
Date : 1-Aug-22
Calibrate By : Papat

Site Conditions

Barometric Pressure (mm Hg) : 760.00
Temperature (°C) : 25.0
Corrected Pressure (mm Hg) : 760.0
Average Press. (mm Hg) : 754.5
Temperature (deg K) : 298.0
Corrected Average (mm Hg) :
Average Temp (°C) : 32.6
Average Temp (Deg K) :

Calibration Orifice

Make : Tisch
Model : TE-5025A
Serial# : 0068
Qstd Slope : 1.99331
Qstd Intercept : -0.00049
Calibration Due Date : 19-Nov-22

Calibration Information

| Plate or Test # | ORIFICE (in H ₂ O) | Qstd (m3/min) | Indicate (CFM) | IC (corrected) | Linear Regression Slope : 34.2901 Intercept : 1.3289 Corr. Coeff : 0.9921 |
|-----------------|-------------------------------|---------------|----------------|----------------|------------------------------------------------------------------------------------|
| 1 | 12.00 | 1.738 | 60.0 | 60.00 | |
| 2 | 9.60 | 1.555 | 54.0 | 54.00 | |
| 3 | 7.20 | 1.345 | 50.0 | 50.00 | |
| 4 | 5.00 | 1.122 | 40.0 | 40.00 | |
| 5 | 3.00 | 0.869 | 30.0 | 30.00 | |

Calculations

$$Qstd = 1/m[\sqrt{(H_2O(Pa/Pstd)(Tstd/Ta))}] - b$$
$$IC = [1/\sqrt{(Pa/Pstd)(Tstd/Ta)}]$$

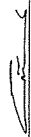
Qstd = standard flow rate
IC = corrected chart response
I = actual chart response


m = calibrator Qstd slope
b = calibrator Qstd intercept
Ta = actual temperature during calibration (deg K)
Pa = actual pressure during calibration (mm Hg)
Tstd = 298 deg K

Pstd = 760 mm Hg

For subsequent calculation of sampler flow:
 $1/m[(1/\sqrt{(298/Tav)(Pav/760)})] - b$

NOTE: Ensure calibration orifice has been certified within 12 months of use

Calibrate By : 

Approve By : 



Thai Environmental Technic Limited
บริษัท เทคโนโลยีสิ่งแวดล้อมไทย จำกัด



High Volume TSP&PM-10 Calibration Report

Location : Thai Environmental Tech
ITEM : TSP
Site ID : Bangkok
Serial No : (No. 42)
Date : 1-Aug-22
Calibrate By : Pipat

Site Conditions

Barometric Pressure (mm Hg) : 760.00
Temperature (°C) : 25.0
Corrected Pressure (mm Hg) : 760.0
Corrected Temperature (deg K) : 298.0
Average Press. (mm Hg) : 754.5
Average Temp (°C) : 32.1
Average Temp. (Deg K) :

Calibration Orifice

Make : Tisch
Model : TE-5025A
Serial# : 0068
Qstd Slope : 1.99331
Qstd Intercept : -0.00049
Calibration Due Date : 19-Nov-22

Calibration Information

| Plate or Test # | ORIFICE (in H ₂ O) | Qstd (m3/min) | Indicate (CFM) | IC (corrected) | Linear Regression |
|-----------------|-------------------------------|---------------|----------------|----------------|----------------------|
| 1 | 12.20 | 1.753 | 60.0 | 60.00 | Slope : 34.0904 |
| 2 | 9.40 | 1.538 | 54.0 | 54.00 | Intercept : 1.6064 |
| 3 | 7.20 | 1.346 | 50.0 | 50.00 | Corr. Coeff : 0.9915 |
| 4 | 5.00 | 1.122 | 40.0 | 40.00 | |
| 5 | 3.00 | 0.869 | 30.0 | 30.00 | |

Calculations

$$Qstd = 1/m[\sqrt{Pa(Pa/Pstd)(Tstd/Ta)} - b]$$

$$IC = [1/\sqrt{Pa(Pa/Pstd)(Tstd/Ta)}]$$

Qstd = standard flow rate

IC = corrected chart response

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pa = actual pressure during calibration (mm Hg)

Tstd = 298 deg K

Pstd = 760 mm Hg

For subsequent calculation of sampler flow:

$$1/m[(1/\sqrt{Pa(Pa/Pstd)(Tstd/Ta)}) - b]$$

NOTE: Ensure calibration orifice has been certified within 12 months of use

Calibrate By : _____

Approve By : Piyachon B



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High Volume TSP&PM-10 Calibration Report

Location : Thai Environmental Tech
ITEM : TSP
Site ID : Bangkok
Serial No : (No. 39)
Date : 1-Aug-22
Calibrate By : Pipat

Site Conditions

Barometric Pressure (mm Hg) : 760.00
Temperature (°C) : 25.0
Corrected Pressure (mm Hg) : 760.0
Corrected Temperature (deg K) : 298.0
Average Press. (mm Hg) : 754.5
Average Temp (°C) : 32.9
Average Temp. (Deg K) :

Calibration Orifice

Make : Tisch
Model : TE-5025A
Serial# : 0068
Qstd Slope : 1.99331
Qstd Intercept : -0.00049
Calibration Due Date : 19-Nov-22

Calibration Information

| Plate or Test # | ORIFICE (in H ₂ O) | Qstd (m3/min) | Indicate (CFM) | IC (corrected) | Linear Regression |
|-----------------|-------------------------------|---------------|----------------|----------------|----------------------|
| 1 | 12.20 | 1.738 | 60.0 | 60.00 | Slope : 34.8308 |
| 2 | 9.20 | 1.522 | 54.0 | 54.00 | Intercept : 0.8400 |
| 3 | 7.20 | 1.346 | 50.0 | 50.00 | Corr. Coeff : 0.9926 |
| 4 | 5.00 | 1.122 | 40.0 | 40.00 | |
| 5 | 3.00 | 0.869 | 30.0 | 30.00 | |

Calculations

$$Qstd = 1/m[\sqrt{Pa(Pa/Pstd)(Tstd/Ta)} - b]$$

$$IC = [1/\sqrt{Pa(Pa/Pstd)(Tstd/Ta)}]$$

Qstd = standard flow rate

IC = corrected chart response

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pa = actual pressure during calibration (mm Hg)

Tstd = 298 deg K

Pstd = 760 mm Hg

For subsequent calculation of sampler flow:

$$1/m[(1/\sqrt{Pa(Pa/Pstd)(Tstd/Ta)}) - b]$$

NOTE: Ensure calibration orifice has been certified within 12 months of use

Calibrate By : _____

Approve By : Piyachon B



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Thai Environmental Technic Limited
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High Volume TSP&PM-10 Calibration Report

Location : Thai Environmental Technic
ITEM : PM10
Site ID : Bangkok
Serial No : (No. 11)
Date : 1-Aug-22
Calibrate By : Pipat

Site Conditions

Barometric Pressure (mm Hg) : 760.00
Temperature (°C) : 25.0
Average Press. (mm Hg) : 754.5
Average Temp (°C) : 30.8
Corrected Pressure (mm Hg) : 760.0
Temperature (deg K) : 298.0
Corrected Average (mm Hg) : -
Average Temp: (Deg K) : -

Calibration Orifice

Make : Tisch
Model : TE-5025A
Serial# : 0068
Qstd Slope : 1.99331
Qstd Intercept : -0.00049
Calibration Due Date : 19-Nov-22

Calibration Information

| Plate or Test # | ORIFICE (in H ₂ O) | Qstd (m3/min) | Indicate (CFM) | IC (corrected) | Linear Regression |
|-----------------|-------------------------------|---------------|----------------|----------------|----------------------|
| 1 | 12.00 | 1.738 | 60.0 | 60.00 | Slope : 34.8308 |
| 2 | 9.20 | 1.522 | 54.0 | 54.00 | Intercept : 0.8400 |
| 3 | 7.20 | 1.346 | 50.0 | 50.00 | Corr. Coeff : 0.9926 |
| 4 | 5.00 | 1.122 | 40.0 | 40.00 | |
| 5 | 3.00 | 0.869 | 30.0 | 30.00 | |

$$Qstd = 1/[m(\sqrt{Pa/Pstd})(Tstd/Ta)]-b]$$

$$IC = [1/(\sqrt{Pa/Pstd})(Tstd/Ta)]$$

Qstd = standard flow rate

IC = corrected chart response

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pa = actual pressure during calibration (mm Hg)

Tstd = 298 deg K

Pstd = 760 mm Hg

For subsequent calculation of sampler flow:

$$1/[m(I)(\sqrt{Pa/Pstd})(Pav/760)]-b]$$

NOTE: Ensure calibration orifice has been certified within 12 months of use

Calibrate By : _____

Approve By : _____

Calculations

m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure

Calculations

$$Qstd = 1/[m(\sqrt{Pa/Pstd})(Tstd/Ta)]-b]$$

$$IC = [1/(\sqrt{Pa/Pstd})(Tstd/Ta)]$$

Qstd = standard flow rate

IC = corrected chart response

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pa = actual pressure during calibration (mm Hg)

Tstd = 298 deg K

Pstd = 760 mm Hg

For subsequent calculation of sampler flow:

$$1/[m(I)(\sqrt{Pa/Pstd})(Pav/760)]-b]$$

NOTE: Ensure calibration orifice has been certified within 12 months of use

Calibrate By : _____

Approve By : _____



Thai Environmental Technic Limited
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High Volume TSP&PM-10 Calibration Report

Location : Thai Environmental Tech Site ID : Bangkok Date : 1-Aug-22
ITEM : PM10 Serial No : (No. 26) Calibrate By : Pipat

Site Conditions

Barometric Pressure (mm Hg) : 760.00 Corrected Pressure (mm Hg) : 760.0
Temperature (°C) : 25.0 Temperature (deg K) : 298.0
Average Press. (mm Hg) : 754.5 Corrected Average (mm Hg) : -
Average Temp (°C) : 31.6 Average Temp: (Deg K) : -

Calibration Office

Make : Tisich Qstd Slope : 1.99331
Model : TE-5025A Qstd Intercept : -0.00049
Serial#: 0068 Calibration Due Date : 19-Nov-22

Calibration Information

| Plate or Test # | ORIFICE (in H ₂ O) | Qstd (m ³ /min) | Indicate (CFM) | IC (corrected) | Linear Regression |
|-----------------|-------------------------------|----------------------------|----------------|----------------|--------------------------------------------------------------|
| 1 | 12.00 | 1.738 | 60.0 | 60.00 | Slope : 34.3409 Intercept : 1.1310 Corr. Coeff: 0.9947 |
| 2 | 9.60 | 1.555 | 54.0 | 54.00 | |
| 3 | 7.40 | 1.365 | 50.0 | 50.00 | |
| 4 | 5.00 | 1.122 | 40.0 | 40.00 | |
| 5 | 3.00 | 0.859 | 30.0 | 30.00 | |

Calculations

$$Qstd = 1/m[\text{Sqrt}(H_2O(Pa/Pstd)(Tstd/Ta))-b]$$
$$IC = [(\text{Sqrt}(Pa/Pstd)(Tstd/Ta))]$$

Qstd = standard flow rate
IC = corrected chart response
I = actual chart response
m = calibrator Qstd slope
b = calibrator Qstd intercept
Ta = actual temperature during calibration (deg K)
Pa = actual pressure during calibration (mm Hg)
Tstd = 298 deg K
Pstd = 760 mm Hg

Calibrate By : _____

Approve By : Piyacha B

For subsequent calculation of sampler flow:
 $1/m[(1)/\text{Sqrt}(298/Tav)(Pav/760))-b]$

NOTE: Ensure calibration office has been certified within 12 months of use



Thai Environmental Technic Limited
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High Volume TSP&PM-10 Calibration Report

Location : Thai Environmental Tech Site ID : Bangkok Date : 1-Aug-22
ITEM : PM10 Serial No : (No. 24) Calibrate By : Pipat

Site Conditions

Barometric Pressure (mm Hg) : 760.00 Corrected Pressure (mm Hg) : 760.0
Temperature (°C) : 25.0 Temperature (deg K) : 298.0
Average Press. (mm Hg) : 754.5 Corrected Average (mm Hg) : -
Average Temp (°C) : 31.8 Average Temp: (Deg K) : -

Calibration Office

Make : Tisich Qstd Slope : 1.99331
Model : TE-5025A Qstd Intercept : -0.00049
Serial#: 0068 Calibration Due Date : 19-Nov-22

Calibration Information

| Plate or Test # | ORIFICE (in H ₂ O) | Qstd (m ³ /min) | Indicate (CFM) | IC (corrected) | Linear Regression |
|-----------------|-------------------------------|----------------------------|----------------|----------------|--------------------------------------------------------------|
| 1 | 12.00 | 1.738 | 60.0 | 60.00 | Slope : 34.8308 Intercept : 0.8400 Corr. Coeff: 0.9926 |
| 2 | 9.60 | 1.522 | 54.0 | 54.00 | |
| 3 | 7.20 | 1.346 | 50.0 | 50.00 | |
| 4 | 5.00 | 1.122 | 40.0 | 40.00 | |
| 5 | 3.00 | 0.859 | 30.0 | 30.00 | |

Calculations

$$Qstd = 1/m[\text{Sqrt}(H_2O(Pa/Pstd)(Tstd/Ta))-b]$$
$$IC = [(\text{Sqrt}(Pa/Pstd)(Tstd/Ta))]$$

Qstd = standard flow rate
IC = corrected chart response
I = actual chart response
m = calibrator Qstd slope
b = calibrator Qstd intercept
Ta = actual temperature during calibration (deg K)
Pa = actual pressure during calibration (mm Hg)
Tstd = 298 deg K
Pstd = 760 mm Hg

Calibrate By : _____

Approve By : Piyacha B

For subsequent calculation of sampler flow:
 $1/m[(1)/\text{Sqrt}(298/Tav)(Pav/760))-b]$

NOTE: Ensure calibration office has been certified within 12 months of use



Cert. No.: 22CHO625

Page : 2 of 3

Condition of calibration result

1. Reference Standard Material :

| Material | Serial No. | Certificate No. | Due date |
|-----------------------------|------------|-----------------|-------------|
| 1. Absorbance Standard set | 39130 | 106269 | 10 Oct 2024 |
| 2. Wavelength Standard set | 29829 | 94776 | 02 Sep 2023 |
| 3. Wavelength Standard set | 29829 | 94777 | 02 Sep 2023 |
| 4. Stray Light Standard set | 32629 | 9112980 | 03 Aug 2024 |

2. This certificate is valid only to the item calibrated on date and place of calibration.

3. This certificate is traceable to the International System of Unit maintained at :

- National Physical Laboratory (NPL), The United Kingdom of Great Britain and Northern Ireland
- National Institute of Standards and Technology (NIST), The United States of America

4. Spectral Bandwidth : 1 nm

Scan Speed : 30 nm/min

Calibration Results : without adjustment

Wavelength Accuracy

| Certified Values of Reference Material (nm) | UUC Reading (nm) | Uncertainty of Measurement (\pm nm) | Coverage Factor k |
|---------------------------------------------|------------------|----------------------------------------|---------------------|
| 418.53 | 418.32 | 0.12 | 2.00 |
| 536.52 | 536.61 | 0.12 | 2.00 |
| 638.00 | 637.96 | 0.12 | 2.00 |
| 684.50 | 684.48 | 0.12 | 2.00 |
| 879.41 | 879.39 | 0.12 | 2.00 |

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TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)

CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES

53/44 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250

TEL: 0-2717-3000-27 FAX: 0-2719-9484



NSC-TIS-TIS17025
CALIBRATION 0008

Cert.No.: 22CHO625

Page: 1 of 3

Certificate of Calibration

Equipment : Spectrophotometer

Manufacturer : PerkinElmer

Model : Lambda 365

Serial No. : 365K9042909

ID No. : -

Condition As-Received: Used Item

Received Date : 01 November 2022

Calibration Date : 01 November 2022

Reference : 2211-0001OC-5

Submitted by :

Thai Environmental Technic Limited
1/6 Soi Ramkhamhaeng 145,
Khwaeng/Khet Saphan Sung,
Bangkok 10240

Calibration Place :

Laboratory (Thai Environment Technic Limited)

Ambient Temperature : (24.9 - 24.4) °C (On-Site)

Relative Humidity : (54 - 52) % (On-Site)

Calibration Procedure : In - house method :

CP-OCH4 based on ASTM E 275-01

Calibrated by :

Uthen Kankawi

Approved by :

Walu

Approved Signatory

(✓) Malee Bulkrua

() Sathip Meangmai

() Warakorn Lernagrakul

Issue Date :

10 November 2022

The Uncertainties are for a confidence probability of approximately 95 %

This certificate may not be reproduced other than in full, except with the prior written
Approval of the head of Corporate Services 3 : Equipment Calibration and Testing Services.

A 0047052



Certificate of Analysis
Special Gases Mixture

Customer Details
Name: Thai Environmental Technic Limited
Address: 1/6 Soi Ramkhamhaeng 45, Khut Saphansong, Bangkok 10240
Customer Tag No.:

Certificate Details
Number: 3450/21
Date of Issue: 18-Aug-2021
Expiry date: 18-Aug-2023
Material Details: 90167125
Production Order: 640300-SK-44
Material Code: A009625K
Gas contents: 5.52 N₂
Filling pressure: CGA 660 55
Cylinder Owner: LINDE
Valve: 40 L
Cylinder Material: Spectra seal
Cylinder Size: 40 L

Laboratory Report
Component: Nitric Oxide
Nominal Concentration: 40.0 ppm
Analysis Result: 39.2 ppm
Uncertainty: ± 1% relative
Method of Analysis: (6) 1-PB-352
Assay Date: 11-Aug-18-Aug-21
Less than 1.9 ppm

Reference Standard: Nitric Oxide in Nitrogen
Reference number: 2788115G
Concentration: 51.58 ± 0.41 ppm
Expiry date: 29-Oct-2022

Instrument/Make/Model: FTIR Spectrometers Nicolet 1550
Analytical Principle: FTIR-NO
Last Multipoint Calibration: 9-Aug-2021

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

Comments:
When reordering, please quote the material number
Note:
1. All results expressed in this report are on a dry basis, unless otherwise specified. The Assay of this Standard has been performed in accordance with the ISO 6186-1:2007 and Calibration of Gases Calibration Standards using procedure G1.
2. The reported expanded uncertainty is based on the ISO 91:2008 and ISO 17025:2017. The expanded uncertainty is expressed as a percentage of the measured value.
3. The measurement of this material is traceable to the SI through the reference gas standard which is traceable to the National Standard of Mass.
4. The gas composition is subject to change without notice.
5. The gas composition is subject to change without notice.
6. The gas composition is subject to change without notice.
7. The gas composition is subject to change without notice.
8. The gas composition is subject to change without notice.
9. The gas composition is subject to change without notice.
10. The gas composition is subject to change without notice.

Page 1 of 1
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Linde (Thailand) Public Company Limited
15/15, Bangkok Tower A, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000.



Calibration Results : without adjustment
Photometric Accuracy

| Wavelength (nm) | Certified Values of Reference Material (Abs) | UUC Reading (Abs) | Uncertainty of Measurement (±Abs) | Coverage Factor k |
|-----------------|----------------------------------------------|--------------------------------------|--------------------------------------|------------------------------|
| 420.0 | Zero 0.5796 0.7105 1.0186 | 0.0000 0.5788 0.7095 1.0179 | 0.0028 0.0028 0.0028 0.0028 | 2.00 2.00 2.00 2.00 |
| 546.1 | Zero 0.5281 0.6962 0.9984 | 0.0000 0.5258 0.6945 0.9956 | 0.0028 0.0028 0.0028 0.0028 | 2.00 2.00 2.00 2.00 |
| 635.0 | Zero 0.5699 0.7606 1.0927 | 0.0000 0.5684 0.7590 1.0904 | 0.0028 0.0028 0.0028 0.0028 | 2.00 2.00 2.00 2.00 |

Stray Light

| | |
|-------------------------------------|--------------------------------|
| * Straylight at 280.05 nm ± 0.11 nm | Reading at 280.05 nm ± 0.11 nm |
| Abs | 2.0728 |
| %T | 0.8299 |

Remark

- Each individual filter is measured against the empty filter holder (blank) used to zero the spectrophotometer
- Cut-off wavelength of stray light reference material (Potassium Iodide) at wavelength 280.05 nm ± 0.11 nm
- Result = Pass, if Absorbance > 2.00 Abs and Transmission < 1.0 %T at Wavelength 280.05 nm ± 0.11 nm
- * : Not NSC-ONSC Accredited

The reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor k, providing a level of confidence of approximately 95 %.

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Thai Environmental Technic Limited
บริษัท เทคโนโลยีสิ่งแวดล้อมไทย จำกัด

Analyzer Calibration Report

Calibrate Date : 10-May-23
Analyzer Type : NOx
Brand : API
Model : 200 E
Serial Number : 1732 (No. 5)
Range : 500 ppb

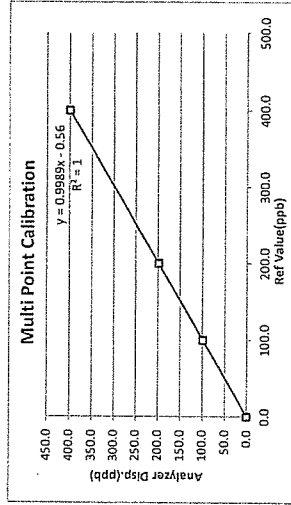
Temperature (°C) : 25 °C
Barometer (mmHg) : 759.9
Humidity (50±15 %) : 50.0%RH
Dilutor : API M700 S/N 625
Zero Air : API M701 S/N 1926
Standard gas : A00962 SK

Calibration of Span

| Supply Gas | Ref Value(ppb) | Before of Span.(ppb) | | | After of Span.(ppb) | | | % diff of Span |
|------------|----------------|----------------------|-------|-----------------|---------------------|-------|-----------------|----------------|
| | | NOx | NO | NO ₂ | NOx | NO | NO ₂ | |
| Zero | 0.0 | 0.5 | 0.1 | 0.4 | 0.0 | 0.0 | 0.0 | 0.0 |
| Span | 400.0 | 387.0 | 384.0 | 3.0 | 400.0 | 400.0 | 0.0 | 0.0 |

Multi Point Calibration

| Ref Value(ppb) | Analyzer Disp.(ppb) | | | Output Difference | |
|------------------|---------------------|-------|-----------------|-------------------|--------------|
| | NOx | NO | NO ₂ | Diff(ppb) | Abs (% Diff) |
| 0.0 | 0.4 | 0.2 | 0.2 | 0.20 | 0.001 |
| 100.0 | 99.8 | 98.8 | 1.0 | -1.20 | -0.012 |
| 200.0 | 199.7 | 198.5 | 1.2 | -1.50 | -0.008 |
| 400.0 | 401.0 | 399.5 | 1.5 | -0.50 | -0.001 |
| Average Diff (%) | | | | | 0.53 |



Calibrate by: Y.S.

Approved by: Piyachon B

แก้ไขครั้งที่ : 00

วันที่อนุมัติ : 02/09/15

เลขที่แบบฟอร์ม : QF-QP16-06

Thai Environmental Technic Limited 1/6 Soi Ramkhamhaeng 145 Khwaeng/Khet Saphan Sung Bangkok 10240 Thailand
Tel : +66(0)2732-7799(Auto) Fax : +66(0)2732-7799 • admin@tet1995.com • www.tet1995.com



Thai Environmental Technic Limited
บริษัท เทคโนโลยีสิ่งแวดล้อมไทย จำกัด

Analyzer Calibration Report

Calibrate Date : 10-May-23
Analyzer Type : NOx
Brand : API
Model : 200 E
Serial Number : 1732 (No. 5)
Range : 500 ppb

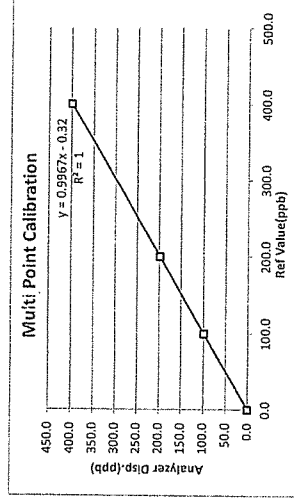
Temperature (°C) : 25 °C
Barometer (mmHg) : 759.9
Humidity (50±15 %) : 50.0%RH
Dilutor : API M700 S/N 625
Zero Air : API M701 S/N 1926
Standard gas : A00962 SK

Calibration of Span

| Supply Gas | Ref Value(ppb) | Before of Span.(ppb) | | | After of Span.(ppb) | | | % diff of Span |
|------------|----------------|----------------------|-------|-----------------|---------------------|-------|-----------------|----------------|
| | | NOx | NO | NO ₂ | NOx | NO | NO ₂ | |
| Zero | 0.0 | 1.8 | 1.5 | 0.3 | 0.2 | 0.2 | 0.0 | 0.2 |
| Span | 400.0 | 382.0 | 380.5 | 1.5 | 400.0 | 400.0 | 0.0 | 0.0 |

Multi Point Calibration

| Ref Value(ppb) | Analyzer Disp.(ppb) | | | Output Difference | |
|------------------|---------------------|-------|-----------------|-------------------|--------------|
| | NOx | NO | NO ₂ | Diff(ppb) | Abs (% Diff) |
| 0.0 | 0.4 | 0.2 | 0.2 | 0.20 | 0.001 |
| 100.0 | 99.8 | 99.2 | 0.6 | -0.80 | -0.008 |
| 200.0 | 199.6 | 198.2 | 1.4 | -1.80 | -0.009 |
| 400.0 | 399.0 | 398.8 | 0.2 | -1.20 | -0.003 |
| Average Diff (%) | | | | | 0.51 |



Calibrate by: Y.S.

Approved by: Piyachon B

แก้ไขครั้งที่ : 00

วันที่อนุมัติ : 02/09/15

เลขที่แบบฟอร์ม : QF-QP16-06

Thai Environmental Technic Limited 1/6 Soi Ramkhamhaeng 145 Khwaeng/Khet Saphan Sung Bangkok 10240 Thailand
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Thai Environmental Technic Limited
บริษัท เทคโนโลยีสิ่งแวดล้อมไทย จำกัด

Analyzer Calibration Report

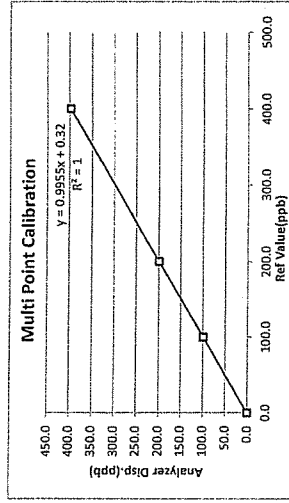
Calibrate Date : 12-May-23
Analyzer Type : NOx
Brand : Teledyne
Model : 200 B
Serial Number : 2789 (No.36)
Range : 500 ppb
Temperature (°C) : 25°C
Barometer (mmHg) : 760.0
Humidity (50±15 %) : 50.03RH
Dilutor : API M700 S/N 625
Zero Air : API M701 S/N 1926
Standard gas : A00962 SK

Calibration of Span

| Supply Gas | Ref Value(ppb) | Before of Span(ppb) | | | After of Span(ppb) | | | % diff of Span |
|------------|----------------|---------------------|-------|-----------------|--------------------|-------|-----------------|----------------|
| | | NOx | NO | NO ₂ | NOx | NO | NO ₂ | |
| Zero | 0.0 | 0.3 | 0.1 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 |
| Span | 400.0 | 387.0 | 382.0 | 5.0 | 400.0 | 400.0 | 0.0 | 0.0 |

Multi Point Calibration

| Ref Value(ppb) | Analyzer Disp.(ppb) | | | Output Difference | | |
|------------------|---------------------|-------|-----------------|-------------------|--------|--------------|
| | NOx | NO | NO ₂ | Diff(ppb) | % Diff | Abs (%) Diff |
| 0.0 | 0.5 | 0.4 | 0.1 | 0.40 | 0.001 | 0.10 |
| 100.0 | 99.8 | 99.7 | 0.1 | -0.30 | -0.003 | 0.30 |
| 200.0 | 199.8 | 199.5 | 0.2 | -0.50 | -0.003 | 0.25 |
| 400.0 | 398.7 | 398.5 | 0.2 | -1.50 | -0.004 | 0.38 |
| Average Diff (%) | | | | | | |
| 0.26 | | | | | | |



Calibrate by:

Approved by: Piyachon B

แก้ไขครั้งที่: 00

วันที่อนุมัติ 02/09/15

Thai Environmental Technic Limited 1/6 Soi Ramkhamhaeng 145 Khwaeng/Kiet Saphan Sung Bangkok 10240 Thailand
Tel : +66(0)2373-7799(Auto) Fax : +66(0)2373-7979 • admin@tet1995.com • www.tet1995.com

เลขที่แบบฟอร์ม : QF-QP16-06



Thai Environmental Technic Limited
บริษัท เทคโนโลยีสิ่งแวดล้อมไทย จำกัด

Analyzer Calibration Report

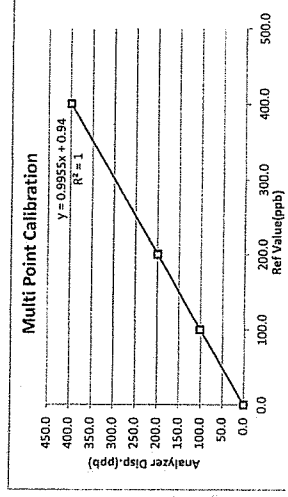
Calibrate Date : 10-May-23
Analyzer Type : NOx
Brand : API
Model : 200 A
Serial Number : 777 (No.25)
Range : 500 ppb
Temperature (°C) : 25°C
Barometer (mmHg) : 759.9
Humidity (50±15 %) : 50.03RH
Dilutor : API M700 S/N 625
Zero Air : API M701 S/N 1926
Standard gas : A00962 SK

Calibration of Span

| Supply Gas | Ref Value(ppb) | Before of Span(ppb) | | | After of Span(ppb) | | | % diff of Span |
|------------|----------------|---------------------|-------|-----------------|--------------------|-------|-----------------|----------------|
| | | NOx | NO | NO ₂ | NOx | NO | NO ₂ | |
| Zero | 0.0 | 3.5 | 3.1 | 0.4 | 0.0 | 0.0 | 0.0 | 0.0 |
| Span | 400.0 | 387.0 | 382.0 | 5.0 | 400.0 | 400.0 | 0.0 | 0.0 |

Multi Point Calibration

| Ref Value(ppb) | Analyzer Disp.(ppb) | | | Output Difference | | |
|------------------|---------------------|-------|-----------------|-------------------|--------|--------------|
| | NOx | NO | NO ₂ | Diff(ppb) | % Diff | Abs (%) Diff |
| 0.0 | 0.8 | 0.4 | 0.4 | 0.40 | 0.001 | 0.10 |
| 100.0 | 101.3 | 101.5 | -0.2 | 1.50 | 0.015 | 1.50 |
| 200.0 | 199.8 | 199.6 | 0.2 | -0.40 | -0.002 | 0.20 |
| 400.0 | 399.4 | 399.1 | 0.3 | -0.90 | -0.002 | 0.22 |
| Average Diff (%) | | | | | | |
| 0.51 | | | | | | |



Calibrate by:

Approved by: Piyachon B

แก้ไขครั้งที่: 00

วันที่อนุมัติ 02/09/15

Thai Environmental Technic Limited 1/6 Soi Ramkhamhaeng 145 Khwaeng/Kiet Saphan Sung Bangkok 10240 Thailand
Tel : +66(0)2373-7799(Auto) Fax : +66(0)2373-7979 • admin@tet1995.com • www.tet1995.com

เลขที่แบบฟอร์ม : QF-QP16-06



TET

Thai Environmental Technic Limited
บริษัท เทคโนโลยีสิ่งแวดล้อมไทย จำกัด

Analyzer Calibration Report

Calibrate Date : 12-May-23
Analyzer Type : CO
Brand : API
Model : 300
Serial Number : 1068
Range : 100 ppm

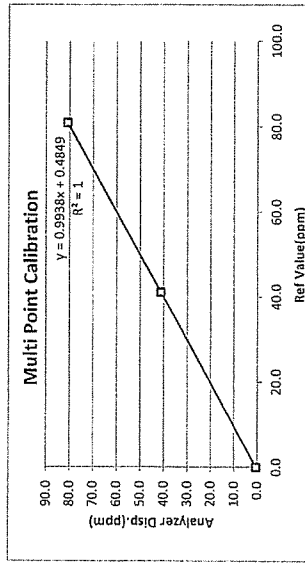
Temperature (°C) : 25°C
Barometer (mmHg) : 760.0
Humidity (50±15 %) : 50.5%RH
Dilutor : API M700 S/N625
Zero Air : API M701 S/N1926
Standard gas : D824408, ND24989

Calibration of Span

| Supply Gas | Ref Value(ppm) | Before of Span.(ppm) | After of Span.(ppm) | Abs% diff of Span |
|------------|----------------|----------------------|---------------------|-------------------|
| Zero | 0.0 | 2.4 | 0.0 | 0.0 |
| Span | 80.9 | 80.7 | 80.9 | 0.0 |

Multi Point Calibration

| Ref Value(ppm) | Analyzer Disp.(ppm) | Output Difference | | |
|------------------|---------------------|-------------------|--------------|------------------|
| | | Diff (ppm) | Percent Diff | Abs Percent Diff |
| 0.0 | 0.5 | 0.5 | 0.01 | 0.62 |
| 41.1 | 41.3 | 0.2 | 0.00 | 0.49 |
| 80.9 | 80.9 | 0.0 | 0.00 | 0.00 |
| Average Diff (%) | | 0.37 | | |



Calibrate by: Jh-S.

Approved by: Piyada B

แก้ไขครั้งที่ : 00

วันที่อนุมัติ 02/09/15

เลขที่แบบฟอร์ม : QF-QP16-06

Thai Environmental Technic Limited 116 Soi Ramkhamhaeng 145 Khwaeng/Phee Saphan Sung Bangkok 10240 Thailand
• Tel : +66(0)2373-7799(Auto) Fax : +66(0)2373-7799 • admin@tet1995.com • www.tet1995.com



TET

Thai Environmental Technic Limited
บริษัท เทคโนโลยีสิ่งแวดล้อมไทย จำกัด

Analyzer Calibration Report

Calibrate Date : 12-May-23
Analyzer Type : NOx
Brand : Teledyne
Model : 200 E
Serial Number : 2789 (NO.36)
Range : 500 ppb

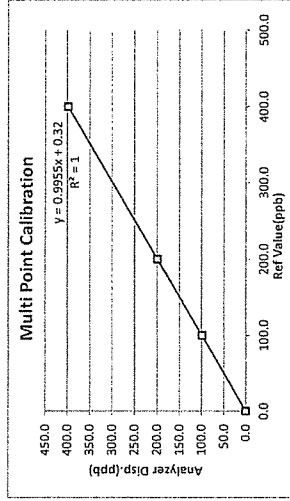
Temperature (°C) : 25°C
Barometer (mmHg) : 760.0
Humidity (50±15 %) : 50.0%RH
Dilutor : API M700 S/N 625
Zero Air : API M701 S/N 1926
Standard gas : A00962 SX

Calibration of Span

| Supply Gas | Ref Value(ppb) | Before of Span.(ppb) | | | After of Span.(ppb) | | | % diff of Span |
|------------|----------------|----------------------|-------|-----------------|---------------------|-------|-----------------|----------------|
| | | NOx | NO | NO ₂ | NOx | NO | NO ₂ | |
| Zero | 0.0 | 0.3 | 0.1 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 |
| Span | 400.0 | 387.0 | 382.0 | 5.0 | 400.0 | 400.0 | 0.0 | 0.0 |

Multi Point Calibration

| Ref Value(ppb) | Analyzer Disp (ppb) | | | Output Difference | | |
|------------------|---------------------|-------|-----------------|-------------------|--------|--------------|
| | NOx | NO | NO ₂ | Diff(ppb) | % Diff | Abs (%) Diff |
| 0.0 | 0.5 | 0.4 | 0.1 | 0.40 | 0.001 | 0.10 |
| 100.0 | 99.8 | 99.7 | 0.1 | -0.30 | -0.003 | 0.30 |
| 200.0 | 199.8 | 199.5 | 0.2 | -0.50 | -0.003 | 0.25 |
| 400.0 | 398.7 | 398.5 | 0.2 | -1.50 | -0.004 | 0.38 |
| Average Diff (%) | | 0.26 | | | | |



Calibrate by: Jh-S.

Approved by: Piyada B

แก้ไขครั้งที่ : 00

วันที่อนุมัติ 02/09/15

เลขที่แบบฟอร์ม : QF-QP16-06

Thai Environmental Technic Limited 116 Soi Ramkhamhaeng 145 Khwaeng/Phee Saphan Sung Bangkok 10240 Thailand
• Tel : +66(0)2373-7799(Auto) Fax : +66(0)2373-7799 • admin@tet1995.com • www.tet1995.com



The Result of Calibration

Certification No. 229/22

16 June, 2022

Page : 2 of 2

| Standard Ultrasonic Anemometer m/sec | HOOK GAGE NO. 1425 | | | TESTED ANEMOMETER | |
|--------------------------------------------|-------------------------------------|-----------------------------------|-------------------|-------------------|---------------------|
| | Pressure inches H ₂ O | Vacuum inches H ₂ O | Velocity m/sec | Velocity m/sec | Correction m/sec |
| 1.00 | - | - | - | 0.4 | 0.60 |
| 3.02 | - | - | - | 2.7 | 0.32 |
| 5.00 | - | - | - | 4.5 | 0.50 |
| 7.00 | - | - | - | 6.7 | 0.30 |
| 9.02 | - | - | - | 8.5 | 0.52 |
| 11.01 | - | - | - | 10.7 | 0.31 |
| 13.01 | - | - | - | 12.5 | 0.51 |
| 15.01 | - | - | - | 14.7 | 0.31 |
| 17.02 | - | - | - | 16.5 | 0.52 |
| 20.02 | - | - | - | 19.7 | 0.32 |

| Wind Aloft Plotting Board. | |
|------------------------------------------|-----------------------|
| US.DEPARTMENT OF COMMERCE WEATHER BUREAU | |
| WIND DIRECTION | TESTED WIND DIRECTION |
| 0 | 0 |
| 90 | 90 |
| 180 | 180 |
| 270 | 270 |

Calibrated by :

Mr. Watcharapol Subwat

Mechanical Engineer



Calibration Certificate

Issued by : Calibration & Test Section : Meteorological Instruments Bureau

Date of issue 16 June, 2022

Certification No. 229/22

Page : 1 of 2

Object : Wind speed and wind direction

Manufacturer : Davis Instruments Inc.

Type : Weather Wizard III

Serial No. : LE10919AA62 ID No. : No.6

Customer : Thai Environmental Technic Limited.
1/6 Soi Ramkhamhaeng 145,
Khwaeng/Khet Saphan Sung, Bangkok 10240.

Calibration Condition : Temperature 25.1 °C Barometric Pressure 1009.7 hPa

NATIONAL STANDARD WIND TUNNEL :

: Thermal Anemometer 642 S/N 91563

: HOOK GAGE NO 1425 Pilot Tube Theodor Friedrichs Type 0800.0000 serial 9023

N.I.S.T. Test Reference Number 731/241460 : Standard Velocity at 20 - 30 m/sec

: Ultrasonic Anemometer Model DA-650-3TV (sensor TR-90AH)

Serial Number 110730029 (sensor 120629586)

JAPAN QUALITY ASSURANCE ORGANIZATION



Calibrated by : Mr. Watcharapol Subwat

Signed

Mechanical Engineer



THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804, 0-2399-0469

The Result of Calibration

Certification No. 228/22

16 June, 2022

Page : 2 of 2

| Standard Ultrasonic Anemometer m/sec | HOOK GAGE NO. 1425 | | TESTED ANEMOMETER | |
|--------------------------------------------|------------------------|----------------------|-------------------|---------------------|
| | Pressure inches H2O | Vacuum inches H2O | Velocity m/sec | Correction m/sec |
| 1.00 | - | - | 0.9 | 0.10 |
| 3.02 | - | - | 2.7 | 0.32 |
| 5.00 | - | - | 4.5 | 0.50 |
| 7.00 | - | - | 6.7 | 0.30 |
| 9.02 | - | - | 8.5 | 0.52 |
| 11.01 | - | - | 10.7 | 0.31 |
| 13.01 | - | - | 12.5 | 0.51 |
| 15.01 | - | - | 14.7 | 0.31 |
| 17.02 | - | - | 16.5 | 0.52 |
| 20.02 | - | - | 19.7 | 0.32 |

| Wind Aloft Plotting Board. | |
|--------------------------------------------|-----------------------|
| U.S. DEPARTMENT OF COMMERCE WEATHER BUREAU | |
| WIND DIRECTION | TESTED WIND DIRECTION |
| 0 | 0 |
| 90 | 90 |
| 180 | 180 |
| 270 | 270 |



Calibrated by :

Mr. Watcharapol Subwat

Mechanical Engineer



THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804, 0-2399-0469

Calibration Certificate

Issued by : Calibration & Test Section : Meteorological Instruments Bureau

Date of Issue 16 June, 2022

Certification No. 228/22

Page : 1 of 2

Object : Wind speed and wind direction

Manufacturer : Davis Instruments Inc.

Type : Weather Wizard III

Serial No. : WC40105A43 ID No. : No.8

Customer : Thai Environmental Technic Limited.

1/6 Soi Ramkhamhaeng 145,

Khwaeng/Khet Saphan Sung, Bangkok 10240.

Calibration Condition : Temperature 25.1 °C Barometric Pressure 1010.2 hPa

NATIONAL STANDARD WIND TUNNEL :

: Thermal Anemometer 642 S/N 91563

: HOOK GAGE NO 1425 Pilot Tube Theodor Friedrichs Type 0800.0000 serial 9023

N.I.S.T. Test Reference Number 731/241460 : Standard Velocity at 20 - 30 m/sec

: Ultrasonic Anemometer Model DA-850-3TV (sensor TR-90AH)

Serial Number 110730029 (sensor 120629586)

JAPAN QUALITY ASSURANCE ORGANIZATION

: Standard Velocity at 20 - 30 m/sec

Calibrated by : Mr. Watcharapol Subwat

Mechanical Engineer

Signed
Mr. Pisoot Primsut





THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804,0-2399-0469

The Result of Calibration

16 September, 2022

Certification No. 338/22

Page : 2 of 2

| Standard Ultrasonic Anemometer m/sec | HOOK GAGE NO. 1425 | | | TESTED ANEMOMETER | |
|--------------------------------------------|------------------------|----------------------|-------------------|-------------------|---------------------|
| | Pressure Inches H2O | Vacuum Inches H2O | Velocity m/sec | Velocity m/sec | Correction m/sec |
| 1.00 | - | - | - | 0.4 | 0.60 |
| 3.02 | - | - | - | 2.2 | 0.82 |
| 5.00 | - | - | - | 4.5 | 0.50 |
| 7.00 | - | - | - | 6.7 | 0.30 |
| 9.02 | - | - | - | 8.5 | 0.52 |
| 11.01 | - | - | - | 10.3 | 0.71 |
| 13.01 | - | - | - | 12.5 | 0.51 |
| 15.01 | - | - | - | 14.3 | 0.71 |
| 17.02 | - | - | - | 16.1 | 0.92 |
| 20.02 | - | - | - | 19.2 | 0.82 |

| Wind Aloft Plotting Board. | |
|------------------------------------------|-----------------------|
| US.DEPARTMENT OF COMMERCE WEATHER BUREAU | |
| WIND DIRECTION | TESTED WIND DIRECTION |
| 0 | 0 |
| 90 | 90 |
| 180 | 180 |
| 270 | 270 |

Calibrated by : *Wacharapol*

Mr. Wacharapol Subwat
Mechanical Engineer



THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804,0-2399-0469

Calibration Certificate

Issued by : Calibration & Test Section : Meteorological Instruments Bureau

Date of Issue : 16 September, 2022

Certification No. 338/22

Page : 1 of 2

Object : Wind speed and wind direction

Manufacturer : Davis Instruments Inc.

Type : Weather Wizard II

Serial No. : WC50309B03 ID No. : No.28

Customer : Thai Environmental Technic Limited.
1/6 Soi Ramkhamhaeng 145,
Khwaeng/Khet Saphan Sung, Bangkok 10240.

Calibration Condition : Temperature 25.1 ° C Barometric Pressure 1006.5 hPa

NATIONAL STANDARD WIND TUNNEL :

: Micromanometer Theodor Friedrichs FC014 Serial No. 9310119

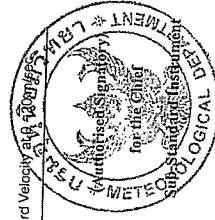
: HOOK GAGE NO 1425 Pitot Tube Theodor Friedrichs Type 0800.0000 serial 9023

N.I.S.T. Test Reference Number 731/241480 : Standard Velocity at 20 - 30 m/sec

: Ultrasonic Anemometer Model DA-650-3TV (sensor TR-90AH)

Serial Number 110730029 (sensor 120629586)

JAPAN QUALITY ASSURANCE ORGANIZATION



Calibrated by : *Wacharapol* Signed : *Mr. Wacharapol Subwat*

Mr. Wacharapol Subwat
Mechanical Engineer



THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804,0-2399-0469

The Result of Calibration

Certification No. 363/22

19 October, 2022

Page : 2 of 2

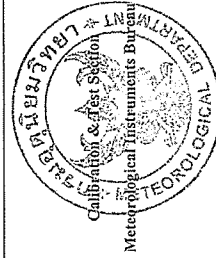
| Standard Ultrasonic Anemometer m/sec | HOOK GAGE NO. 1425 | | TESTED ANEMOMETER | |
|--------------------------------------------|----------------------|--------------------|-------------------|---------------------|
| | Pressure mbar H2O | Vacuum mbar H2O | Velocity m/sec | Correction m/sec |
| 1.00 | - | - | 0.4 | 0.60 |
| 3.02 | - | - | 2.2 | 0.82 |
| 5.00 | - | - | 4.5 | 0.50 |
| 7.00 | - | - | 6.3 | 0.70 |
| 9.02 | - | - | 8.5 | 0.52 |
| 11.01 | - | - | 10.3 | 0.71 |
| 13.01 | - | - | 12.5 | 0.51 |
| 15.01 | - | - | 14.8 | 0.21 |
| 17.02 | - | - | 16.5 | 0.52 |
| 20.02 | - | - | 19.7 | 0.32 |

| Wind Aloft Plotting Board. | |
|------------------------------------------|-----------------------|
| US DEPARTMENT OF COMMERCE WEATHER BUREAU | |
| WIND DIRECTION | TESTED WIND DIRECTION |
| 0 | 0 |
| 90 | 90 |
| 180 | 180 |
| 270 | 270 |

Calibrated by :

Mr. Watcharapol Subwat

Mechanical Engineer



THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804,0-2399-0469

Calibration Certificate

Issued by : Calibration & Test Section : Meteorological Instruments Bureau

Date of Issue 19 October, 2022

Certification No. 363/22

Page : 1 of 2

Object : Wind speed and wind direction
Manufacturer : Davis Instruments Inc.
Type : Vanlage VUE Model No. : 6250EU
ID No. : No.18
Serial No. : Display E110124A077 Transmitter E110124A078
Customer : Thai Environmental Technic Limited.
1/6 Soi Ramkhamhaeng 145,
Khwaeng/Khet Saphan Sung, Bangkok 10240.

Calibration Condition : Temperature 25.1 °C Barometric Pressure 1012.7 hPa

NATIONAL STANDARD WIND TUNNEL :

: Thermal Anemometer 642 S/N 91563

: HOOK GAGE NO 1425 Pitot Tube Theodor Friedrichs Type 0800.0000 serial 9023

N.I.S.T. Test Reference Number 731/241460 : Standard Velocity at 20 - 30 m/sec

: Ultrasonic Anemometer Model DA-650-3TV (sensor TR-90AH)

Serial Number 110730029 (sensor 120629586)

JAPAN QUALITY ASSURANCE ORGANIZATION

: Standard Velocity at 20 m/sec

Calibrated by :

Mr. Watcharapol Subwat

Mechanical Engineer

Signed:

Mr. P. Soodprimsut





Personal Pump Calibration Report

Equipment Type : Personal Pump/Parameter

Equipment Range : 0.1-7.0 V/min

Calibration Range : 0.1-4.0 V/min

Calibration Type : Drycal

Calibration S/N : 4491

[illegible]Calibration Date 05 / 05 / 66Calibration By Am

Remark: Uncertainty Type A = $\sigma =$ SD

 \sqrt{n}

= Standard:

= Mean

-1-



Personal Pump Calibration Report

Equipment Type : Personal Pump/Parameter

Equipment Range

Calibration Range

Calibration Type : Drycal

Calibration S/N : 4491

[illegible]Calibration Date 13 / 05 / 66

Calibration By Amu

Remark : Uncertainty Type A $= \sigma = SD$

 $\sqrt{22}$

= Standard deviation

= Mean



TEST

Thai Environmental Technic Limited
บริษัท เทคโนโลยีสิ่งแวดล้อมไทย จำกัด

Personal Pump Calibration Report

| | | |
|-------------------|---|-------------------------|
| Equipment Type | : | Personal Pump/Parameter |
| Equipment Range | : | 0.1-7.0 L/min |
| Calibration Range | : | 0.1-4.0 L/min |
| Calibration Type | : | Drycal |
| Calibration S/N | : | 4491 |

[illegible]

Calibration Date 23 / 06 / 66

Calibration By gma

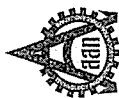
Remark : Uncertainty Type A $\Rightarrow \sigma = \frac{SD}{\sqrt{n}}$

$$\sqrt{n}$$

: SD = Standard deviation

 \bar{X} = Mean

-5-



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250
TEL. 0-2717-3000-29 FAX. 0-2719-9484



Cert.No.: 23MM161
Page.: 1 of 3

Certificate of Calibration

| | |
|----------------|--------------------|
| Equipment : | Electronic Balance |
| Manufacturer : | Mettler Toledo |
| Model : | XP205DR |
| Serial No. : | 1129273885 |
| ID No. : | |

Submitted by :
Thai Environmental Technic Limited
1/6 Soi Ramkhamhaeng 145,
Khwaeng/Khet Saphan Sung,
Bangkok 10240

Location : Balance Room

Received order : 10 April 2023

Calibration Date: 11 April 2023

Ambient Temperature : 15 °C to 40 °C

Relative Humidity : 30 % to 90 %

Calibrated by :
Khit Rutnanapachai

Approved by : Mallu.
Approved Signatory

() Pornthippa Tameyakul
(✓) Malee Bulkruea
() Suwit Imjai

Issue Date : 25 April 2023

25 April 2023

The Uncertainties are for a confidence probability of approximately 95%

This certificate may not be reproduced other than in full, except with the prior written

Approval of the head of Corporate Services 3 : Equipment Calibration and Testing Services.

A 0053465



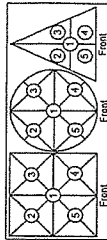
Equipment : Electronic Balance
Condition As-Received : Used Item
Reference : 2304-01460C-13

Cert.No.: 23MM161
Page: 3 of 3

Result of calibration

2. Effect of off center loading

A mass of 100 g was placed to various position on the pan.
The weighing machine reading error obtained is given in the table



| Maximum difference between off-center and central loading (g) | | | | |
|---------------------------------------------------------------|----------------|----------------|----------------|----------------|
| Position 1 (g) | Position 2 (g) | Position 3 (g) | Position 4 (g) | Position 5 (g) |
| -0.0001 | -0.0001 | -0.0002 | -0.0001 | 0.0000 |
| 0.0001 | | | | |

3. Departure from nominal value

| Applied Weight (g) | | Balance Reading (g) | | Correction (g) | | Measurement Uncertainty (\pm mg) | | Coverage Factor (k) | |
|--------------------|--|---------------------|--|----------------|--|-------------------------------------|--|---------------------|--|
| Unload | | 0.00000 | | 0.00000 | | 0.038 | | 2.28 | |
| 0.01 | | 0.01000 | | 0.00000 | | 0.039 | | 2.28 | |
| 0.05 | | 0.05000 | | 0.00000 | | 0.039 | | 2.28 | |
| 1 | | 1.00001 | | -0.00001 | | 0.040 | | 2.23 | |
| 2 | | 2.00001 | | -0.00001 | | 0.042 | | 2.17 | |
| 5 | | 5.00001 | | -0.00001 | | 0.045 | | 2.13 | |
| 10 | | 10.00001 | | -0.00001 | | 0.051 | | 2.06 | |
| 20 | | 20.00001 | | -0.00001 | | 0.085 | | 2.00 | |
| 50 | | 49.99998 | | +0.00002 | | 0.15 | | 2.00 | |
| 80 | | 80.00002 | | -0.00002 | | 0.30 | | 2.00 | |
| 200 | | 199.9999 | | +0.0001 | | | | | |

The reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor k , providing a level of confidence of approximately 95 %.

-000-

Malu

a 1158496



Equipment : Electronic Balance
Condition As-Received : Used Item
Reference : 2304-01460C-13

Cert.No.: 23MM161
Page: 2 of 3

Procedure used :-

Calibration were conducted using in-house calibration procedure CP-OB01 according to direct measurement method against standard weight.

Condition of this result of calibration

1. Reference standard instruments:-

- 1) Standard Weight Set (E2)
- 2) This certificate is valid only to the item calibrated on date and place of calibration.
3. This result of calibration was made on requested at the point specified by customer.
4. This certificate is not certified for any commercial transaction.
5. This certification is traceable to the International System of Unit.

Result of calibration () Without Adjustment (*) After Adjustment by Internal Calibration

Range capacity : 0 g to 81 g Resolution 0.00001 g
81 g to 220 g Resolution 0.0001 g

Before Adjustment :

| Applied Weight (g) | | Balance Reading (g) | | Correction (g) | | Measurement Uncertainty (\pm mg) | | Coverage Factor (k) | |
|--------------------|--|---------------------|--|----------------|--|-------------------------------------|--|---------------------|--|
| 80 | | 79.99946 | | +0.00054 | | 0.15 | | 2.00 | |
| 200 | | 199.9984 | | +0.0016 | | 0.30 | | 2.00 | |

After Adjustment :

1. Determination of the standard deviation of weighing machine

| Applied Weight (g) | | Standard Deviation of Reading (g) | |
|--------------------|--|-----------------------------------|--|
| 80 | | 0.000023 | |
| 200 | | 0.00008 | |

(n = 10)

Malu

a 1158497

MAINTENANCE REPORT AND TEST CERTIFICATE
OPTIMA 8000

| | |
|----------------------------------------------------------------------------------|----------------------------------------|
| SERIAL NUMBER : 078N1310024C | DATE TESTED : April 3, 2023 |
| 1. MECHANICAL CHECKS | |
| A. Inspect and clean all fans and filters. | <input checked="" type="checkbox"/> OK |
| B. Inspect and replace as necessary, all torch components including the RF coil. | <input checked="" type="checkbox"/> OK |
| C. Inspect all tubing for sign of clacking or leaking. | <input checked="" type="checkbox"/> OK |
| D. Adjust water and gas pressure regulator settings. | <input checked="" type="checkbox"/> OK |
| E. Inspect and leak check pneumatics drawers. | <input checked="" type="checkbox"/> OK |
| F. Clean the exterior of the instrument. | <input checked="" type="checkbox"/> OK |
| 2. OPTICAL CHECKS | |
| A. Inspect and clean all optical components. | <input checked="" type="checkbox"/> OK |
| B. As required, check and replace all purgefilters. | <input checked="" type="checkbox"/> OK |
| C. Recheck optical alignment. | <input checked="" type="checkbox"/> OK |
| 3. COOLING SYSTEM CHECKS | |
| A. Perform preventive maintenance on chiller. | <input checked="" type="checkbox"/> OK |
| B. Flush out the chiller every six months. | <input checked="" type="checkbox"/> OK |
| 4. PERFORMANCE CHECKS | |
| A. Torch View Alignment. | <input checked="" type="checkbox"/> OK |
| B. Wavelength Calibration. | <input checked="" type="checkbox"/> OK |

MAINTENANCE REPORT AND TEST CERTIFICATE
OPTIMA 8000

| | |
|----------------------------------------------------------------------------|------------------------------------------------|
| Customer : บริษัท เทคโนโลยีสิ่งแวดล้อมไทย จำกัด | Date Tested: April 3, 2023 |
| Address : 1/6 ซอยรามคำแหง 145 แขวงจันทบุรี เขตจันทบุรี กรุงเทพมหานคร 10240 | Recommendation Recertification Period 6 Months |
| User Name: Khun Nattapong | Recertification Due: October 3, 2023 |
| Phone: 02-3737799 | Date Last Certified: October 4, 2022 |
| Fax: | Visit Number: 1 of 2 |
| | PerkinElmer Phone: 02-719-6420 ext 203 |
| | PerkinElmer Fax: 02-318-5597 |

| | | | |
|----------------------|--------------------|------------------------------------|--|
| CONFIGURATION TESTED | | ACCESSORIES/COMPONENT NOT INCLUDED | |
| MODEL | SERIAL NUMBER | | |
| OPTIMA 8000 | 078N1310024C | | |
| S10 | | | |
| TESTED EQUIPMENT | | EXPIRATION | |
| IPV Methods | CALIBRATION NUMBER | | |
| | | | |
| TEST STANDARD USED | | EXPIRATION DATE | |
| Mixed standard 1/10 | PART NUMBER | May 30, 2023 | |
| Mixed standard 1/100 | N089-1579 | November 30, 2023 | |
| | N930-0221 | | |
| CUSTOMER SUPPLIED | | CUSTOMER INITIALS | |
| 2 % HNO3 | COMMENTS | | |
| 10 % HNO3 | | | |

MAINTENANCE REPORT AND TEST CERTIFICATE
OPTIMA 8000

SERIAL NUMBER : 078N1310024C DATE TESTED : April 3, 2023

Remarks :

Commissioning follow as commissioning performance sheets.

This is to certify that the above tests have been performed and the configuration tested

☒ meets
☐ does not meet

the PerkinElmer Specifications listed on this certificate.

This certificate does not modify PerkinElmer's standard terms and condition of sale, including warranty terms.

Service Department PerkinElmer Ltd.

Authorized Representative : Wiphan Promlumda
(Wiphan Promlumda)
Service Engineer

MAINTENANCE REPORT AND TEST CERTIFICATE
OPTIMA 8000

SERIAL NUMBER : 078N1310024C DATE TESTED : April 3, 2023

PARAMETER

SPECIFICATION

FINAL VALUE

Spectral Resolution : UV

As 193.696 nm

≤ 0.009

0.00702

Ni 231.604 nm

≤ 0.011

0.00790

Ni 341.476 nm

≤ 0.015

0.01192

Spectral Resolution : VIS

Ba 455.403 nm

≤ 0.020

0.01500

Precision

Zn 206.200 nm

% RSD < 1.0

0.58

Mg 280.271 nm

% RSD < 1.0

0.28

Mg 285.213 nm

% RSD < 1.0

0.39

Ba 455.403 nm

% RSD < 1.0

0.39

Detection Limits : Axial

As 193.696 nm

3(SD) ppb

4.26

Se 196.026 nm

3(SD) ppb

2.87

Tl 190.801 nm

3(SD) ppb

3.73

Pb 220.353 nm

3(SD) ppb

11.48

Detection Limits : Radial

As 193.696 nm

3(SD) ppb

2.60

Zn 213.857 nm

3(SD) ppb

0.26

Mn 257.610 nm

3(SD) ppb

1.49

La 379.478 nm

3(SD) ppb

0.12

Ba 455.403 nm

3(SD) ppb

2.86

Ba 483.408 nm

3(SD) ppb

9.64

BEC : Axial (IB X 1000)/(IS-IB)

Mn 257.610 nm

≤ 30 ppb

15.70

BEC : Radial (IB X 1000)/(IS-IB)

Mn 257.610 nm

≤ 30 ppb

23.89

1.5 15.0 1099234.2
2.0 15.0 784376.5
2.5 15.0 574061.3
3.0 15.0 437455.8
3.5 15.0 324105.7
4.0 15.0 264022.3
4.5 15.0 183005.6
5.0 15.0 117089.3
5.5 15.0 70743.1
6.0 15.0 40927.8
6.5 15.0 27379.1
7.0 15.0 20863.3

3/4/2566 10:54:00 aligned for analyte Mn 257.610

X viewing position set to 0.5 mm having Peak Intensity 1426400.1 for Radial viewing

Align View XY Axial for analyte Mn 257.610

| X-position | Y-position | Intensity |
|------------|------------|-----------|
| -2.0 | 15.0 | 2920926.2 |
| -1.6 | 15.0 | 4117205.6 |
| -1.2 | 15.0 | 5581541.7 |
| -0.8 | 15.0 | 6990827.7 |
| -0.4 | 15.0 | 8176328.5 |
| 0.0 | 15.0 | 9075081.4 |
| 0.4 | 15.0 | 8960285.5 |
| 0.8 | 15.0 | 8360445.5 |
| 1.2 | 15.0 | 7467099.0 |
| 1.6 | 15.0 | 6255831.1 |
| 2.0 | 15.0 | 5030853.2 |
| 0.0 | 10.0 | 159365.9 |
| 0.0 | 10.5 | 241214.9 |
| 0.0 | 11.0 | 446309.1 |
| 0.0 | 11.5 | 964275.3 |
| 0.0 | 12.0 | 1659518.8 |
| 0.0 | 12.5 | 2781326.3 |
| 0.0 | 13.0 | 4117574.4 |
| 0.0 | 13.5 | 5863526.6 |
| 0.0 | 14.0 | 7007618.7 |
| 0.0 | 14.5 | 8248882.5 |
| 0.0 | 15.0 | 8915353.6 |
| 0.0 | 15.5 | 8830206.3 |
| 0.0 | 16.0 | 8476274.2 |
| 0.0 | 16.5 | 7574239.7 |
| 0.0 | 17.0 | 5916553.5 |
| 0.0 | 17.5 | 4606692.1 |
| 0.0 | 18.0 | 3470213.6 |
| 0.0 | 18.5 | 2459999.5 |
| 0.0 | 19.0 | 1409798.3 |
| 0.0 | 19.5 | 836888.1 |
| 0.0 | 20.0 | 457127.2 |
| -0.8 | 15.0 | 7399406.7 |
| -0.4 | 15.0 | 8255530.6 |
| 0.0 | 15.0 | 8767341.7 |
| 0.4 | 15.0 | 8902714.8 |
| 0.8 | 15.0 | 8341631.7 |
| 1.2 | 15.0 | 4448485.6 |
| 1.6 | 15.0 | 5980471.5 |
| 2.0 | 15.0 | 7305087.4 |
| 0.4 | 14.5 | 8079824.9 |
| 0.4 | 15.0 | 9038053.5 |
| 0.4 | 15.5 | 8965844.2 |
| 0.4 | 16.0 | 8519954.3 |
| 0.4 | 16.5 | 7478375.8 |
| 0.4 | 17.0 | 5956440.9 |

3/4/2566 10:51:07 aligned for analyte Mn 257.610

X viewing position set to 0.4 mm having Peak Intensity 9038053.5 for Axial viewing

Y viewing position set to 15.0 mm having Peak Intensity 9038053.5 for Axial viewing

| X-position | Y-position | Intensity |
|------------|------------|-----------|
| -7.0 | 15.0 | 23032.5 |
| -6.5 | 15.0 | 27006.7 |
| -6.0 | 15.0 | 35560.5 |
| -5.5 | 15.0 | 57821.4 |
| -5.0 | 15.0 | 90935.9 |
| -4.5 | 15.0 | 136105.4 |
| -4.0 | 15.0 | 206645.2 |
| -3.5 | 15.0 | 299882.1 |
| -3.0 | 15.0 | 428677.1 |
| -2.5 | 15.0 | 589771.2 |
| -2.0 | 15.0 | 706184.3 |
| -1.5 | 15.0 | 841150.2 |
| -1.0 | 15.0 | 1019788.8 |
| -0.5 | 15.0 | 1329407.6 |
| 0.0 | 15.0 | 1381151.1 |
| 0.5 | 15.0 | 1426400.1 |
| 1.0 | 15.0 | 1309824.4 |

Method Loaded
TEC File:
Method Description: C8000-Calibration for later test
Method Last Saved: 5/4/2565 10:59:28
MSF File:

Sequence No.: 1
Sample ID: Calib Blank 1
Logged In Analyst (Original) : TET
Initial Sample Wt:
Dilution:
Wash Time:
Autosampler Location:
Data Collected: 3/4/2566 11:18:12
Data Type: Reprocessed on 3/4/2566 11:32:52
Initial Sample Vol:
Sample Prep Vol:

Nebulizer Parameters: Calib Blank 1
Analyte Back Pressure Flow
All 197.0 kPa 0.50 L/min

Mean Data: Calib Blank 1

| Analyte | Mean Corrected Intensity | Std.Dev. | RSD | Conc. Units | Calib |
|------------|-----------------------------|----------|-----|-------------|-------|
| As 193.696 | 96.5 | | | [0.00] mg/L | |
| Zn 213.857 | 584.3 | | | [0.00] mg/L | |
| Mn 257.610 | 1401.8 | | | [0.00] mg/L | |
| La 379.478 | 352.7 | | | [0.00] mg/L | |
| Ba 455.403 | 25802.4 | | | [0.00] mg/L | |
| Ba 493.408 | 45750.3 | | | [0.00] mg/L | |

Sequence No.: 2
Sample ID: Calib Std 1
Logged In Analyst (Original) : TET
Initial Sample Wt:
Dilution:
Wash Time:
Autosampler Location:
Data Collected: 3/4/2566 10:55:27
Data Type: Reprocessed on 3/4/2566 11:32:52
Initial Sample Vol:
Sample Prep Vol:

Nebulizer Parameters: Calib Std 1
Analyte Back Pressure Flow
All 194.0 kPa 0.50 L/min

Mean Data: Calib Std 1

| Analyte | Mean Corrected Intensity | Std.Dev. | RSD | Conc. Units | Calib |
|------------|-----------------------------|----------|-----|-------------|-------|
| As 193.696 | 13655.9 | | | [5.0] mg/L | |
| Zn 213.857 | 149844.9 | | | [1.0] mg/L | |
| Mn 257.610 | 1615840.4 | | | [1.0] mg/L | |
| La 379.478 | 340770.3 | | | [1.0] mg/L | |
| Ba 455.403 | 839940.7 | | | [0.1] mg/L | |
| Ba 493.408 | 633243.6 | | | [0.1] mg/L | |

Calibration Summary

| Analyte | Stds. | Equation | Intercept | Slope | Curvature | Corr. Coef. | Reslope |
|------------|-------|---------------|-----------|---------|-----------|-------------|---------|
| As 193.696 | 1 | Lin, Calc Int | 0.0 | 2731 | 0.00000 | 1.000000 | |
| Zn 213.857 | 1 | Lin, Calc Int | 0.0 | 149800 | 0.00000 | 1.000000 | |
| Mn 257.610 | 1 | Lin, Calc Int | 0.0 | 1616000 | 0.00000 | 1.000000 | |
| La 379.478 | 1 | Lin, Calc Int | 0.0 | 340800 | 0.00000 | 1.000000 | |
| Ba 455.403 | 1 | Lin, Calc Int | 0.0 | 8399000 | 0.00000 | 1.000000 | |
| Ba 493.408 | 1 | Lin, Calc Int | 0.0 | 6332000 | 0.00000 | 1.000000 | |

Sequence No.: 3
Sample ID: IDL-RL (2% HNO3)
Logged In Analyst (Original) : TET
Initial Sample Wt:
Autosampler Location:
Data Collected: 3/4/2566 11:19:52
Data Type: Reprocessed on 3/4/2566 11:32:52
Initial Sample Vol:

Sample Prep Vol:

Dilution: 3X

Wash Time:

Nebulizer Parameters: IDL-RL (2% HNO3)
Analyte Back Pressure Flow
All 198.0 kPa 0.50 L/min

Mean Data: IDL-RL (2% HNO3)

| Analyte | Mean Corrected Intensity | Std.Dev. | RSD | Conc. Units | Sample |
|------------|-----------------------------|----------|---------|-------------|--------|
| As 193.696 | -32.0 | 2.60 | 7.40% | -35.2 µg/L | |
| Zn 213.857 | 37.4 | 0.26 | 35.07% | 0.7 µg/L | |
| Mn 257.610 | 475.9 | 1.49 | 168.85% | 0.9 µg/L | |
| La 379.478 | -36.3 | 1.12 | 350.55% | -0.3 µg/L | |
| Ba 455.403 | 26579.4 | 2.86 | 30.09% | 9.5 µg/L | |
| Ba 493.408 | -20698.9 | 9.64 | 98.34% | -9.8 µg/L | |

Reprocessing Begun
Logged In Analyst: TET
Technique: ICP Continuous

Results Data Set (Original): PH3APR23
Results Library (Original): C:\Users\Public\PerkinElmer\IPV\Results.mdb
Results Data Set (Reprocessed):
Results Library (Reprocessed):

Sequence No.: 1
Sample ID: Calib Blank 1
Autosampler Location:
Date Collected: 3/4/2566 11:23:46
Data Type: Reprocessed on 3/4/2566 11:32:04
Logged In Analyst (Original): TET
Initial Sample Vol:
Dilution:
Wash Time:
Initial Sample Vol:
Sample Prep Vol:

Nebulizer Parameters: Calib Blank 1
Analyte Back Pressure Flow
All 198.0 kPa 0.50 L/min

Mean Data: Calib Blank 1
Mean Corrected
Analyte Intensity Std. Dev. RSD Calib
Tl 190.801 -113.3
As 193.696 285.4
Se 196.026 89.6
Pb 220.353 1176.2

Sequence No.: 2
Sample ID: DL-Standard
Autosampler Location:
Date Collected: 3/4/2566 11:29:24
Data Type: Reprocessed on 3/4/2566 11:32:04
Logged In Analyst (Original): TET
Initial Sample Wt:
Dilution:
Wash Time:
Initial Sample Vol:
Sample Prep Vol:

Nebulizer Parameters: DL-Standard
Analyte Back Pressure Flow
All 199.0 kPa 0.50 L/min

Mean Data: DL-Standard
Mean Corrected
Analyte Intensity Std. Dev. RSD Calib
Tl 190.801 19454.6
As 193.696 17563.5
Se 196.026 4574.6
Pb 220.353 31327.5

Calibration Summary

| Analyte | Stds. | Equation | Intercept | Slope | Curvature | Corr. Coef. | Reslope |
|------------|-------|---------------|-----------|-------|-----------|-------------|---------|
| Tl 190.801 | 1 | Lin, Calc Int | 0.0 | 19.45 | 0.00000 | 1.000000 | |
| As 193.696 | 1 | Lin, Calc Int | -0.0 | 17.56 | 0.00000 | 1.000000 | |
| Se 196.026 | 1 | Lin, Calc Int | 0.0 | 9.149 | 0.00000 | 1.000000 | |
| Pb 220.353 | 1 | Lin, Calc Int | 0.0 | 62.65 | 0.00000 | 1.000000 | |

Sequence No.: 3
Sample ID: IDL-XL (2% HNO3)
Autosampler Location:
Date Collected: 3/4/2566 11:25:37
Analyst:
Logged In Analyst (Original): TET
Initial Sample Wt:
Dilution: 3X
Wash Time:
Initial Sample Vol:
Sample Prep Vol:

Nebulizer Parameters: IDL-XL (2% HNO3)
Analyte Back Pressure Flow
All 198.0 kPa 0.50 L/min

Mean Data: IDL-XL (2% HNO3)
Mean Corrected
Analyte Intensity Std. Dev. RSD Sample
Tl 190.801 35.1 3.73 68.95%
As 193.696 -14.0 4.26 177.97%
Se 196.026 -6.5 2.87 134.85%
Pb 220.353 -135.0 11.48 177.50%

Method Last Saved: 15/10/2563 10:51:07

Autosampler Location:

B (2% HNO₃)

NO3)

Autosampler Location:

01579-1579/10

-1579/10

Method Loaded
Method Name: Precision
IEC File:
Method Description: C8000 -N=10- 1.0% RSD

Sequence No.: 4
Sample ID: RSD STD (N069-1579/10)
Analyst:
Initial Sample Wt:
Dilution:
Nash Time:

Nebulizer Parameters: RSD STD (N069-1579/10)
Back Pressure 195.0 kPa
Flow 0.50 L/min

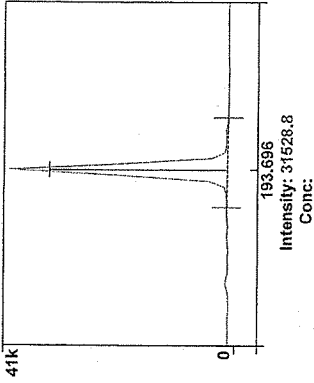
| Mean Data: RSD STD (N069-1579/10) | | | | |
|-----------------------------------|----------------|--------|-------------|--------------------|
| Analyte | Mean Corrected | Calib. | Conc. Units | Sample Conc. Units |
| Zn 206.200 | 493474.3 | | | 17093.12 |
| Mg 280.271 | 3275340.1 | | | 23266.88 |
| Mg 285.213 | 196113.7 | | | 11109.46 |
| Ba 455.403 | 7794526.3 | | | 80474.48 |

Method Loaded
Method Name: Precision
IEC File:
Method Description: C8000 -N=10- 1.0% RSD

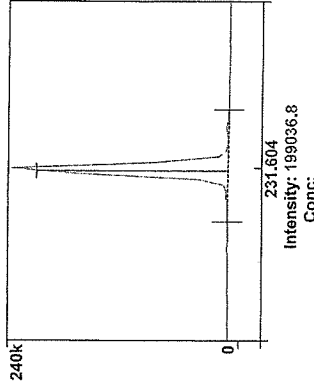
Sequence No.: 5
Sample ID: RSD STD (N069-1579/10)
Analyst:
Initial Sample Wt:
Dilution:
Nash Time:

Nebulizer Parameters: RSD STD (N069-1579/10)
Back Pressure 196.0 kPa
Flow 0.50 L/min

| Mean Data: RSD STD (N069-1579/10) | | | | |
|-----------------------------------|----------------|--------|-------------|--------------------|
| Analyte | Mean Corrected | Calib. | Conc. Units | Sample Conc. Units |
| Zn 206.200 | 515663.2 | | | 2890.08 |
| Mg 280.271 | 3404809.8 | | | 43469.63 |
| Mg 285.213 | 197460.0 | | | 775.34 |
| Ba 455.403 | 8071203.3 | | | 31631.19 |

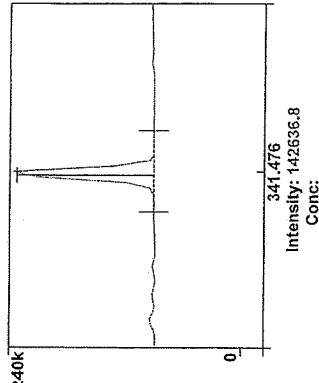


As 193.696-Res



Rep: 3 Ni 231.604-Res

Rep: 3



Rep: 3 Ba 455.403-Res

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PerkinElmer TruQ

Atomic Spectroscopy Standard

Certificate of Analysis

PerkinElmer Number: N0691579
 Description: Multi-Element Standard
 Matrix: 2% HNO₃
 Lot Number: 57-024CRX1

Certification Date: NOV -- 2021
 Expiration Date: MAY 3 0 2023

* Instrumental Analysis using ICP Spectrometer:

| Analyte | Labeled | Measured | SRM | Analyte | Labeled | Measured | SRM |
|---------|------------|------------|--------|---------|------------|------------|--------|
| As | 50.0 µg/mL | 50.1 µg/mL | 3103a* | Ni | 10.0 µg/mL | 10.0 µg/mL | 3136* |
| K | 50.0 µg/mL | 50.3 µg/mL | 3141a* | Sr | 10.0 µg/mL | 10.0 µg/mL | 3153a* |
| La | 10.0 µg/mL | 10.0 µg/mL | 3127a* | Zn | 10.0 µg/mL | 10.0 µg/mL | 3168a* |
| Li | 10.0 µg/mL | 10.0 µg/mL | 3128a* | Ba | 1.00 µg/mL | 1.01 µg/mL | 3104a* |
| Mn | 10.0 µg/mL | 10.4 µg/mL | 3132* | Mg | 1.00 µg/mL | 1.01 µg/mL | 3131a* |

* - Indicates NIST SRM (when NIST SRM is not available)

Reference Multi: Lot# 2-84MJ, 3-168MJ, 4-39MJ

Refer to side 2 for details of certification.

We guarantee that our PerkinElmer TruQ Atomic Spectroscopy Standards are stable and accurate to ±0.5% of certified concentration until the expiration date, provided the standards are kept tightly capped and stored under normal laboratory conditions. The values are the average of three separate analyses performed on the standards after dilution to final volume. Certified standards are stored in high purity acid, ASTM Type I water (18 megohm double deionized), and deionized, triple-rinsed bottles. All glassware used is class A.

Certifying Officer:

[Signature]

PerkinElmer, Inc.

U.S.A. Tel: 1-203-925-4600

U.S.A. Toll Free: 1-800-762-4000

PerkinElmer

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Spectra

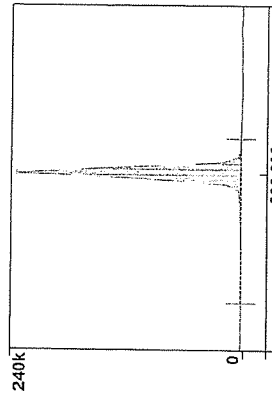
Method: Precision
 Result: PM3APR23

Sample ID: RSD STD (N069-1579/10)

Zn 206.200

Rep: 5 | Mg 280.271

Rep: 5

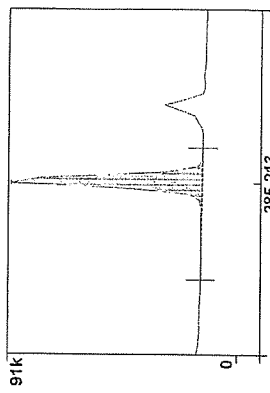


Intensity: 501635.4
 Conc:

Mg 285.213

Rep: 5 | Ba 455.403

Rep: 1

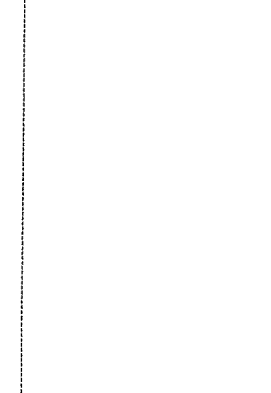


Intensity: 190357.4
 Conc:

Ba 455.403

Rep: 5 | Ba 455.403

Rep: 1



Intensity: 7796566.6
 Conc:



PerkinElmer

Global Service Training Department

Service Engineer Certification

Wiphan Promlunda

This is to certify that the above mentioned
PerkinElmer representative has been trained to
service the instrument indicated below:

ICP220B Optima S300 & Optima 4X/5X/7X00 Series

Instructor:

Geoff Cook

Date: July 20, 2012

Certified by:

(Manager, Global Training Operations)

ISO
9001
CERTIFIED

PerkinElmer TruQ
Atomic Spectroscopy Standard

Certificate of Analysis

PerkinElmer Number: N9300221
Description: Instrument Calibration Standard 4
Matrix: 5% HNO₃
Lot Number: 58-169CRY1

Certification Date: MAY -- 2022
Expiration Date: NOV 30 2023

* Instrumental Analysis using ICP Spectrometer:

| Analyte | Labeled | Measured | SRM | Analyte | Labeled | Measured | SRM |
|---------|------------|------------|--------|---------|------------|------------|-------|
| As | 100 µg/mL | 99.8 µg/mL | 3103a* | Pb | 50.0 µg/mL | 49.9 µg/mL | 3128* |
| Ti | 100 µg/mL | 99.4 µg/mL | 3158* | Se | 50.0 µg/mL | 49.8 µg/mL | 3149* |
| Cd | 50.0 µg/mL | 50.0 µg/mL | 3108* | | | | |

* - Indicates NIST SRM
† - Indicates CRM (when NIST SRM is not available)

Reference Multi: Lot# 57-156CR, 1-177Y1, 54-134CR

Refer to side 2 for details of certification.

Balances are calibrated with weight sets traceable to NIST.
We guarantee that our PerkinElmer TruQ Atomic Spectroscopy Standards are stable and accurate to ±0.5% of certified concentration until the expiration date, provided the standards are kept tightly capped and stored under normal laboratory conditions. This value is the sum of cumulative errors associated with the analytical determinations, pipetting, and diluting to final volume. For these solutions we use high purity acids, ASTM Type 1 water (18 megohm double deionized), and leached, triple-rinsed bottles. All glassware used is class A.



Certifying Officer:

PerkinElmer

PerkinElmer, Inc.

U.S.A. Toll: 1-203-925-4600
U.S.A. Toll Free: 1-800-762-4000

Visit www.perkinelmer.com/iso9001 for a complete listing of our global offices.



Condition of this calibration result

1. Reference Standard Instrument :-

| Instrument | Serial No. | ID No. | Cert. No. | Due Date |
|--------------------------------|------------|----------|-----------|-------------|
| 1) Document Process Calibrator | 48530031 | 130RC098 | 21E3245 | 07 Oct 2022 |
| 2) Digital Thermometer | 130RC112 | 21T2118 | | 16 Nov 2022 |

This certification is traceable to the International System of Unit maintained at:-

- Traceable to National Institute of Metrology (Thailand), NIMT

2. Certified Reference Materials

: The measurement results are traceable to SI through CPA chem Ltd.,

ANSI-ASQ National Accreditation Board, Accredited No. AR-1835

| Buffer Solution | Manufacturer | Lot No. | Exp. date |
|-----------------|-----------------|---------|-------------|
| pH 1.681 | CPA chem | 754027 | 28 Jun 2023 |
| pH 4.008 | CPA chem | 794120 | 14 Feb 2024 |
| pH 6.866 | CPA chem | 754029 | 28 Jun 2023 |
| pH 9.181 | CPA chem | 768823 | 04 Sep 2022 |
| *pH 12.44 | Hach Lenge GmbH | C02796 | 15 Dec 2022 |

3. This certificate is valid only to the item calibrated on date and place of calibration.

Calibration Results

Function : mV Measurement

Performing standard curve by Fluke at pH (1.68,4.7,10)

| Unit Under Calibration | Nominal Value | Standard Voltage Input | | Actual Reading | | Uncertainty of Measurement (\pm mV) | Coverage factor k |
|----------------------------|---------------|------------------------|--------|----------------|--------|----------------------------------------|---------------------|
| | | pH | mV | mV | pH | | |
| pH Meter S/N.: B06D0012 | 1.680 | 314.73 | 314.7 | 1.694 | 1.694 | 0.058 | 2.00 |
| | 4.000 | 177.48 | 177.5 | 4.008 | 4.008 | 0.058 | 2.00 |
| | 6.860 | 8.28 | 8.3 | 6.860 | 6.860 | 0.058 | 2.00 |
| | 7.000 | 0.0 | 0.0 | 7.000 | 7.000 | 0.058 | 2.00 |
| | 9.180 | -128.97 | -128.9 | 9.188 | 9.188 | 0.058 | 2.00 |
| | 10.000 | -177.48 | -177.4 | 10.011 | 10.011 | 0.058 | 2.00 |

Function : pH Measurement

Performing four buffers standard curve by using buffer nominal pH (1.68,4.7,9)

| Unit Under Calibration | Standard pH Buffer Solution | Actual pH Reading | | Uncertainty of pH measurement (\pm) | | Coverage factor k |
|--------------------------------|-----------------------------|-------------------|--------------|-----------------------------------------|-----------|---------------------|
| | | Actual pH Reading | Reading (mV) | pH measurement | (\pm) | |
| pH Electrode S/N.: 9X9M0055 | 1.681 | 1.681 | 295.6 | 0.0050 | 0.0050 | 2.00 |
| | 4.008 | 4.007 | 159.9 | 0.0047 | 0.0047 | 2.00 |
| | 6.866 | 6.866 | -6.9 | 0.0084 | 0.0084 | 2.00 |
| | 9.181 | 9.181 | -139.9 | 0.014 | 0.014 | 2.00 |
| | *12.44 | 12.440 | -314.5 | 0.056 | 0.056 | 2.00 |

Remark: *: Not NSC-ONSC Accredited

The reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor k , providing a level of confidence of approximately 95 %.

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TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)

CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES

534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250

TEL. 0-2717-3000-27 FAX. 0-2719-9164



NSC-TS1-TS17025
CALIBRATION 0008

Cert.No.: 22CHO410
Page.: 1 of 2

Certificate of Calibration

Equipment : pH Meter

Manufacturer : Horiba

Model : LAQUA-PH1300

Serial No. : B06D0012

ID No. : -

Condition As-Received:

Received Date : 11 July 2022

Calibration Date : 11 July 2022

Reference : 2207-0243OC-7

Submitted by : Thai Environmental Technic Limited

1/6 Soi Ramkhamhaeng, 145

Khwaeng/Khet Saphan Sung,

Bangkok 10240

Calibration Place : Laboratory (Thai Environment Technic Limited)

Ambient Temperature : (25.2 - 25.4) °C

Relative Humidity : (50.8 - 51.3) %

Calibration Procedure : In - house method :

- CP-OCH2 by direct measurement with standard voltage calibrator and direct measurement with certified reference material (CRM)

Calibrated by : Krisda Malee

Approved by :

Approved Signatory

(/) Malee Butkruea

() Sathip Meangmai

Issue Date : 19 July 2022

The Uncertainties are for a confidence probability of approximately 95 %

This certificate may not be reproduced other than in full, except with the prior written

Approval of the head of Corporate Services 3: Equipment Calibration and Testing Services.

a 1090860

A 0042417



Equipment : BOD Incubator
Condition As-Received : Used Item
Reference : 2304-0146OC-2
Procedure Used :-

Calibration were conducted using calibration procedure CP-OT02 according to direct measurement method with Data Acquisition which connected with Resistance Temperature Detector (RTD).
The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standard instrument:-

| Instrument | Model | Serial No. | Cert. No. | Due Date |
|----------------------|--------|------------|-----------|-------------|
| 1) Data Acquisition | 34972A | MY57013711 | 22LM93 | 02 Jul 2023 |

2. This certificate is valid only to the item calibrated on date and place of calibration.

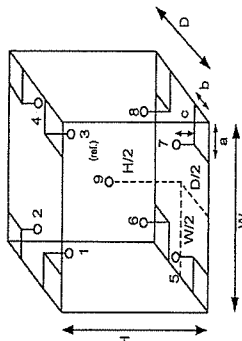
3. This certification is traceable to the International System of Unit.

Result of Calibration :- (*) Without Adjustment

Function of UUC* : Temperature Source

Fresh air setting : Not Available

| Environment during calibration | | |
|--------------------------------|-----------|----------|
| | Beginning | Finished |
| Temp. (°C) | 25 | 26 |
| REL.Humid. (%) | 51 | 54 |
| AC Supply (Volt) | 221 | 221 |



Probe Installation Details :
a = 10 cm
b = 10 cm
c = 10 cm
Dimension of Chamber :
D = 0.48 m
W = 0.50 m
H = 1.1 m
Capacity = 0.26 m³

Signature

a 1158205



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250
TEL. 0-2717-3000-20 FAX. 0-2719-9484



Cert. No.: 23TM673
Page : 1 of 3

Certificate of Calibration

Equipment : BOD Incubator
Manufacturer : Accuplus
Model : 1250
Serial No. : 0408-0115-0008
ID No. : TET.LAB.BOD05
Submitted by : Thai Environmental Technic Limited
1/6 Soi Ramkhamhaeng 145,
Khwaeng/Khet Saphan Sung,
Bangkok 10240
Location : Laboratory (Thai Environmental Technic Limited)

Received Order : 10 April 2023
Calibration Date : 11 April 2023
Ambient Temperature : (26 ± 10) °C
Relative Humidity : (50 ± 30) %
Calibrated by : Khit Ruttanaprapachai

Approved by : *Signature*
() Ponthippa Tameyakul
(/) Malee Bukruea
() Suwit Imjai

Issue Date : 25 April 2023

The Uncertainties are for a confidence probability of approximately 95 %

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Approval of the head of Corporate Services 3 : Equipment Calibration and Testing Services.

A 0053455



MAINTENANCE REPORT

ATOMIC ABSORPTION SPECTROPHOTOMETER MODEL

AAAnalyst 100

Customer : บริษัท เทคโนโลยีสิ่งแวดล้อมไทย
 จำกัด
 Address : 1/6 หมู่บ้านคันทนา 145,
 แขวงสะพานสูง, เขตสะพานสูง,
 กรุงเทพมหานคร 10240 TH
 User Name: คุณ กิตติศักดิ์ เมืองงาม
 Phone: 02-3737799
 E-mail: phornitip.p@tet1995.com
 ketsarin.o@tet1995.com

Date Tested: 30-มิ.ค.-66
 Recommendation Recertification
 Period 6 Months
 Recertification Due: 29-ก.ย.-66
 Date Last Certified: 3-ก.ค.-65
 Visit Number: 1 of 2
 TH ONE SOURCE Phone: 081-7316733
 E-mail: thonesource@gmail.com

CONFIGURATION TESTED

| | | |
|---------------------------|----------------------|-----------------|
| MODEL | SERIAL NUMBER | SOFTWARE |
| AAAnalyst 100 | 040S0110503 | AA WinLab 3.2 |
| | | |
| | | |
| | | |
| TEST STANDARD USED | PART NUMBER | |
| Copper | N9300183 | |
| Filter 0.2 % | MGD-057 | |
| | | |
| | | |



Equipment : BOD Incubator
 Condition As-Received : Used Item
 Reference : 2304-0146QC-2
 Result of Calibration :-
 Function of UUC* : (*) Without Adjustment
 Temperature Source
 Fresh air setting : Not Available

| Calibration Point (°C) | UUC* Setting (°C) | UUC* Reading (°C) | Temperature stability (± °C) | Temperature uniformity (°C) | Overall Variation (°C) | Coverage Factor k |
|------------------------|-------------------|-------------------|------------------------------|-----------------------------|------------------------|-------------------|
| 20.0 | 19.8 | 19.7 | 0.54 | 0.37 | 1.1 | 2 |

| Calibration Point (°C) | Measured Temperature (°C) | | | | | | | | | Uncertainty (± °C) |
|--------------------------------|-----------------------------|--------|--------|--------|--------|--------|--------|--------|----------|-------------------------|
| | Position | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 (ref.) | |
| 20.0 | 20.121 | 20.227 | 19.983 | 20.098 | 19.992 | 19.953 | 19.936 | 19.914 | 20.048 | 0.72 |

Average* : The average of 30 values in each position.

Temperature stability : One-half of the greatest maximum difference of measured temperature at any one sensor.

Temperature uniformity : The maximum difference of measured temperatures at any sensors and the measured temperature at the reference location which are observed at the same time or at as close an observation time as possible to determine the temperature pattern or homogeneity within the chamber under steady-state conditions.

Overall Variation : The Difference of the maximum and minimum measured temperatures throughout observation.

UUC* : Unit Under Calibration

Note : The reported uncertainty of measurement was included stability and excluded uniformity .

The reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor k, providing a level of confidence of approximately 95 %.

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Wuu.



MAINTENANCE REPORT
ATOMIC ABSORPTION SPECTROPHOTOMETER MODEL

AAnalyst 100

| | | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|-------------|------------|
| SERIAL NUMBER | 040S0110503 | DATE TESTED | 30-11-66 |
| 5. PERFORMANCE TESTS | | SPEC. | RESULTS |
| *A. Neutral density filter checks with Copper (324.8 nm) Neutral Density Filter 0.2 ± 10% | | 0.180 | 0.173 Abs. |
| B. AA Baseline noise test with Copper (324.8 nm) Integration time = 0.5 seconds Replicates = 99 times Standard Deviation | | ≤ 0.001 | 0.000 |
| C. Flame sensitivity with Copper (324.8nm) (5 mg/L Cu Standard a read time of 10 seconds 10 replicates, standard burner) Stainless steel nebulizer | | ≥ 0.25 | 0.285 Abs. |
| %RSD | | ≤ 0.3 | 0.18 % |



MAINTENANCE REPORT
ATOMIC ABSORPTION SPECTROPHOTOMETER MODEL

AAnalyst 100

| | | | |
|----------------------------------------------------------------|-------------|-------------|----------|
| SERIAL NUMBER | 040S0110503 | DATE TESTED | 30-11-66 |
| 1. OPTIC CHECKS | | | |
| A. Optical alignment condition (if necessary) | | | |
| B. Condition of Mirrors,Lenses etc.(if necessary) | | | |
| C. D2,HCL beam adjust (if necessary) | | | |
| 2. GAS SYSTEM CHECKS | | | |
| A. Leak test all internal and external gas box joints | | | |
| B. All gas box safety features | | | |
| C. Burner system including nebulizer and all o-ring and gasket | | | |
| D. Drain system (safety) | | | |
| 3. ELECTRONICS CHECKS | | | |
| A. Power Supplies | | | |
| + 5.00 Vdc ± 0.2 Vdc | | | |
| + 11.50 Vdc ± 0.2 Vdc | | | |
| + 15.00 Vdc ± 1.0 Vdc | | | |
| - 15.00 Vdc ± 1.0 Vdc | | | |
| + 35.00 Vdc ± 3.0 Vdc | | | |
| 4. WAVELENGTH ACCURACY TEST | | | |
| A. Zn Lamp wavelength 213.9 nm ± 0.3 nm. | | | |
| B. Fe Lamp wavelength 248.3 nm ± 0.3 nm. | | | |
| C. Cu Lamp wavelength 324.8 nm ± 0.3 nm. | | | |



MAINTENANCE REPORT
ATOMIC ABSORPTION SPECTROPHOTOMETER MODEL
AAnalyst 100

SERIAL NUMBER 04050110503 DATE TESTED 30-11-66

Remarks :

This is to certify that the above tests have been performed and the configuration tested

☒ meets
☐ does not meet

This certificate does not modify PerkinElmer's standard terms and condition of sale, including warranty terms.

Service Department TH ONE SOURCE CO., LTD.

Krungchai T.
 (Krungchai Treevichien)
 Customer Support Engineer



PerkinElmer®
 precisely.

Certificate of Training

This is to certify that

Mr. Krungchai Treevichien

Has successfully completed

Atomic Absorption 100/300 Service Training
17 September, 2007 TO 21 September, 2007

Gary Tyson
 Gary Tyson
 INSTRUCTOR

21 September 2007
 Date



THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-66/0197

MTC No. EEL. BP. 60/0166

The reported expanded uncertainty is based upon a standard uncertainty multiplied by a coverage factor $k = 2$, providing a level of confidence of approximately 95%.

Nominal Output of Unit Under Test = 94 dB re 20 μ Pa at 1000 Hz

Acoustic Output in dB re 20 μ Pa, Corrected to Reference Conditions : 101.325 kPa, 23.0°C and 50 %RH

1. Sound Pressure Level

| Standard Microphone Type | Measured Sound Pressure Level (dB) | Deviated value (dB) | Uncertainty (dB) | Tolerance limit IEC60942:2003 Class 2 |
|---------------------------|------------------------------------|---------------------|------------------|---------------------------------------|
| 1/2 inch Briel&Kjaer 4180 | 94.26 | 0.26 | ± 0.10 | ± 0.75 dB |

2. Frequency

| Standard Microphone Type | Measured Frequency (Hz) | Deviated value (Hz) | Uncertainty (Hz) | Tolerance limit IEC60942:2003 Class 2 |
|---------------------------|-------------------------|---------------------|------------------|---------------------------------------|
| 1/2 inch Briel&Kjaer 4180 | 989.3 | -10.7 | ± 1.5 | $\pm 2.0\%$ |

3. Total distortion

| Standard Microphone Type | Measured Total distortion (%) | Uncertainty (%) | Tolerance limit IEC60942:2003 Class 2 |
|---------------------------|-------------------------------|-----------------|---------------------------------------|
| 1/2 inch Briel&Kjaer 4180 | 2.20 | ± 0.50 | $\pm 4.0\%$ |

Note : 1. No adjustment.

2. The calibrator pressure correction was not included.

3. The microphone volume correction was not included.

Date of Calibration : 16 Jan. 2023

2/3

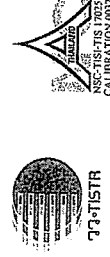
The results relate only to the items tested/calibrated or value assigned.
Advertising the Report/Certificate and publicity of the results except in full are prohibited unless written permission is obtained from the governor of TISTR.

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Fax. (66) 0 2577 9009
E-mail : rumpal@tistr.or.th Website: www.tistr.or.th

Office/Laboratory
Soi 1C, Bangpoo Industrial Estate, Sukhumvit Road,
Amphoe Muang, Changwat Samutprakan 10280, Thailand
Tel. (66) 0 2323 1672-80 ext. 115, 116
Fax. (66) 0 2323 9165
E-mail : mtc@tistr.or.th

Office
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Thailand
Tel. (66) 0 2579 1121-30 ext. 5219, 5225, 5217
Fax. (66) 0 2579 8592
E-mail : sumalee@tistr.or.th

FM.BLMTC.002 Rev.4



THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-66/0197

MTC No. EEL. BP. 60/0166

CALIBRATION CERTIFICATE

Submitted by : THAI ENVIRONMENTAL TECHNIC LIMITED.

Address : 1/6 Soi Ramkhamhaeng 145, Khwaeng/Khet Saphansung, Bangkok 10240.

Calibrated at : Electrical and Electronic Standards Laboratory, Industrial Metrology and Testing Service Centre.

: Soi 1C, Bangpoo Industrial Estate, Sukhumvit Rd., Muang, Samutprakan 10280.

Instrument Calibrated :

Description : Sound Calibrator

Manufacturer : Tennars

Model : TM-100

Serial No. : 181203570

Standards used : 1. Digital Function Synthesizer NF Electronic DP-193A S/N 122037.

2. Measuring Amplifier Briel&Kjaer 2636 S/N 1537484.

3. Programmable Attenuator Tamagawa TPA-303A S/N OF 2214.

4. Digital Multimeter Agilent 34401A S/N MY44005560.

5. Pressure Transmitter Vaisala PTB202AD S/N T0650001.

6. Audio Analyzer Keithley 2015-P S/N 4106495.

7. Condenser Microphone Briel&Kjaer 4180 S/N 2889871.

Calibration Procedure: CP-102-04 based on IEC 60942:2003. The sound pressure level of instrument was measured by standard microphone using an insert voltage technique.

This instrument has been calibrated against standards maintained at Electrical and Electronic Standards Laboratory (EEL), which are traceable to the International System of Units through the National Institute of Metrology (Thailand).

The information on actual reading is attached herewith and the uncertainty limits quoted refer to the measured values only.

Date of Receipt : 10 Jan. 2023

Date of Calibration : 16 Jan. 2023

1/3

The results relate only to the items tested/calibrated or value assigned.
Advertising the Report/Certificate and publicity of the results except in full are prohibited unless written permission is obtained from the governor of TISTR.

Head Office
35 Mu 3 Tambon Khlong Ha, Amphoe Khlong Luang
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Amphoe Muang, Changwat Samutprakan 10280, Thailand
Tel. (66) 0 2323 1672-80 ext. 115, 116
Fax. (66) 0 2323 9165
E-mail : mtc@tistr.or.th

Office
196 Phahonyothin Road, Chulachak, Bangkok 10900,
Thailand
Tel. (66) 0 2579 1121-30 ext. 5219, 5225, 5217
Fax. (66) 0 2579 8592
E-mail : sumalee@tistr.or.th

FM.BLMTC.002 Rev.4




Thai Environmental Technic Limited
บริษัท เทคโนโลยีสิ่งแวดล้อมไทย จำกัด

Sound Level Meter Calibration Report

Equipment Type : Sound Level Meter
Calibrator : TENMARS Sound Calibrator TM-100
Standard : IEC 60942
Accuracy : 94.0 ±0.3 dB and 114.0 ±0.5 dB
Frequency : at 1,000 Hz ±1%
Calibrator Serial NO. : 181203570
Calibration Date : 25-Apr-2023
Barometric pressure (mmHg) : 759.0 mmHg
Temperature (23±3)°C : 25 °C
Relative Humidity(50±5 %) : 50.0 % RH
Dued Date of Calibrate : 31-May-2023

| Item | Instrument Calibrated | | Reference Acoustic dB | Before Adjust | | | After Adjust ± dB | Deviation ± dB | Result |
|------|-----------------------|-------|--------------------------|---------------|------------|------------|----------------------|-------------------|--------|
| | Brand | Model | | ครั้งที่ 1 | ครั้งที่ 2 | ครั้งที่ 3 | | | |
| 18 | ACO | 6226 | 070046 | 94.1 | 94.1 | 94.1 | 94.1 | 0.1 | PASS |
| 19 | ACO | 6226 | 070047 | 94.1 | 94.1 | 94.1 | 94.1 | 0.1 | PASS |
| 20 | ACO | 6226 | 070048 | 93.9 | 93.9 | 93.9 | 93.9 | 0.1 | PASS |
| 21 | ACO | 6226 | 070049 | 94.0 | 94.2 | 94.2 | 94.2 | 0.2 | PASS |
| 23 | RION | NL-21 | 00487676 | 93.9 | 93.9 | 93.9 | 93.9 | 0.1 | PASS |
| 25 | ACO | 6226 | 100098 | 94.0 | 94.2 | 94.2 | 94.2 | 0.2 | PASS |
| 26 | ACO | 6226 | 100099 | 94.0 | 93.9 | 93.9 | 93.9 | 0.1 | PASS |
| 28 | ACO | 6226 | 100101 | 93.8 | 93.8 | 93.8 | 93.8 | 0.2 | PASS |
| 29 | ACO | 6226 | 100102 | 94.0 | 94.1 | 94.1 | 94.1 | 0.1 | PASS |
| 30 | ACO | 6226 | 100106 | 94.0 | 93.8 | 93.8 | 93.8 | 0.2 | PASS |

Calibration By : 
Approve by : Piyachon B



THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-66/0197 MTC No. EEL. BP. 60/0166

Nominal Output of Unit Under Test = 114 dB re 20µPa at 1000 Hz
Acoustic Output in dB re 20µPa, Corrected to Reference Conditions : 101.325 kPa, 23.0 °C and 50 %RH

1. Sound Pressure Level

| Standard Microphone Type | Measured Sound Pressure Level (dB) | Deviated value (dB) | Uncertainty (dB) | Tolerance limit IEC60942:2003 Class 2 |
|-----------------------------|---------------------------------------|------------------------|---------------------|------------------------------------------|
| 1/2 inch Brüel&Kjaer 4180 | 113.96 | -0.04 | ± 0.10 | ± 0.75 dB |

2. Frequency

| Standard Microphone Type | Measured Frequency (Hz) | Deviated value (Hz) | Uncertainty (Hz) | Tolerance limit IEC60942:2003 Class 2 |
|-----------------------------|----------------------------|------------------------|---------------------|------------------------------------------|
| 1/2 inch Brüel&Kjaer 4180 | 985.1 | -14.9 | ± 1.5 | ± 2.0% |

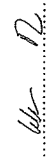
3. Total Distortion

| Standard Microphone Type | Measured Total Distortion (%) | Uncertainty (%) | Tolerance limit IEC60942:2003 Class 2 |
|-----------------------------|----------------------------------|--------------------|------------------------------------------|
| 1/2 inch Brüel&Kjaer 4180 | 2.60 | ± 0.60 | ± 4.0% |

Note : 1. No adjustment.

2. The calibrator pressure correction was not included.

3. The microphone volume correction was not included.

Calibrated by : 
(Mr. Weerachai Deschalyae)

Approved by :



Electrical and Electronic Standards Laboratory
Industrial Metrology and Testing Service Centre

Date of Calibration : 16 Jan. 2023

Date of Issue : 18 Jan. 2023

Ref : 2011266011000062001

End of Certificate

3 / 3

The results relate only to the items tested/calibrated or value assigned.

Advertising the Report/Certificate and publicity of the results except in full are prohibited unless written permission is obtained from the governor of TISTR.

FM.BL.MTC.002 Rev.4

Head Office

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Office/Laboratory

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Amphoe Muang, Changwat Samutprakarn 10280, Thailand
Tel. (66) 0 2323 1672-80 ext. 115, 116
Fax. (66) 0 2323 9165
E-mail : mtc@tistr.or.th

Office

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Fax. (66) 0 2579 8592
E-mail : sumalee@tistr.or.th



Thai Environmental Technic Limited
บริษัท เทคโนโลยีสิ่งแวดล้อมไทย จำกัด

Sound Level Meter Calibration Report

Equipment Type : Sound Level Meter
Calibrator : TENMARS Sound Calibrator TM-100
Standard : IEC 60942
Accuracy : 94.0 ±0.3 dB and 114.0 ±0.5 dB
Frequency : at 1,000 Hz ±1%
Calibrator Serial NO. : 181203570

Calibration Date : 25-Apr-2023
Barometric pressure (mmHg) : 759.0 mmHg
Temperature (23±3)°C : 25 °C
Relative Humidity (50±15 %) : 50.0 % RH
Dued Date of Calibrate : 31-May-2023

| Item | Instrument Calibrated | | Reference Acoustic dB | Before Adjust | | | After Adjust ± dB | Deviation ± dB | Result Calibrate |
|------|-----------------------|-------|--------------------------|---------------|------------|------------|----------------------|-------------------|---------------------|
| | Brand | Model | | ครั้งที่ 1 | ครั้งที่ 2 | ครั้งที่ 3 | | | |
| 51 | ACO | 6236 | 152077 | 94.2 | 94.2 | 94.2 | 94.0 | 0.2 | PASS |
| 52 | ACO | 6226 | 150142 | 114.1 | 114.1 | 114.1 | 114.1 | | |
| | | | | 94.1 | 94.1 | 94.1 | 94.0 | 0.1 | PASS |
| 53 | ACO | 6226 | 160095 | 114.1 | 114.1 | 114.1 | 114.1 | | |
| | | | | 93.9 | 93.9 | 93.9 | 94.0 | 0.1 | PASS |
| 54 | ACO | 6226 | 160096 | 113.9 | 113.9 | 113.9 | 113.9 | | |
| | | | | 93.8 | 93.8 | 93.8 | 94.0 | 0.2 | PASS |
| 55 | ACO | 6226 | 160097 | 114.0 | 114.0 | 114.0 | 114.0 | | |
| | | | | 94.0 | 94.0 | 94.0 | 94.0 | 0.0 | PASS |
| 56 | ACO | 6226 | 160098 | 114.0 | 114.0 | 114.0 | 114.0 | | |
| | | | | 94.1 | 94.1 | 94.1 | 94.0 | 0.1 | PASS |
| 57 | ACO | 6226 | 160099 | 114.1 | 114.1 | 114.1 | 114.1 | | |
| | | | | 94.0 | 94.0 | 94.0 | 94.0 | 0.0 | PASS |
| 58 | ACO | 6226 | 160143 | 114.0 | 114.0 | 114.0 | 114.0 | | |
| | | | | 94.1 | 94.1 | 94.1 | 94.0 | 0.1 | PASS |
| 59 | ACO | 6226 | 160203 | 114.0 | 114.0 | 114.0 | 114.0 | | |
| | | | | 93.8 | 93.8 | 93.8 | 94.0 | 0.2 | PASS |
| 60 | ACO | 6226 | 160204 | 113.9 | 113.9 | 113.9 | 113.9 | | |
| | | | | 94.1 | 94.1 | 94.1 | 94.1 | 0.1 | PASS |

Calibration By :

Approve by : *Piyachon B*



Thai Environmental Technic Limited
บริษัท เทคโนโลยีสิ่งแวดล้อมไทย จำกัด

Sound Level Meter Calibration Report

Equipment Type : Sound Level Meter
Calibrator : TENMARS Sound Calibrator TM-100
Standard : IEC 60942
Accuracy : 94.0 ±0.3 dB and 114.0 ±0.5 dB
Frequency : at 1,000 Hz ±1%
Calibrator Serial NO. : 181203570

Calibration Date : 25-Apr-2023
Barometric pressure (mmHg) : 759.0 mmHg
Temperature (23±3)°C : 25 °C
Relative Humidity (50±15 %) : 50.0 % RH
Dued Date of Calibrate : 31-May-2023

| Item | Instrument Calibrated | | Reference Acoustic dB | Before Adjust | | | After Adjust ± dB | Deviation ± dB | Result Calibrate |
|------|-----------------------|-------|--------------------------|---------------|------------|------------|----------------------|-------------------|---------------------|
| | Brand | Model | | ครั้งที่ 1 | ครั้งที่ 2 | ครั้งที่ 3 | | | |
| 41 | ACO | 6226 | 130127 | 94.1 | 94.1 | 94.1 | 94.0 | 0.0 | PASS |
| 42 | ACO | 6226 | 130128 | 114.1 | 114.1 | 114.1 | 114.1 | | |
| | | | | 94.1 | 94.1 | 94.1 | 94.0 | 0.1 | PASS |
| 43 | ACO | 6226 | 130129 | 114.1 | 114.1 | 114.1 | 114.1 | | |
| | | | | 94.1 | 94.1 | 94.1 | 94.0 | 0.1 | PASS |
| 44 | ACO | 6226 | 130130 | 114.0 | 114.0 | 114.0 | 114.0 | | |
| | | | | 94.1 | 94.1 | 94.1 | 94.0 | 0.1 | PASS |
| 45 | ACO | 6226 | 130131 | 114.0 | 114.0 | 114.0 | 114.0 | | |
| | | | | 93.9 | 93.9 | 93.9 | 94.0 | 0.0 | PASS |
| 46 | ACO | 6236 | 112029 | 113.9 | 113.9 | 113.9 | 113.9 | | |
| | | | | 94.1 | 94.1 | 94.1 | 94.0 | 0.1 | PASS |
| 47 | ACO | 6236 | 152073 | 114.0 | 114.0 | 114.0 | 114.0 | | |
| | | | | 94.1 | 94.1 | 94.1 | 94.0 | 0.1 | PASS |
| 48 | ACO | 6236 | 152074 | 114.0 | 114.0 | 114.0 | 114.0 | | |
| | | | | 94.0 | 94.0 | 94.0 | 94.0 | 0.0 | PASS |
| 49 | ACO | 6236 | 152075 | 114.0 | 114.1 | 114.1 | 114.1 | | |
| | | | | 93.9 | 93.9 | 93.9 | 94.0 | 0.1 | PASS |
| 50 | ACO | 6236 | 152076 | 113.8 | 113.8 | 113.8 | 113.8 | | |
| | | | | 94.1 | 94.1 | 94.1 | 94.0 | 0.1 | PASS |

Calibration By :

Approve by : *Piyachon B*

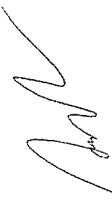


Thai Environmental Technic Limited
บริษัท เทคโนโลยีสิ่งแวดล้อมไทย จำกัด

Sound Level Meter Calibration Report

Equipment Type : Sound Level Meter
Calibrator : TENMARS Sound Calibrator TM-100
Standard : IEC 60942
Accuracy : 94.0 ±0.3 dB and 114.0±0.5 dB
Frequency : at 1,000 Hz ±1%
Calibrator Serial NO. : 181203570
Calibration Date : 23-Mar-2023
Barometric pressure (mmHg) : 759.0 mmHg
Temperature (23±3)°C : 25 °C
Relative Humidity(50±15 %) : 50.0 % RH
Dued Date of Calibrate : 30-Apr-2023

| Item | Instrument Calibrated | | Reference Acoustic dB | Before Adjust | | | After Adjust ± dB | Deviation ± dB | Result Calibrate |
|------|-----------------------|-------|--------------------------|---------------|------------|------------|----------------------|-------------------|---------------------|
| | Brand | Model | | ครั้งที่ 1 | ครั้งที่ 2 | ครั้งที่ 3 | | | |
| 41 | ACO | 6226 | 130127 | 94.1 | 94.1 | 94.1 | 94.0 | 0.1 | PASS |
| 42 | ACO | 6226 | 130128 | 94.3 | 94.3 | 94.3 | 94.0 | 0.3 | PASS |
| 43 | ACO | 6226 | 130129 | 93.7 | 93.7 | 93.7 | 94.0 | 0.3 | PASS |
| 44 | ACO | 6226 | 130130 | 93.8 | 93.8 | 93.8 | 94.0 | 0.2 | PASS |
| 45 | ACO | 6226 | 130131 | 93.8 | 93.8 | 93.8 | 94.0 | 0.2 | PASS |
| 46 | ACO | 6236 | 112029 | 94.1 | 94.1 | 94.1 | 94.0 | 0.1 | PASS |
| 47 | ACO | 6236 | 152073 | 94.1 | 94.1 | 94.1 | 94.0 | 0.1 | PASS |
| 48 | ACO | 6236 | 152074 | 94.1 | 94.1 | 94.1 | 94.0 | 0.1 | PASS |
| 49 | ACO | 6236 | 152075 | 94.2 | 94.2 | 94.2 | 94.0 | 0.2 | PASS |
| 50 | ACO | 6236 | 152076 | 94.2 | 94.2 | 94.2 | 94.0 | 0.2 | PASS |

Calibration By : 
Approve by : Piyada B.




Thai Environmental Technic Limited
บริษัท เทคโนโลยีสิ่งแวดล้อมไทย จำกัด

Sound Level Meter Calibration Report

Equipment Type : Sound Level Meter
Calibrator : TENMARS Sound Calibrator TM-100
Standard : IEC 60942
Accuracy : 94.0 ±0.3 dB and 114.0±0.5 dB
Frequency : at 1,000 Hz ±1%
Calibrator Serial NO. : 181203570
Calibration Date : 23-Mar-2023
Barometric pressure (mmHg) : 759.0 mmHg
Temperature (23±3)°C : 25 °C
Relative Humidity(50±15 %) : 50.0 % RH
Dued Date of Calibrate : 30-Apr-2023

| Item | Instrument Calibrated | | Reference Acoustic dB | Before Adjust | | | After Adjust ± dB | Deviation ± dB | Result Calibrate |
|------|-----------------------|-------|--------------------------|---------------|------------|------------|----------------------|-------------------|---------------------|
| | Brand | Model | | ครั้งที่ 1 | ครั้งที่ 2 | ครั้งที่ 3 | | | |
| 31 | ACO | 6226 | 110098 | 94.2 | 94.2 | 94.2 | 94.0 | 0.2 | PASS |
| 32 | ACO | 6226 | 110105 | 94.2 | 94.2 | 94.2 | 94.0 | 0.2 | PASS |
| 33 | ACO | 6226 | 110096 | 94.1 | 94.1 | 94.1 | 94.0 | 0.1 | PASS |
| 34 | ACO | 6226 | 110099 | 94.2 | 94.2 | 94.2 | 94.0 | 0.2 | PASS |
| 35 | ACO | 6226 | 110097 | 94.1 | 94.1 | 94.1 | 94.0 | 0.1 | PASS |
| 36 | ACO | 6226 | 110102 | 93.9 | 93.9 | 93.9 | 94.0 | 0.1 | PASS |
| 37 | ACO | 6226 | 110101 | 94.1 | 94.1 | 94.1 | 94.0 | 0.1 | PASS |
| 38 | ACO | 6226 | 110106 | 93.9 | 93.9 | 93.9 | 94.0 | 0.1 | PASS |
| 39 | ACO | 6226 | 110104 | 93.9 | 93.9 | 93.9 | 94.0 | 0.1 | PASS |
| 40 | ACO | 6226 | 110100 | 93.8 | 93.8 | 93.8 | 94.0 | 0.2 | PASS |

Calibration By : 
Approve by : Piyada B.



Thai Environmental Technic Limited
บริษัท เทคโนโลยีสิ่งแวดล้อมไทย จำกัด

Sound Level Meter Calibration Report

Equipment Type : Sound Level Meter
Calibrator : TENMARS Sound Calibrator TM-100
Standard : IEC 60942
Accuracy : 94.0 ±0.3 dB and 114.0±0.5 dB
Frequency : at 1,000 Hz ±1%
Calibrator Serial NO. : 181203570

Calibration Date : 24-May-2023
Barometric pressure (mmHg) : 759.0 mmHg
Temperature (23±3)°C : 25 °C
Relative Humidity(50±15 %) : 50.0 % RH
Dued Date of Calibrate : 30-June-2023

| Item | Instrument Calibrated | | Reference Acoustic dB | Before Adjust | | | After Adjust ± dB | Deviation ± dB | Result Calibrate |
|------|-----------------------|-------|--------------------------|---------------|------------|------------|----------------------|-------------------|---------------------|
| | Brand | Model | | ครั้งที่ 1 | ครั้งที่ 2 | ครั้งที่ 3 | | | |
| 18 | ACO | 6226 | 94.0 | 94.1 | 94.1 | 94.1 | 94.0 | 0.1 | PASS |
| 19 | ACO | 6226 | 94.0 | 94.1 | 94.1 | 94.1 | 94.0 | 0.1 | PASS |
| 20 | ACO | 6226 | 94.0 | 93.9 | 93.9 | 93.9 | 94.0 | 0.1 | PASS |
| 21 | ACO | 6226 | 94.0 | 94.1 | 94.1 | 94.1 | 94.0 | 0.1 | PASS |
| 23 | RION | NL-21 | 94.0 | 94.1 | 94.1 | 94.1 | 94.0 | 0.1 | PASS |
| 25 | ACO | 6226 | 94.0 | 93.8 | 93.8 | 93.8 | 94.0 | 0.2 | PASS |
| 26 | ACO | 6226 | 94.0 | 94.1 | 94.1 | 94.1 | 94.0 | 0.1 | PASS |
| 28 | ACO | 6226 | 94.0 | 94.1 | 94.1 | 94.1 | 94.0 | 0.1 | PASS |
| 29 | ACO | 6226 | 94.0 | 94.1 | 94.1 | 94.1 | 94.0 | 0.1 | PASS |
| 30 | ACO | 6226 | 94.0 | 94.1 | 94.1 | 94.1 | 94.0 | 0.1 | PASS |

Calibration By : 

Approve by : Piyada B




Thai Environmental Technic Limited
บริษัท เทคโนโลยีสิ่งแวดล้อมไทย จำกัด

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Frequency : at 1,000 Hz ±1%
Calibrator Serial NO. : 181203570

Calibration Date : 23-Mar-2023
Barometric pressure (mmHg) : 759.0 mmHg
Temperature (23±3)°C : 25 °C
Relative Humidity(50±15 %) : 50.0 % RH
Dued Date of Calibrate : 30-Apr-2023

| Item | Instrument Calibrated | | Reference Acoustic dB | Before Adjust | | | After Adjust ± dB | Deviation ± dB | Result Calibrate |
|------|-----------------------|-------|--------------------------|---------------|------------|------------|----------------------|-------------------|---------------------|
| | Brand | Model | | ครั้งที่ 1 | ครั้งที่ 2 | ครั้งที่ 3 | | | |
| 51 | ACO | 6226 | 94.0 | 94.0 | 94.0 | 94.0 | 94.0 | 0.0 | PASS |
| 52 | ACO | 6226 | 94.0 | 94.1 | 94.1 | 94.1 | 94.0 | 0.1 | PASS |
| 53 | ACO | 6226 | 94.0 | 93.9 | 93.9 | 93.9 | 94.0 | 0.1 | PASS |
| 54 | ACO | 6226 | 94.0 | 94.1 | 94.1 | 94.1 | 94.0 | 0.1 | PASS |
| 55 | ACO | 6226 | 94.0 | 94.2 | 94.2 | 94.2 | 94.0 | 0.2 | PASS |
| 56 | ACO | 6226 | 94.0 | 94.1 | 94.1 | 94.1 | 94.0 | 0.1 | PASS |
| 57 | ACO | 6226 | 94.0 | 93.9 | 93.9 | 93.9 | 94.0 | 0.1 | PASS |
| 58 | ACO | 6226 | 94.0 | 94.2 | 94.2 | 94.2 | 94.0 | 0.2 | PASS |
| 59 | ACO | 6226 | 94.0 | 93.9 | 93.9 | 93.9 | 94.0 | 0.1 | PASS |
| 60 | ACO | 6226 | 94.0 | 93.8 | 93.8 | 93.8 | 94.0 | 0.2 | PASS |

Calibration By : 

Approve by : Piyada B





Thai Environmental Technic Limited
บริษัท เทคโนโลยีสิ่งแวดล้อมไทย จำกัด

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Frequency : at 1,000 Hz ±1%
Calibrator Serial NO. : 181203570

Calibration Date : 24-May-2023
Barometric pressure (mmHg) : 759.0 mmHg
Temperature (23±3)°C : 25 °C
Relative Humidity(50±15 %) : 50.0 % RH
Dued Date of Calibrate : 30-June-2023

| Item | Instrument Calibrated | | Reference Acoustic dB | Before Adjust | | | After Adjust ± dB | Deviation ± dB | Result Calibrate |
|------|-----------------------|-------|--------------------------|---------------|------------|------------|----------------------|-------------------|---------------------|
| | Brand | Model | | ครั้งที่ 1 | ครั้งที่ 2 | ครั้งที่ 3 | | | |
| 73 | ACO | 6236 | 222244 | 94.1 | 94.1 | 94.1 | 94.0 | 0.1 | PASS |
| 74 | ACO | 6236 | 222246 | 94.1 | 94.1 | 94.1 | 94.0 | 0.1 | PASS |
| 75 | ACO | 6236 | 222248 | 94.0 | 94.0 | 94.0 | 94.0 | 0.0 | PASS |
| 76 | ACO | 6236 | 222247 | 94.0 | 94.0 | 94.0 | 94.0 | 0.0 | PASS |
| 77 | ACO | 6236 | 222248 | 94.0 | 94.0 | 94.0 | 94.0 | 0.0 | PASS |

Calibration By : 
Approve by : 




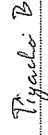
Thai Environmental Technic Limited
บริษัท เทคโนโลยีสิ่งแวดล้อมไทย จำกัด

Sound Level Meter Calibration Report

Equipment Type : Sound Level Meter
Calibrator : TENMARS Sound Calibrator TM-100
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Frequency : at 1,000 Hz ±1%
Calibrator Serial NO. : 181203570

Calibration Date : 24-May-2023
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Temperature (23±3)°C : 25 °C
Relative Humidity(50±15 %) : 50.0 % RH
Dued Date of Calibrate : 30-June-2023

| Item | Instrument Calibrated | | Reference Acoustic dB | Before Adjust | | | After Adjust ± dB | Deviation ± dB | Result Calibrate |
|------|-----------------------|-------|--------------------------|---------------|------------|------------|----------------------|-------------------|---------------------|
| | Brand | Model | | ครั้งที่ 1 | ครั้งที่ 2 | ครั้งที่ 3 | | | |
| 61 | ACO | 6226 | 160205 | 94.0 | 94.0 | 94.0 | 94.0 | 0.0 | PASS |
| 62 | ACO | 6226 | 160211 | 94.0 | 93.9 | 93.9 | 94.0 | 0.1 | PASS |
| 63 | ACO | 6226 | 160212 | 94.0 | 94.1 | 94.1 | 94.0 | 0.1 | PASS |
| 64 | ACO | 6226 | 160213 | 94.0 | 93.9 | 93.9 | 94.0 | 0.1 | PASS |
| 66 | ACO | 6226 | 160215 | 94.0 | 94.2 | 94.2 | 94.0 | 0.2 | PASS |
| 67 | ACO | 6226 | 160216 | 94.0 | 94.0 | 94.0 | 94.0 | 0.0 | PASS |
| 68 | ACO | 6236 | 222036 | 94.0 | 94.0 | 94.0 | 94.0 | 0.0 | PASS |
| 69 | ACO | 6236 | 222037 | 94.0 | 94.1 | 94.1 | 94.0 | 0.1 | PASS |
| 70 | ACO | 6236 | 222038 | 94.0 | 94.0 | 94.0 | 94.0 | 0.0 | PASS |
| 71 | ACO | 6236 | 222039 | 94.0 | 94.1 | 94.1 | 94.0 | 0.1 | PASS |
| 72 | ACO | 6236 | 222040 | 94.0 | 93.9 | 93.9 | 94.0 | 0.1 | PASS |

Calibration By : 
Approve by : 



METROLOGY SYSTEM (THAILAND) CO.,LTD.



Certificate of Calibration

Certificate Number : SPR22110329-5
Customer : Thai Environmental Technic Limited.
1/6 Soi Ramkhamhaeng 145, Khwaeng Saphan Sung, Khet Saphan Sung, Bangkok 10240, Thailand.

Page : 1 of 3

Equipment Name : Liquid in Glass Thermometer
Manufacturer : AMA
Model : N/A
Serial Number : 1851321
ID. Number : N/A

Environmental Conditions
Ambient Temperature : $23^{\circ}\text{C} \pm 2^{\circ}\text{C}$ Received Date : 18 Nov 2022
Relative Humidity : $50\% \pm 15\%$ Calibration Date : 18 Nov 2022
Location of Calibration : In-Lab Recommend Due Date : 18 Nov 2023
Calibration Procedure : SP-CPT-04-08 Date of Issue : 19 Nov 2022

Method of Calibration

This certifies that the above instrument was calibrated in compliance with the calibration system requirement of ISO/IEC 17025:2017 in accordance with reference procedure. Standards used to perform this calibration are certified by to NIST or equivalent, National metrology institute, Natural physical constants, consensus standards. The result reported herein apply only to the calibration of the item described above as received. Our decision rule is to contact the customer if the item pass and fail calibration when the results include the uncertainties and the customer must determine if the results meets their needs.

All calibrations are performed within manufacture's specifications. The calibration certificate shall not be reproduced except in full, without written approval of SP Metrology System (Thailand).

Calibrated by : Mr. Pakapon Nammontree
Calibration Officer
Approved by :
(Mr. Worapong Sinthusopa)
Authorized Signatory

SP-FM-04-15 rev.0



Thai Environmental Technic Limited
บริษัท เทคโนโลยีสิ่งแวดล้อมไทย จำกัด

Sound Level Meter Calibration Report

Equipment Type : Sound Level Meter
Calibrator : SCARLET ST-120
Standard : IEC 60942:2017 CLASS1
Accuracy : 94.0 ± 0.3 dB and 114.0 ± 0.5 dB
Frequency : at 1,000 Hz $\pm 1\%$
Calibrator Serial NO. : ST120C0263E
Calibration Date : 24-May-2023
Barometric pressure (mmHg) : 759.0 mmHg
Temperature (23 \pm 3) $^{\circ}\text{C}$: 25 $^{\circ}\text{C}$
Relative Humidity (50 \pm 15 %) : 50.0 % RH
Dued Date of Calibration : 30-June-2023

| Item | Instrument Calibrated | | | Reference Acoustic dB | Before Adjust | | | After Adjust After Adjust | Deviation \pm dB | Result Calibrate |
|------|-----------------------|--------|------------|--------------------------|---------------|------------|------------|------------------------------|-----------------------|---------------------|
| | Brand | Model | Serial NO. | | ครั้งที่ 1 | ครั้งที่ 2 | ครั้งที่ 3 | | | |
| 78 | SCARLET | ST-11D | 820380 | 94.0 | 94.0 | 94.0 | 94.0 | 94.0 | 0.0 | PASS |
| 79 | SCARLET | ST-11D | 820391 | 94.0 | 94.0 | 94.0 | 94.0 | 94.0 | 0.0 | PASS |
| 80 | SCARLET | ST-11D | 820392 | 94.0 | 93.9 | 93.9 | 93.9 | 94.0 | 0.1 | PASS |
| 81 | SCARLET | ST-11D | 820393 | 94.0 | 94.0 | 94.0 | 94.0 | 94.0 | 0.0 | PASS |
| 82 | SCARLET | ST-11D | 820394 | 94.0 | 94.1 | 94.1 | 94.1 | 94.0 | 0.1 | PASS |
| 83 | SCARLET | ST-11D | 820377 | 94.0 | 94.1 | 94.1 | 94.1 | 94.0 | 0.1 | PASS |
| 84 | SCARLET | ST-11D | 820878 | 94.0 | 94.0 | 94.0 | 94.0 | 94.0 | 0.0 | PASS |
| 85 | SCARLET | ST-11D | 820879 | 94.0 | 94.0 | 94.0 | 94.0 | 94.0 | 0.0 | PASS |

Calibration By :

Approve by :

Thai Environmental Technic Limited 1/6 Soi Ramkhamhaeng 145 Khwaeng/Khet Saphan Sung Bangkok 10240 Thailand
• Tel : +66(0)2373-7799(Auto) Fax : +66(0)2373-7979 • admin@tet1995.com • www.tet1995.com



Result of Calibration

Certificate No. : SPR22110329-5

Page : 3 of 3

Range : -5 to 110 °C Resolution : 0.5 °C

| Unit : °C | | | | |
|---------------|------------------|-------------|--------|-------------------|
| Setting Value | Standard Reading | UUC Reading | Error | Uncertainty (±) |
| 25.0 | 25.012 | 25.0 | -0.012 | 0.29 |
| 30.0 | 30.011 | 30.0 | -0.011 | 0.29 |
| 35.0 | 35.014 | 35.0 | -0.014 | 0.29 |
| 40.0 | 40.015 | 40.0 | -0.015 | 0.29 |
| 45.0 | 45.017 | 45.0 | -0.017 | 0.29 |
| 50.0 | 50.013 | 50.0 | -0.013 | 0.29 |

Note:

The result of calibration was found accurate as show on date and place of calibration only.
This Certificate is not certified for any commercial transaction.

Measurement Uncertainty

The reported uncertainty of measurement is the expanded uncertainty obtained by multiplying the standard uncertainty with the coverage factor $k = 2.00$, providing a level of confidence approximately 95%.

- End of Certificate -



Calibration Report

Certificate Number : SPR22110329-5

Page : 2 of 3

Reference Standards

| Equipment Name | Model | Serial No. | Certificate No. | Due Date |
|----------------------------|-----------------|-------------|-----------------|-------------|
| Super Thermometer with PRT | 15753850-40-392 | 58087100288 | PSL-T 0383/05 | 26 Feb 2023 |

Traceability

This certification is traceable to the International System of Unit maintained at :
TISTR - Thailand Institute of Scientific and Technological Research



Calibration Report

Certificate Number : SPR22110329-6

Page : 2 of 3

Reference Standards

| Equipment Name | Model | Serial No. | Certificate No. | Due Date |
|----------------------------|------------------|--------------|-----------------|-------------|
| Super Thermometer with PRT | 1575/3850-40-392 | 58087/100288 | PSL-T 0383/65 | 26 Feb 2023 |

Traceability

This certification is traceable to the International System of Unit maintained at :
TISTR - Thailand Institute of Scientific and Technological Research



Certificate of Calibration

Certificate Number : SPR22110329-6

Page : 1 of 3

Customer

: Thai Environmental Technic Limited.

1/6 Soi Ramkhamhaeng 145, Khwaeng Saphan Sung, Khet Saphan
Sung, Bangkok 10240, Thailand

Equipment Name : Liquid in Glass Thermometer

Manufacturer : AMA

Model : N/A

Serial Number : 1851322

ID Number : N/A

Environmental Conditions

Ambient Temperature : 23 °C ± 2 °C Received Date : 18 Nov 2022

Relative Humidity : 50 % ± 15 % Calibration Date : 18 Nov 2022

Location of Calibration : In-Lab Recommend Due Date : 18 Nov 2023

Calibration Procedure : SP-CPT-04-08 Date of Issue : 19 Nov 2022

Method of Calibration

This certifies that the above instrument was calibrated in compliance with the calibration system requirement of ISO/IEC 17025:2017 in accordance with reference procedure. Standards used to perform this calibration are certified by to NIST or equivalent. National metrology institute, Natural physical constants, consensus standards. The result reported herein apply only to the calibration of the item described above as received. Our decision rule is to contact the customer if the item pass and fail calibration when the results include the uncertainties and the customer must determine if the results meets their needs.

All calibrations are performed within manufacture's specifications. The calibration certificate shall not be reproduced except in full, without written approval of SP Metrology System (Thailand).

Calibrated by : Mr. Pakapon Nammontree

Approved by :

Calibration Officer

(Mr. Worapong Sinthusopa)

Authorized Signatory



Certificate of Calibration

Certificate Number : SPR23020181-1
Customer : Thai Environmental Technic Limited.
1/6 Soi Ramkhamhaeng 145, Khwaeng Saphan Sung, Khet Saphan
Sung, Bangkok 10240, Thailand.

Page : 1 of 3

Equipment Name : Liquid in Glass Thermometer
Manufacturer : AMA
Model : H1
Serial Number : 1851349
ID. Number : N/A

Environmental Conditions
Ambient Temperature : 23 °C ± 2 °C Received Date : 10 Feb 2023
Relative Humidity : 50 % ± 15 % Calibration Date : 11 Feb 2023
Location of Calibration : In-Lab Recommend Due Date : 11 Feb 2024
Calibration Procedure : SP-OPT-04-08 Date of Issue : 12 Feb 2023

Method of Calibration

This certifies that the above instrument was calibrated in compliance with the calibration system requirement of ISO/IEC 17025:2017 in accordance with reference procedure. Standards used to perform this calibration are certified by to NIST or equivalent, National metrology institute, Natural physical constants, consensus standards. The result reported herein apply only to the calibration of the item described above as received. Our decision rule is to contact the customer if the item pass and fail calibration when the results include the uncertainties and the customer must determine if the results meets their needs.
All calibrations are performed within manufacture's specifications. The calibration certificate shall not be reproduced except in full, without written approval of SP Metrology System (Thailand).

Calibrated by : Mr. Pakapon Nammontree
Calibration Officer
Approved by : 
(Mr. Prayoon Topart)
Authorized Signatory

SP-FM-04-15 rev.0



Result of Calibration

Certificate No. : SPR22110329-6
Range : -5 to 110 °C Resolution : 0.5 °C

Page : 3 of 3

| Setting Value | Standard Reading | UUC Reading | Error | Uncertainty (±) |
|---------------|------------------|-------------|--------|-------------------|
| 25.0 | 25.012 | 25.0 | -0.012 | 0.29 |
| 30.0 | 30.013 | 30.0 | -0.013 | 0.29 |
| 35.0 | 35.014 | 35.0 | -0.014 | 0.29 |
| 40.0 | 40.014 | 40.0 | -0.014 | 0.29 |
| 45.0 | 45.016 | 45.0 | -0.016 | 0.29 |
| 50.0 | 50.014 | 50.0 | -0.014 | 0.29 |

Unit : °C

Note:

The result of calibration was found accurate as show on date and place of calibration only.
This Certificate is not certified for any commercial transaction.

Measurement Uncertainty

The reported uncertainty of measurement is the expanded uncertainty obtained by multiplying the standard uncertainty with the coverage factor $k = 2.00$, providing a level of confidence approximately 95%.
- End of Certificate -

SP-FM-04-15 REV.0



Result of Calibration

Certificate No. : SPR23020181-1

Page : 3 of 3

Range : -5 to 110 °C

Resolution : 0.5 °C

| Unit : °C | | | | |
|---------------|------------------|-------------|--------|-------------------|
| Setting Value | Standard Reading | UUC Reading | Error | Uncertainty (±) |
| 25.0 | 25.005 | 25.0 | -0.005 | 0.29 |
| 30.0 | 30.004 | 30.0 | -0.004 | 0.29 |
| 35.0 | 35.008 | 35.0 | -0.008 | 0.29 |
| 40.0 | 40.007 | 40.0 | 0.007 | 0.29 |
| 45.0 | 45.009 | 45.0 | -0.009 | 0.29 |
| 50.0 | 50.008 | 50.0 | -0.008 | 0.29 |

Note:

The result of calibration was found accurate as show on date and place of calibration only.
This Certificate is not certified for any commercial transaction.

Measurement Uncertainty

The reported uncertainty of measurement is the expanded uncertainty obtained by multiplying the standard uncertainty with the coverage factor $k = 2.00$, providing a level of confidence approximately 95%.

- End of Certificate -



Calibration Report

Certificate Number : SPR23020181-1

Page : 2 of 3

Reference Standards

| Equipment Name | Model | Serial No. | Certificate No. | Due, Date |
|----------------------------|------------------|--------------|-----------------|-------------|
| Super Thermometer with PRT | 1575/3850-40-392 | 58087/100288 | PSL-T 0383/65 | 26 Feb 2023 |

Traceability

This certification is traceable to the International System of Unit maintained at :
TISTR - Thailand Institute of Scientific and Technological Research



METROLOGY SYSTEM (THAILAND) CO.,LTD.



Calibration Report

Certificate Number : SPR23020181-5

Page : 2 of 3

Reference Standards

| Equipment Name | Model | Serial No. | Certificate No. | Due Date |
|----------------------------|------------------|---------------|-----------------|-------------|
| Super Thermometer with PRT | 1575/3850-40-392 | 58087/1100288 | PSL-T 0383/65 | 26 Feb 2023 |

Traceability

This certification is traceable to the International System of Unit maintained at :
TISTR - Thailand Institute of Scientific and Technological Research



METROLOGY SYSTEM (THAILAND) CO.,LTD.



Certificate of Calibration

Certificate Number : SPR23020181-5

Page : 1 of 3

Customer

: Thai Environmental Technic Limited.

1/6 Soi Rankhamhaeng 145, Khwaeng Saphan Sung, Khet Saphan
Sung, Bangkok 10240, Thailand.

Equipment Name : Liquid in Glass Thermometer

Manufacturer : AMA

Model : H2

Serial Number : 1851353

ID. Number : N/A

Environmental Conditions

Ambient Temperature : $23^{\circ}\text{C} \pm 2^{\circ}\text{C}$ Received Date : 10 Feb 2023
Relative Humidity : $50\% \pm 15\%$ Calibration Date : 11 Feb 2023
Location of Calibration : In-Lab Recommend Due Date : 11 Feb 2024
Calibration Procedure : SP-CPT-04-08 Date of Issue : 12 Feb 2023

Method of Calibration

This certifies that the above instrument was calibrated in compliance with the calibration system requirement of ISO/IEC 17025:2017 in accordance with reference procedure. Standards used to perform this calibration are certified by to NIST or equivalent, National metrology institute, Natural physical constants, consensus standards. The result reported herein apply only to the calibration of the item described above as received. Our decision rule is to contact the customer if the item pass and fail calibration when the results include the uncertainties and the customer must determine if the results meets their needs.

All calibrations are performed within manufacture's specifications. The calibration certificate shall not be reproduced except in full, without written approval of SP Metrology System (Thailand).

Calibrated by : Mr. Pakapon Nammontree

Approved by :

Calibration Officer

(Mr. Prayoon Topat)

Authorized Signatory



METROLOGY SYSTEM (THAILAND) CO.,LTD.



Certificate of Calibration

Certificate Number : SPR23020181-4 Page : 1 of 3

Customer : Thai Environmental Technic Limited.
1/6 Soi Ramkhamhaeng 145, Khwaeng Saphan Sung, Khet Saphan
Sung, Bangkok 10240, Thailand.

Equipment Name : Liquid in Glass Thermometer

Manufacturer : AMA

Model : H2

Serial Number : 1851354

ID. Number : N/A

Environmental Conditions

Ambient Temperature : $23\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$ Received Date : 10 Feb 2023
Relative Humidity : $50\% \pm 15\%$ Calibration Date : 11 Feb 2023
Location of Calibration : In-Lab Recommend Due Date : 11 Feb 2024
Calibration Procedure : SP-CPT-04-08 Date of Issue : 12 Feb 2023

Method of Calibration

This certifies that the above instrument was calibrated in compliance with the calibration system requirement of ISO/IEC 17025:2017 in accordance with reference procedure. Standards used to perform this calibration are certified by to NIST or equivalent, National metrology institute, Natural physical constants, consensus standards. The result reported herein apply only to the calibration of the item described above as received. Our decision rule is to contact the customer if the item pass and fail calibration when the results include the uncertainties and the customer must determine if the results meets their needs.

All calibrations are performed within manufacture's specifications. The calibration certificate shall not be reproduced except in full without written approval of SP Metrology System (Thailand).

Calibrated by : Mr. Pakapon Nammontree

Calibration Officer

Approved by :

(Mr. Prayoon Topart)

Authorized Signatory

SP-FM-04-15 rev.0



METROLOGY SYSTEM (THAILAND) CO.,LTD.



Result of Calibration

Certificate No. : SPR23020181-5 Page : 3 of 3

Range : -5 to 110 $^{\circ}\text{C}$ Resolution : 0.5 $^{\circ}\text{C}$

| Unit : $^{\circ}\text{C}$ | | | | |
|---------------------------|------------------|-------------|--------|-----------------------|
| Setting Value | Standard Reading | UUC Reading | Error | Uncertainty (\pm) |
| 25.0 | 25.009 | 25.0 | -0.009 | 0.29 |
| 30.0 | 30.005 | 30.0 | -0.005 | 0.29 |
| 35.0 | 35.007 | 35.0 | -0.007 | 0.29 |
| 40.0 | 40.006 | 40.0 | -0.006 | 0.29 |
| 45.0 | 45.008 | 45.0 | -0.008 | 0.29 |
| 50.0 | 50.010 | 50.0 | -0.010 | 0.29 |

Note:

The result of calibration was found accurate as show on date and place of calibration only.
This Certificate is not certified for any commercial transaction.

Measurement Uncertainty

The reported uncertainty of measurement is the expanded uncertainty obtained by multiplying the standard uncertainty with the coverage factor $k = 2.00$, providing a level of confidence approximately 95%.

- End of Certificate -



Result of Calibration

Certificate No. : SPR23020181-4

Page : 3 of 3

Range : -5 to 110 °C Resolution : 0.5 °C

Unit : °C

| Setting Value | Standard Reading | UUC Reading | Error | Uncertainty (±) |
|---------------|------------------|-------------|--------|-------------------|
| 25.0 | 25.005 | 25.0 | -0.005 | 0.29 |
| 30.0 | 30.010 | 30.0 | -0.010 | 0.29 |
| 35.0 | 35.009 | 35.0 | -0.009 | 0.29 |
| 40.0 | 40.009 | 40.0 | -0.009 | 0.29 |
| 45.0 | 45.012 | 45.0 | -0.012 | 0.29 |
| 50.0 | 50.010 | 50.0 | -0.010 | 0.29 |

Note:

The result of calibration was found accurate as show on date and place of calibration only.
This Certificate is not certified for any commercial transaction.

Measurement Uncertainty

The reported uncertainty of measurement is the expanded uncertainty obtained by multiplying the standard uncertainty with the coverage factor $k = 2.00$, providing a level of confidence approximately 95%.

- End of Certificate -



Calibration Report

Certificate Number : SPR23020181-4

Page : 2 of 3

Reference Standards

| Equipment Name | Model | Serial No. | Certificate No. | Due. Date |
|----------------------------|------------------|-------------|-----------------|-------------|
| Super Thermometer with PRT | 1575/3850-40-392 | 56087100288 | PSL-T 0389/65 | 26 Feb 2023 |

Traceability

This certification is traceable to the International System of Unit maintained at :
TISIR - Thailand Institute of Scientific and Technological Research



Calibration Report

Certificate Number : SPR23020181-6

Page : 2 of 3

Reference Standards

| Equipment Name | Model | Serial No. | Certificate No. | Due. Date |
|----------------------------|------------------|--------------|-----------------|-------------|
| Super Thermometer with PRT | 1575/3850-40-392 | 58087/100288 | PSL-T 0383/65 | 26 Feb 2023 |

Traceability

This certification is traceable to the International System of Unit maintained at:
TISTR - Thailand Institute of Scientific and Technological Research



Certificate of Calibration

Certificate Number : SPR23020181-6

Page : 1 of 3

Customer

: Thai Environmental Technic Limited.

1/6 Soi Ramkhamhaeng 145, Khwaeng Saphan Sung, Khai Saphan
Sung, Bangkok 10240, Thailand.

Equipment Name : Liquid in Glass Thermometer

Manufacturer : AMA

Model : H2

Serial Number : 1851362

ID. Number : N/A

Environmental Conditions

Ambient Temperature : $23^{\circ}\text{C} \pm 2^{\circ}\text{C}$ Received Date : 10 Feb 2023

Relative Humidity : $50\% \pm 15\%$ Calibration Date : 11 Feb 2023

Location of Calibration : In-Lab Recommend Due Date : 11 Feb 2024

Calibration Procedure : SP-CPT-04-08 Date of Issue : 12 Feb 2023

Method of Calibration

This certifies that the above instrument was calibrated in compliance with the calibration system requirement of ISO/IEC 17025:2017 in accordance with reference procedure. Standards used to perform this calibration are certified by to NIST or equivalent, National metrology institute, Natural physical constants, consensus standards. The result reported herein apply only to the calibration of the item described above as received. Our decision rule is to contact the customer if the item pass and fail calibration when the results include the uncertainties and the customer must determine if the results meets their needs.

All calibrations are performed within manufacture's specifications. The calibration certificate shall not be reproduced except in full, without written approval of SP Metrology System (Thailand).

Calibrated by : Mr. Pakapon Nammontree

Approved by :

Calibration Officer

(Mr. Prayoon Topart)

Authorized Signatory



Result of Calibration

Certificate No. : SPR23020181-6

Page : 3 of 3

Range : -5 to 110 °C Resolution : 0.5 °C

Unit : °C

| Setting Value | Standard Reading | UUC Reading | Error | Uncertainty (±) |
|---------------|------------------|-------------|--------|-------------------|
| 25.0 | 25.007 | 25.0 | -0.007 | 0.29 |
| 30.0 | 30.009 | 30.0 | -0.009 | 0.29 |
| 35.0 | 35.008 | 35.0 | -0.008 | 0.29 |
| 40.0 | 40.006 | 40.0 | -0.006 | 0.29 |
| 45.0 | 45.007 | 45.0 | -0.007 | 0.29 |
| 50.0 | 50.009 | 50.0 | -0.009 | 0.29 |

Note:

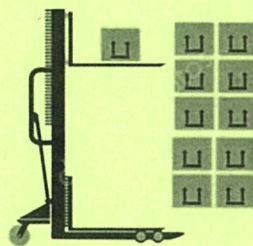
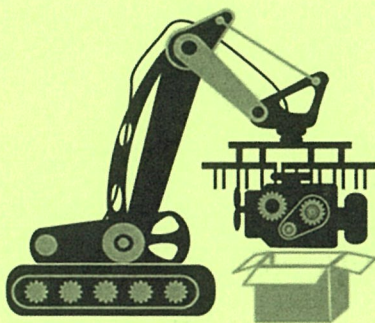
The result of calibration was found accurate as show on date and place of calibration only.
This Certificate is not certified for any commercial transaction.

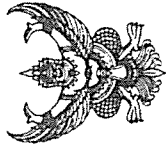
Measurement Uncertainty

The reported uncertainty of measurement is the expanded uncertainty obtained by multiplying the standard uncertainty with the coverage factor $k = 2.00$, providing a level of confidence approximately 95%.
- End of Certificate -

ภาคผนวก จ

หนังสือขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
เลขทะเบียน ว-236





ที่ อก ๐๓๑๐(๑)/ ๙ ๘ ๗ ๖

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๔๐๐
๒๒ มิถุนายน ๒๕๖๖

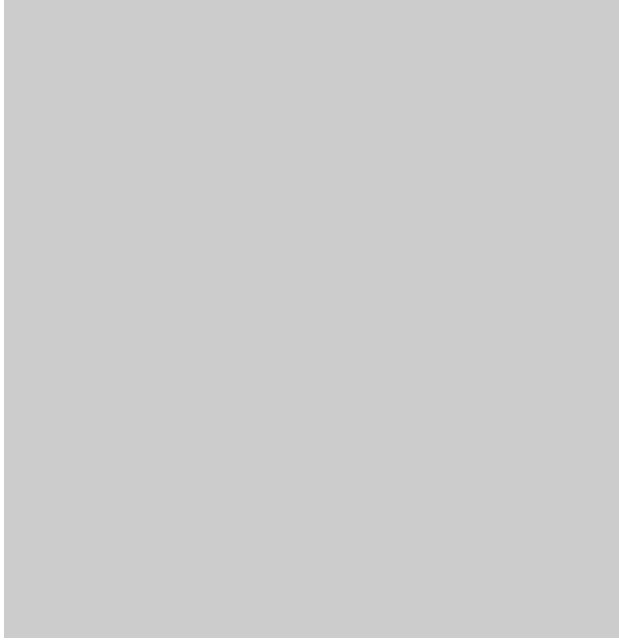
เรื่อง คออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
เรียน กรรมการผู้จัดการ บริษัท เทคโนโลยีสิ่งแวดล้อมไทย จำกัด
อ้างถึง คำขอขึ้นทะเบียน/ค่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารเคมีของห้องปฏิบัติการวิเคราะห์เอกชน
ลงวันที่ ๓ มีนาคม ๒๕๖๖

สิ่งที่ส่งมาด้วย เอกสารแนบท้ายหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
บริษัท เทคโนโลยีสิ่งแวดล้อมไทย จำกัด จำนวน ๒๘ แผ่น
ตามหนังสือที่อ้างถึง บริษัท เทคโนโลยีสิ่งแวดล้อมไทย จำกัด ขอต่ออายุหนังสือรับขึ้นทะเบียน
ห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ๖-๒๓๖ สถานที่ตั้งเลขที่ ๑/๖ ซอยรามคำแหง ๑๔๕ แขวงสะพานสูง
เขตสะพานสูง กรุงเทพมหานคร ต่อกรมโรงงานอุตสาหกรรม นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ได้บริษัท เทคโนโลยีสิ่งแวดล้อมไทย จำกัด ต่ออายุหนังสือรับขึ้น
ทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน โดยมีองค์ประกอบดังนี้
ก. ผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์



๑๓) นายจิรวัดน์...



ค. ขอช่วยสารเคมีที่ได้รับขึ้นทะเบียนไว้วิเคราะห์ในน้ำเสีย น้ำใต้ดิน อากาศเสีย สิ่งปฏิกูลหรือ
วัสดุที่ไม่ใช้แล้ว และดิน ตามสิ่งที่ส่งมาด้วย

หนังสือฉบับนี้จะหมดอายุในวันที่ ๑๓ มีนาคม ๒๕๖๙ หากประสงค์จะต่ออายุหนังสือ
รับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ให้ยื่นคำขอต่ออายุพร้อมเอกสารประกอบคำขอต่อ
กรมโรงงานอุตสาหกรรม ภายใน ๓๐ วัน ก่อนวันสิ้นสุดของหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
ทั้งนี้ สามารถยื่นคำขอผ่านระบบอิเล็กทรอนิกส์ได้ทั้งที่หน้าเว็บไซต์กรมโรงงานอุตสาหกรรม

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ



ผู้ช่วยฯ
ผู้บริหารเทคโนโลยีสารสนเทศระดับสูง
กรมโรงงานอุตสาหกรรม

กองวิจัยและเตือนภัยมลพิษโรงงาน
กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษและทะเบียนห้องปฏิบัติการ
โทร. ๐ ๒๔๓๐ ๖๓๑๒ ต่อ ๒๑๐๓-๕
โทรสาร ๐ ๒๔๓๐ ๖๓๑๒ ต่อ ๒๑๙๙
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“อุตสาหกรรมก้าวไกล ประเทศไทยก้าวหน้า ร่วมกันพัฒนา อุตสาหกรรมสีเขียว”



เอกสารแนบท้ายหนังสือรับต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
บริษัท เทคโนโลยีสิ่งแวดล้อมไทย จำกัด เลขทะเบียน ว-๒๓๖
ที่ อก ๐๓๐๐(๑)/ ๙ ๘ ๗ ๖ ลงวันที่ ๒ มิถุนายน ๒๕๖๖
ขอขยายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๓๗ รายการ
น้ำเสีย จำนวน 40 รายการ

| ลำดับที่ | สารมลพิษ | วิธีวิเคราะห์ |
|----------|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | Aldrin | Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ |
| 2 | Arsenic | Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ⁽⁴⁾ |
| 3 | Barium | 1) Digestion, Direct Nitrous Oxide-Acetylene Flame Method ⁽⁴⁾ 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ⁽⁴⁾ 3) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ |
| 4 | α-BHC | Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ |
| 5 | γ-BHC | Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ |
| 6 | Biochemical Oxygen Demand | 5-Day BOD Test, Azide Modification Method ⁽⁴⁾ |
| 7 | Cadmium | 1) Digestion, Direct Air-Acetylene Flame Method ⁽⁴⁾ 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ⁽⁴⁾ 3) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ |
| 8 | Chemical Oxygen Demand | Closed Reflux, Titrimetric Method ⁽⁴⁾ |
| 9 | Chlordane | Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ |
| 10 | Chromium | 1) Digestion, Direct Air-Acetylene Flame Method ⁽⁴⁾ 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ⁽⁴⁾ 3) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ |
| 11 | Color | ADMI Weighted-Ordinate Spectrophotometric Method ⁽⁴⁾ |
| 12 | Copper | 1) Digestion, Direct Air-Acetylene Flame Method ⁽⁴⁾ 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ⁽⁴⁾ 3) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ |
| 13 | Cyanide | Distillation, Colorimetric Method ⁽⁴⁾ |
| 14 | 4,4'-DDE | Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ |
| 15 | 4,4'-DDT | Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ |
| 16 | Dieldrin | Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ |

17 Endosulfan I...

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| ลำดับที่ | สารมลพิษ | วิธีวิเคราะห์ |
|----------|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 17 | Endosulfan I | Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ |
| 18 | Endosulfan II | Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ |
| 19 | Endosulfan Sulfate | Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ |
| 20 | Endrin | Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ |
| 21 | Formaldehyde | Distillation, Colorimetric Method ⁽³⁾ |
| 22 | Free Chlorine | DPD Ferrous Titrimetric Method ⁽⁴⁾ |
| 23 | Heptachlor | Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ |
| 24 | Heptachlor Epoxide | Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ |
| 25 | Hexavalent Chromium | Colorimetric Method ⁽⁴⁾ |
| 26 | Lead | 1) Digestion, Direct Air-Acetylene Flame Method ⁽⁴⁾ 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ⁽⁴⁾ 3) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ |
| 27 | Manganese | 1) Digestion, Direct Air-Acetylene Flame Method ⁽⁴⁾ 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ⁽⁴⁾ 3) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ |
| 28 | Mercury | Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ⁽⁴⁾ |
| 29 | Nickel | 1) Digestion, Direct Air-Acetylene Flame Method ⁽⁴⁾ 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ⁽⁴⁾ 3) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ |
| 30 | Oil & Grease | 1) Liquid-Liquid, Partition-Gravimetric Method ⁽⁴⁾ 2) Soxhlet Extraction Method ⁽⁴⁾ |
| 31 | pH | Electrometric Method ⁽⁴⁾ |
| 32 | Phenols | Distillation, Direct Photometric Method ⁽⁴⁾ |
| 33 | Selenium | Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ⁽⁴⁾ |
| 34 | Sulfide | 1) Iodometric Method ⁽⁴⁾ 2) Methylene Blue Method ⁽⁴⁾ |
| 35 | Temperature | Laboratory and Field Methods ⁽⁴⁾ |
| 36 | Total Dissolved Solids | Dried at 180 °C ⁽⁴⁾ |
| 37 | Total Kjeldahl Nitrogen | Macro-Kjeldahl Method ⁽⁴⁾ |
| 38 | Total Suspended Solids | Dried at 103-105 °C ⁽⁴⁾ |

39 Trivalent Chromium...

| ลำดับที่ | สารมลพิษ | วิธีวิเคราะห์ |
|----------|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 39 | Trivalent Chromium | Digestion, Inductively Coupled Plasma Method; Colorimetric Method; Calculation ^(a) |
| 40 | Zinc | 1) Digestion, Direct Air-Acetylene Flame Method ^(a) 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^(a) 3) Digestion, Inductively Coupled Plasma Method ^(a) |

น้ำใต้ดิน จำนวน 122 รายการ

| ลำดับที่ | สารมลพิษ | วิธีวิเคราะห์ |
|----------|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | Acenaphthene | Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(a) |
| 2 | Acetone | Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ^(a) |
| 3 | Aldrin | Liquid-Liquid Extraction, Gas Chromatographic Method ^(a) |
| 4 | Anthracene | Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(a) |
| 5 | Antimony | 1) Digestion, Direct Air-Acetylene Flame Method ^(a) 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^(a) 3) Digestion, Inductively Coupled Plasma Method ^(a) |
| 6 | Arsenic | Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^(a) |
| 7 | Atrazine | Liquid-Liquid Extraction, Gas Chromatographic Method ^(a) |
| 8 | Barium | 1) Digestion, Direct Nitrous Oxide-Acetylene Flame Method ^(a) 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^(a) 3) Digestion, Inductively Coupled Plasma Method ^(a) |
| 9 | Benz(a)anthracene | Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(a) |
| 10 | Benzene | Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ^(a) |
| 11 | Benzo(b)fluoranthene | Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(a) |
| 12 | Benzo(k)fluoranthene | Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(a) |

13 Benzoic acid...

| ลำดับที่ | สารมลพิษ | วิธีวิเคราะห์ |
|----------|----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| 13 | Benzoic acid | Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(a) |
| 14 | Benzo(a)pyrene | Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(a) |
| 15 | Benzo(g,h,i)perylene | Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(a) |
| 16 | Beryllium | 1) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^(a) 2) Digestion, Inductively Coupled Plasma Method ^(a) |
| 17 | Bis(2-chloroethyl)ether | Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(a) |
| 18 | Bis(2-ethylhexyl)phthalate | Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(a) |
| 19 | Bromodichloromethane | Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ^(a) |
| 20 | Bromoform | Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ^(a) |
| 21 | Butanol | Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ^(a) |
| 22 | Butyl benzyl phthalate | Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(a) |
| 23 | Cadmium | 1) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^(a) 2) Digestion, Inductively Coupled Plasma Method ^(a) |
| 24 | Carbazole | Liquid-Liquid Extraction, Gas Chromatographic Method ^(a) |
| 25 | Carbon disulfide | Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ^(a) |
| 26 | Carbon tetrachloride | Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ^(a) |
| 27 | Chlordane | Liquid-Liquid Extraction, Gas Chromatographic Method ^(a) |
| 28 | p-Chloroaniline | Liquid-Liquid Extraction, Gas Chromatographic Method ^(a) |
| 29 | Chlorobenzene | Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ^(a) |
| 30 | Chlorodibromomethane | Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ^(a) |
| 31 | Chloroform | Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ^(a) |

32 Chromium...

| ลำดับที่ | สารเคมี | วิธีวิเคราะห์ |
|----------|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 32 | Chromium | 1) Digestion, Direct Air-Acetylene Flame Method ^(a) 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^(a) 3) Digestion, Inductively Coupled Plasma Method ^(a) |
| 33 | Chromium (III) | 1) Digestion, Direct Air-Acetylene Flame Method; Colorimetric Method; Calculation ^(a) 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method; Colorimetric Method; Calculation ^(a) 3) Digestion, Inductively Coupled Plasma Method; Colorimetric Method; Calculation ^(a) Colorimetric Method ^(a) |
| 34 | Chromium (VI) | Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(a) |
| 35 | Chrysene | Distillation, Colorimetric Method ^(a) |
| 36 | Cyanide | Liquid-Liquid Extraction, Gas Chromatographic Method ^(a) |
| 37 | 2,4-D | Liquid-Liquid Extraction, Gas Chromatographic Method ^(a) |
| 38 | DDD | Liquid-Liquid Extraction, Gas Chromatographic Method ^(a) |
| 39 | DDE | Liquid-Liquid Extraction, Gas Chromatographic Method ^(a) |
| 40 | DDT | Liquid-Liquid Extraction, Gas Chromatographic Method ^(a) |
| 41 | Dibenz(a,h)anthracene | Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(a) |
| 42 | Di-n-butyl phthalate | Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(a) |
| 43 | 1,2-Dichlorobenzene | Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ^(a) |
| 44 | 1,3-Dichlorobenzene | Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ^(a) |
| 45 | 1,4-Dichlorobenzene | Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ^(a) |
| 46 | 1,1-Dichloroethane | Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ^(a) |
| 47 | 1,2-Dichloroethane | Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ^(a) |
| 48 | 1,1-Dichloroethylene | Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ^(a) |
| 49 | cis-1,2-Dichloroethylene | Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ^(a) |

| ลำดับที่ | สารเคมี | วิธีวิเคราะห์ |
|----------|----------------------------|--------------------------------------------------------------------------------------------|
| 50 | trans-1,2-Dichloroethylene | Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ^(a) |
| 51 | 1,2-Dichloropropane | Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ^(a) |
| 52 | 1,3-Dichloropropane | Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ^(a) |
| 53 | 1,3-Dichloropropene | Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ^(a) |
| 54 | Dieldrin | Liquid-Liquid Extraction, Gas Chromatographic Method ^(a) |
| 55 | Diethyl phthalate | Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(a) |
| 56 | 2,4-Dimethylphenol | Liquid-Liquid Extraction, Gas Chromatographic Method ^(a) |
| 57 | 2,4-Dinitrophenol | Liquid-Liquid Extraction, Gas Chromatographic Method ^(a) |
| 58 | 2,4-Dinitrotoluene | Liquid-Liquid Extraction, Gas Chromatographic Method ^(a) |
| 59 | 2,6-Dinitrotoluene | Liquid-Liquid Extraction, Gas Chromatographic Method ^(a) |
| 60 | Di-n-Octyl phthalate | Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(a) |
| 61 | Endosulfan | Liquid-Liquid Extraction, Gas Chromatographic Method ^(a) |
| 62 | Endrin | Liquid-Liquid Extraction, Gas Chromatographic Method ^(a) |
| 63 | Ethylbenzene | Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ^(a) |
| 64 | Fluoranthene | Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(a) |
| 65 | Fluorene | Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(a) |
| 66 | Heptachlor | Liquid-Liquid Extraction, Gas Chromatographic Method ^(a) |
| 67 | Heptachlor epoxide | Liquid-Liquid Extraction, Gas Chromatographic Method ^(a) |
| 68 | Hexachloro-1,3-butadiene | Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ^(a) |
| 69 | n-Hexane | Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ^(a) |
| 70 | α-HCH | Liquid-Liquid Extraction, Gas Chromatographic Method ^(a) |
| 71 | β-HCH | Liquid-Liquid Extraction, Gas Chromatographic Method ^(a) |
| 72 | γ-HCH | Liquid-Liquid Extraction, Gas Chromatographic Method ^(a) |
| 73 | Hexachlorocyclopentadiene | Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(a) |

| ลำดับที่ | สารเคมี | วิธีวิเคราะห์ |
|----------|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| 74 | Hexachloroethane | Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(a) |
| 75 | Indeno(1,2,3-cd)pyrene | Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(a) |
| 76 | Isophorone | Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(a) |
| 77 | Lead | 1) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^(a) 2) Digestion, Inductively Coupled Plasma Method ^(a) |
| 78 | Manganese | 1) Digestion, Direct Air-Acetylene Flame Method ^(a) 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^(a) |
| 79 | Mercury | 3) Digestion, Inductively Coupled Plasma Method ^(a) Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ^(a) |
| 80 | Methanol | Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ^(a) |
| 81 | Methoxychlor | Liquid-Liquid Extraction, Gas Chromatographic Method ^(a) |
| 82 | Methyl bromide | Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ^(a) |
| 83 | Methylene chloride | Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ^(a) |
| 84 | 2-Methylphenol | Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(a) |
| 85 | 2-Methylnaphthalene | Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(a) |
| 86 | Methyl tert-butyl ether | Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ^(a) |
| 87 | Naphthalene | Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ^(a) |
| 88 | Nickel | 1) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^(a) 2) Digestion, Inductively Coupled Plasma Method ^(a) |
| 89 | Nitrobenzene | Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(a) |
| 90 | N-Nitrosodiphenylamine | Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(a) |

91 N-Nitrosodi-n-propylamine...

| ลำดับที่ | สารเคมี | วิธีวิเคราะห์ |
|----------|---------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 91 | N-Nitrosodi-n-propylamine | Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(a) |
| 92 | Polychlorinated Biphenyls PCB-1016 PCB-1221 PCB-1232 PCB-1242 PCB-1248 PCB-1254 PCB-1260 | Liquid-Liquid Extraction, Gas Chromatographic Method ^(a) |
| 93 | Pentachlorophenol | Liquid-Liquid Extraction, Gas Chromatographic Method ^(a) |
| 94 | pH | Electrometric Method ^(a) |
| 95 | Phenanthrene | Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(a) |
| 96 | Phenol | 1) Distillation, Direct Photometric Method ^(a) 2) Liquid-Liquid Extraction, Gas Chromatographic Method ^(a) |
| 97 | Pyrene | Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(a) |
| 98 | Selenium | Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^(a) |
| 99 | Silver | 1) Digestion, Direct Air-Acetylene Flame Method ^(a) 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^(a) 3) Digestion, Inductively Coupled Plasma Method ^(a) |
| 100 | Styrene | Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ^(a) |
| 101 | 1,1,2,2-Tetrachloroethane | Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ^(a) |
| 102 | Tetrachloroethylene | Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ^(a) |
| 103 | Toluene | Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ^(a) |
| 104 | Toxaphene | Liquid-Liquid Extraction, Gas Chromatographic Method ^(a) |
| 105 | TPH (C ₅ -C ₆) | Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^{(a)(22)} |

106 TPH (C₅-C₆)...

| ลำดับที่ | สารมลพิษ | วิธีวิเคราะห์ |
|----------|-----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| 106 | TPH (C ₈ -C ₁₆) | Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^(9,22) |
| 107 | TPH (C ₁₆ -C ₃₅) | Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^(9,22) |
| 108 | 1,2,4-Trichlorobenzene | Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ⁽⁶⁾ |
| 109 | 1,1,1-Trichloroethane | Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ⁽⁶⁾ |
| 110 | 1,1,2-Trichloroethane | Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ⁽⁶⁾ |
| 111 | Trichloroethylene | Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ⁽⁶⁾ |
| 112 | 2,4,5-Trichlorophenol | Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁶⁾ |
| 113 | 2,4,6-Trichlorophenol | Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁶⁾ |
| 114 | 1,3,5-Trimethylbenzene | Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ⁽⁶⁾ |
| 115 | Vanadium | 1) Digestion, Electrothermal Atomic Absorption Spectrometric Method ⁽⁶⁾ 2) Digestion, Inductively Coupled Plasma Method ⁽⁶⁾ |
| 116 | Vinyl acetate | Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ⁽⁶⁾ |
| 117 | Vinyl chloride | Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ⁽⁶⁾ |
| 118 | m-Xylene | Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ⁽⁶⁾ |
| 119 | o-Xylene | Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ⁽⁶⁾ |
| 120 | p-Xylene | Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ⁽⁶⁾ |
| 121 | Xylene (Total) | Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ⁽⁶⁾ |
| 122 | Zinc | 1) Digestion, Direct Air-Acetylene Flame Method ⁽⁶⁾ 2) Digestion, Inductively Coupled Plasma Method ⁽⁶⁾ |

อากาศเสีย...

อากาศเสีย (ปล่องระบาย) จำนวน 18 รายการ

| ลำดับที่ | สารมลพิษ | วิธีวิเคราะห์ |
|----------|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | Antimony | 1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁽⁵⁾ 2) Isokinetic Sampling, Digestion, Direct Air-Acetylene Flame Method ⁽⁵⁾ 3) Isokinetic Sampling, Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ⁽⁵⁾ Isokinetic Sampling, Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ⁽⁵⁾ Instrumental Analyzer Method ⁽⁵⁾ Absorption Sampling, Ion Chromatographic Method ⁽⁵⁾ |
| 2 | Arsenic | 1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁽⁵⁾ 2) Isokinetic Sampling, Digestion, Direct Air-Acetylene Flame Method ⁽⁵⁾ |
| 3 | Carbon monoxide | Adsorption Sampling, Gas Chromatographic Method ⁽⁵⁾ |
| 4 | Chlorine | Isokinetic Sampling, Analysis by ISO/IEC 17025 Accredited Laboratory or Analysis by Department of Industrial Works Registered Laboratory (Dioxins/Furans Analysis Approved) ⁽⁵⁾ |
| 5 | Copper | Absorption Sampling, Ion Chromatographic Method ⁽⁵⁾ Absorption Sampling, Ion Chromatographic Method ⁽⁵⁾ Absorption Sampling, Iodometric Method ⁽⁵⁾ |
| 6 | Cresol | 1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁽⁵⁾ 2) Isokinetic Sampling, Digestion, Direct Air-Acetylene Flame Method ⁽⁵⁾ |
| 7 | Dioxins/Furans | Adsorption Sampling, Gas Chromatographic Method ⁽⁵⁾ Isokinetic Sampling, Analysis by ISO/IEC 17025 Accredited Laboratory or Analysis by Department of Industrial Works Registered Laboratory (Dioxins/Furans Analysis Approved) ⁽⁵⁾ |
| 8 | Hydrogen Chloride | Absorption Sampling, Ion Chromatographic Method ⁽⁵⁾ |
| 9 | Hydrogen Fluoride | Absorption Sampling, Ion Chromatographic Method ⁽⁵⁾ |
| 10 | Hydrogen Sulfide | Absorption Sampling, Iodometric Method ⁽⁵⁾ |
| 11 | Lead | 1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁽⁵⁾ 2) Isokinetic Sampling, Digestion, Direct Air-Acetylene Flame Method ⁽⁵⁾ |
| 12 | Mercury | 3) Isokinetic Sampling, Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ⁽⁵⁾ Isokinetic Sampling, Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ⁽⁵⁾ Ringelmann's Method ⁽²⁾ |
| 13 | Opacity | 1) Absorption Sampling, Phenoldisulfonic acid Method ⁽⁵⁾ 2) Instrumental Analyzer Method ⁽⁵⁾ |
| 14 | Oxides of Nitrogen | |

15 Sulfur dioxide...

| ลำดับที่ | สารมลพิษ | วิธีวิเคราะห์ |
|----------|-----------------------------|---------------------------------------------------------------------------------------------------------------------------|
| 15 | Sulfur dioxide | 1) Absorption Sampling, Barium-Thorin Titrimetric Method ^[5] 2) Instrumental Analyzer Method ^[5] |
| 16 | Sulfuric acid | Isokinetic Sampling, Barium-Thorin Titrimetric Method ^[5] |
| 17 | Total Suspended Particulate | Isokinetic Sampling, Gravimetric Method ^[5] |
| 18 | Xylene | Adsorption Sampling, Gas Chromatographic Method ^[5] |

สิ่งปนเปื้อนหรือวัสดุที่ไม่ใช้แล้ว จำนวน 36 รายการ

| ลำดับที่ | สารมลพิษ | วิธีวิเคราะห์ |
|----------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | Aldrin | 1) Waste Extraction, Solid-Phase Extraction, Gas Chromatographic Method ^[1,10,24] 2) Solid-Phase Extraction, Gas Chromatographic Method ^[10,24] 3) Soxhlet Extraction, Gas Chromatographic Method ^[11,24] |
| 2 | Antimony | 1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^[1,6,15] 2) Waste Extraction, Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^[1,6,16] 3) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,14] 4) Digestion, Flame Atomic Absorption Spectrometric Method ^[7,15] 5) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^[7,16] 6) Digestion, Inductively Coupled Plasma Method ^[7,14] |
| 3 | Arsenic | 1) Waste Extraction, Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^[1,6,17] 2) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^[7,17] |
| 4 | Barium | 1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^[1,6,15] 2) Waste Extraction, Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^[1,6,16] 3) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,14] |

4) Digestion...

| ลำดับที่ | สารมลพิษ | วิธีวิเคราะห์ |
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| 5 | Beryllium | 4) Digestion, Flame Atomic Absorption Spectrometric Method ^[7,15] 5) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^[7,16] 6) Digestion, Inductively Coupled Plasma Method ^[7,14] 1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^[1,6,15] 2) Waste Extraction, Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^[1,6,16] 3) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,14] 4) Digestion, Flame Atomic Absorption Spectrometric Method ^[7,15] 5) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^[7,16] 6) Digestion, Inductively Coupled Plasma Method ^[7,14] |
| 6 | Cadmium | 1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^[1,6,15] 2) Waste Extraction, Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^[1,6,16] 3) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,14] 4) Digestion, Flame Atomic Absorption Spectrometric Method ^[7,15] 5) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^[7,16] 6) Digestion, Inductively Coupled Plasma Method ^[7,14] |
| 7 | Chlordane | 1) Waste Extraction, Solid-Phase Extraction, Gas Chromatographic Method ^[1,10,24] 2) Solid-Phase Extraction, Gas Chromatographic Method ^[10,24] 3) Soxhlet Extraction, Gas Chromatographic Method ^[11,24] |
| 8 | Chromium | 1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^[1,6,15] 2) Waste Extraction, Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^[1,6,16] |

3) Waste Extraction...

| ลำดับที่ | สารมลพิษ | วิธีวิเคราะห์ |
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| 9 | Chromium (III) | 3) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1.6.14) 4) Digestion, Flame Atomic Absorption Spectrometric Method ^(7.15) 5) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^(7.16) 6) Digestion, Inductively Coupled Plasma Method ^(7.14) 1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method; Waste Extraction, Colorimetric Method; Calculation ^(1.6.15,18) 2) Waste Extraction, Digestion, Graphite Furnace Atomic Absorption Spectrometric Method; Waste Extraction, Colorimetric Method; Calculation ^(1.6.16,18) 3) Waste Extraction, Digestion, Inductively Coupled Plasma Method; Waste Extraction, Colorimetric Method; Calculation ^(1.6.14,18) 4) Digestion, Flame Atomic Absorption Spectrometric Method; Alkaline Digestion, Colorimetric Method; Calculation ^(7.8,15,18) 5) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method; Alkaline Digestion, Colorimetric Method; Calculation ^(7.8,16,18) 6) Digestion, Inductively Coupled Plasma Method; Alkaline Digestion, Colorimetric Method; Calculation ^(7.8,14,18) 1) Waste Extraction, Colorimetric Method ^(1.18) 2) Alkaline Digestion, Colorimetric Method ^(8.18) |
| 10 | Chromium (VI) | 1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^(1.6.15) 2) Waste Extraction, Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^(1.6.16) 3) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1.6.14) 4) Digestion, Flame Atomic Absorption Spectrometric Method ^(7.15) 5) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^(7.16) 6) Digestion, Inductively Coupled Plasma Method ^(7.14) |
| 11 | Cobalt | |

| ลำดับที่ | สารมลพิษ | วิธีวิเคราะห์ |
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| 12 | Copper | 1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^(1.6.15) 2) Waste Extraction, Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^(1.6.16) 3) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1.6.14) 4) Digestion, Flame Atomic Absorption Spectrometric Method ^(7.15) 5) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^(7.16) 6) Digestion, Inductively Coupled Plasma Method ^(7.14) 1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^(1.9,24) 2) Soxhlet Extraction, Gas Chromatographic Method ^(1.1,24) 1) Waste Extraction, Solid-Phase Extraction, Gas Chromatographic Method ^(1.10,24) 2) Solid-Phase Extraction, Gas Chromatographic Method ^(1.10,24) 3) Soxhlet Extraction, Gas Chromatographic Method ^(1.1,24) 1) Waste Extraction, Solid-Phase Extraction, Gas Chromatographic Method ^(1.10,24) 2) Solid-Phase Extraction, Gas Chromatographic Method ^(1.10,24) 3) Soxhlet Extraction, Gas Chromatographic Method ^(1.1,24) 1) Waste Extraction, Solid-Phase Extraction, Gas Chromatographic Method ^(1.10,24) 2) Solid-Phase Extraction, Gas Chromatographic Method ^(1.10,24) 3) Soxhlet Extraction, Gas Chromatographic Method ^(1.1,24) 1) Waste Extraction, Solid-Phase Extraction, Gas Chromatographic Method ^(1.10,24) 2) Solid-Phase Extraction, Gas Chromatographic Method ^(1.10,24) 3) Soxhlet Extraction, Gas Chromatographic Method ^(1.1,24) |
| 13 | 2,4-D | |
| 14 | DDD | |
| 15 | DDE | |
| 16 | DDT | |
| 17 | Dieldrin | |

| ลำดับที่ | สารเคมี | วิธีวิเคราะห์ |
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| 18 | Endrin | 1) Waste Extraction, Solid-Phase Extraction, Gas Chromatographic Method ^(1.10.24) 2) Solid-Phase Extraction, Gas Chromatographic Method ^(10.24) 3) Soxhlet Extraction, Gas Chromatographic Method ^(11.24) |
| 19 | Heptachlor | 1) Waste Extraction, Solid-Phase Extraction, Gas Chromatographic Method ^(1.10.24) 2) Solid-Phase Extraction, Gas Chromatographic Method ^(10.24) 3) Soxhlet Extraction, Gas Chromatographic Method ^(11.24) |
| 20 | Lead | 1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^(1.6.15) 2) Waste Extraction, Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^(1.6.16) 3) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1.6.14) 4) Digestion, Flame Atomic Absorption Spectrometric Method ^(7.15) 5) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^(7.16) 6) Digestion, Inductively Coupled Plasma Method ^(7.14) |
| 21 | Lindane | 1) Waste Extraction, Solid-Phase Extraction, Gas Chromatographic Method ^(1.10.24) 2) Solid-Phase Extraction, Gas Chromatographic Method ^(10.24) 3) Soxhlet Extraction, Gas Chromatographic Method ^(11.24) |
| 22 | Mercury | 1) Waste Extraction, Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ^(1.6.19) 2) Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ⁽²⁰⁾ |
| 23 | Methoxychlor | 1) Waste Extraction, Solid-Phase Extraction, Gas Chromatographic Method ^(1.10.24) 2) Solid-Phase Extraction, Gas Chromatographic Method ^(10.24) |

3) Soxhlet...

| ลำดับที่ | สารเคมี | วิธีวิเคราะห์ |
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| 24 | Mirex | 3) Soxhlet Extraction, Gas Chromatographic Method ^(11.24) 1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^(1.9.24) 2) Soxhlet Extraction, Gas Chromatographic Method ^(11.24) |
| 25 | Molybdenum | 1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^(1.6.15) 2) Waste Extraction, Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^(1.6.16) 3) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1.6.14) 4) Digestion, Flame Atomic Absorption Spectrometric Method ^(7.15) 5) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^(7.16) 6) Digestion, Inductively Coupled Plasma Method ^(7.14) |
| 26 | Nickel | 1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^(1.6.15) 2) Waste Extraction, Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^(1.6.16) 3) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1.6.14) 4) Digestion, Flame Atomic Absorption Spectrometric Method ^(7.15) 5) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^(7.16) 6) Digestion, Inductively Coupled Plasma Method ^(7.14) |
| 27 | Polychlorinated Biphenyls Aroclor 1016 Aroclor 1221 Aroclor 1232 Aroclor 1242 Aroclor 1248 Aroclor 1254 Aroclor 1260 2,2',5,5'-Tetrachlorobiphenyl | 1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^(1.9.24) 2) Waste Extraction, Solid-Phase Extraction, Gas Chromatographic Method ^(1.10.23) 3) Soxhlet Extraction, Gas Chromatographic Method ^(11.25) |

2,2',4,5,5'...

| ลำดับที่ | สารเคมี | วิธีวิเคราะห์ |
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| 28 | 2,2',4,5,5'-Pentachlorobiphenyl 2,2',3,4,4',5'-Hexachlorobiphenyl 2,2',4,4',5,5'-Hexachlorobiphenyl 2,2',3,4,4',5,5'-Heptachlorobiphenyl Pentachlorophenol | 1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^(1,9,24) 2) Soxhlet Extraction, Gas Chromatographic Method ^(11,24) 1) Waste Extraction, Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^(1,6,21) 2) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^(7,21) |
| 29 | Selenium | 1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^(1,6,15) 2) Waste Extraction, Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^(1,6,16) |
| 30 | Silver | 3) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,6,14) 4) Digestion, Flame Atomic Absorption Spectrometric Method ^(7,15) 5) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^(7,16) 6) Digestion, Inductively Coupled Plasma Method ^(7,14) |
| 31 | Thallium | 1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^(1,6,15) 2) Waste Extraction, Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^(1,6,16) 3) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,6,14) 4) Digestion, Flame Atomic Absorption Spectrometric Method ^(7,15) 5) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^(7,16) 6) Digestion, Inductively Coupled Plasma Method ^(7,14) |

32 Toxaphene...

| ลำดับที่ | สารเคมี | วิธีวิเคราะห์ |
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| 32 | Toxaphene | 1) Waste Extraction, Solid-Phase Extraction, Gas Chromatographic Method ^(1,10,24) 2) Solid-Phase Extraction, Gas Chromatographic Method ^(10,24) 3) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(11,27) 1) Waste Extraction, Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(1,12,28) 2) Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(13,28) |
| 33 | Trichloroethylene | 1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^(1,6,15) 2) Waste Extraction, Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^(1,6,16) 3) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,6,14) 4) Digestion, Flame Atomic Absorption Spectrometric Method ^(7,15) 5) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^(7,16) 6) Digestion, Inductively Coupled Plasma Method ^(7,14) Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(13,28) |
| 34 | Vanadium | 1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^(1,6,15) 2) Waste Extraction, Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^(1,6,16) 3) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,6,14) 4) Digestion, Flame Atomic Absorption Spectrometric Method ^(7,15) 5) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^(7,16) 6) Digestion, Inductively Coupled Plasma Method ^(7,14) Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(13,28) |
| 35 | Vinyl chloride | 1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^(1,6,15) 2) Waste Extraction, Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^(1,6,16) 3) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,6,14) 4) Digestion, Flame Atomic Absorption Spectrometric Method ^(7,15) 5) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^(7,16) 6) Digestion, Inductively Coupled Plasma Method ^(7,14) |
| 36 | Zinc | 1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^(1,6,15) 2) Waste Extraction, Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^(1,6,16) 3) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,6,14) 4) Digestion, Flame Atomic Absorption Spectrometric Method ^(7,15) 5) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^(7,16) 6) Digestion, Inductively Coupled Plasma Method ^(7,14) |

ดิน...

ดิน จำนวน 121 รายการ

| ลำดับที่ | สารมลพิษ | วิธีวิเคราะห์ |
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| 1 | Acenaphthene | Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(1,12,27) |
| 2 | Acetone | Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(1,13,26) |
| 3 | Aldrin | Soxhlet Extraction, Gas Chromatographic Method ^(1,1,24) |
| 4 | Anthracene | Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(1,12,27) |
| 5 | Antimony | 1) Digestion, Flame Atomic Absorption Spectrometric Method ^(7,15) 2) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^(7,16) 3) Digestion, Inductively Coupled Plasma Method ^(7,14) |
| 6 | Arsenic | Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^(7,17) |
| 7 | Atrazine | Soxhlet Extraction, Gas Chromatographic Method ^(1,1,24) |
| 8 | Barium | 1) Digestion, Flame Atomic Absorption Spectrometric Method ^(7,15) 2) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^(7,16) 3) Digestion, Inductively Coupled Plasma Method ^(7,14) |
| 9 | Benz(a)anthracene | Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(1,12,27) |
| 10 | Benzene | Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(1,13,26) |
| 11 | Benzo(b)fluoranthene | Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(1,12,27) |
| 12 | Benzo(k)fluoranthene | Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(1,12,27) |
| 13 | Benzoic acid | Soxhlet Extraction, Gas Chromatographic Method ^(1,1,23) |
| 14 | Benzo(a)pyrene | Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(1,12,27) |
| 15 | Benzo(g,h,i)perylene | Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(1,12,27) |
| 16 | Beryllium | 1) Digestion, Flame Atomic Absorption Spectrometric Method ^(7,15) |

2) Digestion...

2) Digestion...

| ลำดับที่ | สารมลพิษ | วิธีวิเคราะห์ |
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| 17 | Bis(2-chloroethyl)ether | 2) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^(7,16) 3) Digestion, Inductively Coupled Plasma Method ^(7,14) |
| 18 | Bis(2-ethylhexyl)phthalate | Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(1,12,27) |
| 19 | Bromodichloromethane | Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(1,12,27) |
| 20 | Bromoform | Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(1,13,26) |
| 21 | Butanol | Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(1,13,26) |
| 22 | Butyl benzyl phthalate | Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(1,12,27) |
| 23 | Cadmium | 1) Digestion, Flame Atomic Absorption Spectrometric Method ^(7,15) 2) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^(7,16) 3) Digestion, Inductively Coupled Plasma Method ^(7,14) |
| 24 | Carbazole | Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(1,12,27) |
| 25 | Carbon disulfide | Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(1,13,26) |
| 26 | Carbon tetrachloride | Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(1,13,26) |
| 27 | Chlordane | Soxhlet Extraction, Gas Chromatographic Method ^(1,1,24) |
| 28 | p-Chloroaniline | Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(1,12,27) |
| 29 | Chlorobenzene | Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(1,13,26) |
| 30 | Chlorodibromomethane | Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(1,13,26) |
| 31 | Chloroform | Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(1,13,26) |
| 32 | Chromium | 1) Digestion, Flame Atomic Absorption Spectrometric Method ^(7,15) |

2) Digestion...

2) Digestion...

| ลำดับที่ | สารมลพิษ | วิธีวิเคราะห์ |
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| 73 | Hexachlorocyclopentadiene | Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,27) |
| 74 | Hexachloroethane | Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,27) |
| 75 | Indeno(1,2,3-cd)pyrene | Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,27) |
| 76 | Isophorone | Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,27) |
| 77 | Lead | Mass Spectrometric Method ^(11,27) 1) Digestion, Flame Atomic Absorption Spectrometric Method ^(7,15) 2) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^(7,16) 3) Digestion, Inductively Coupled Plasma Method ^(7,14) |
| 78 | Manganese | 1) Digestion, Flame Atomic Absorption Spectrometric Method ^(7,15) 2) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^(7,16) 3) Digestion, Inductively Coupled Plasma Method ^(7,14) |
| 79 | Mercury | Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ⁽²⁰⁾ |
| 80 | Methanol | Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,26) |
| 81 | Methoxychlor | Soxhlet Extraction, Gas Chromatographic Method ^(11,24) |
| 82 | Methyl bromide | Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,26) |
| 83 | Methylene chloride | Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,26) |
| 84 | 2-Methylphenol | Soxhlet Extraction, Gas Chromatographic Method ^(11,23) |
| 85 | 2-Methylnaphthalene | Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,27) |
| 86 | Methyl tert-butyl ether | Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,26) |
| 87 | Naphthalene | Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,26) |
| 88 | Nickel | 1) Digestion, Flame Atomic Absorption Spectrometric Method ^(7,15) 2) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^(7,16) 3) Digestion, Inductively Coupled Plasma Method ^(7,14) |

89 Nitrobenzene...

| ลำดับที่ | สารมลพิษ | วิธีวิเคราะห์ |
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| 89 | Nitrobenzene | Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,27) |
| 90 | N-Nitrosodiphenylamine | Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,27) |
| 91 | N-Nitrosodi-n-propylamine | Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,27) |
| 92 | Polychlorinated Biphenyls | Soxhlet Extraction, Gas Chromatographic Method ^(11,25) |
| | Aroclor 1016 | |
| | Aroclor 1221 | |
| | Aroclor 1232 | |
| | Aroclor 1242 | |
| | Aroclor 1248 | |
| | Aroclor 1254 | |
| | Aroclor 1260 | |
| | 2,2',5,5'-Tetrachlorobiphenyl | |
| | 2,2',4,5,5'-Pentachlorobiphenyl | |
| | 2,2',3,4,4',5'- | |
| | Hexachlorobiphenyl | |
| | 2,2',4,4',5,5'- | |
| | 2,2',3,4,4',5,5'- | |
| | Heptachlorobiphenyl | |
| 93 | Pentachlorophenol | |
| 94 | Phenanthrene | |
| 95 | Phenol | Soxhlet Extraction, Gas Chromatographic Method ^(11,23) |
| 96 | Pyrene | Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,27) |
| 97 | Selenium | Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^(7,21) |
| 98 | Silver | 1) Digestion, Flame Atomic Absorption Spectrometric Method ^(7,15) 2) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^(7,16) 3) Digestion, Inductively Coupled Plasma Method ^(7,14) |
| 99 | Styrene | Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,26) |


100 1,1,2,2-Tetrachloroethane...

| ลำดับที่ | สารเคมี | วิธีวิเคราะห์ |
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| 100 | 1,1,2,2-Tetrachloroethane | Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,26) |
| 101 | Tetrachloroethylene | Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,26) |
| 102 | Toluene | Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,26) |
| 103 | Toxaphene | Soxhlet Extraction, Gas Chromatographic Method ^(1,12,24) |
| 104 | TPH (C ₅ -C ₉) | Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,26) |
| 105 | TPH (C ₈ -C ₁₆) | Soxhlet Extraction, Gas Chromatographic Method ^(1,12,22) |
| 106 | TPH (C ₁₆ -C ₃₅) | Soxhlet Extraction, Gas Chromatographic Method ^(1,12,22) |
| 107 | 1,2,4-Trichlorobenzene | Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,26) |
| 108 | 1,1,1-Trichloroethane | Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,26) |
| 109 | 1,1,2-Trichloroethane | Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,26) |
| 110 | Trichloroethylene | Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,26) |
| 111 | 2,4,5-Trichlorophenol | Soxhlet Extraction, Gas Chromatographic Method ^(1,12,23) |
| 112 | 2,4,6-Trichlorophenol | Soxhlet Extraction, Gas Chromatographic Method ^(1,12,23) |
| 113 | 1,3,5-Trimethylbenzene | Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,26) |
| 114 | Vanadium | 1) Digestion, Flame Atomic Absorption Spectrometric Method ^(7,15) 2) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^(7,16) 3) Digestion, Inductively Coupled Plasma Method ^(7,14) |
| 115 | Vinyl acetate | Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,26) |
| 116 | Vinyl chloride | Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,26) |
| 117 | m-Xylene | Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,26) |
| 118 | o-Xylene | Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,26) |
| 119 | p-Xylene | Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,26) |

120 Xylene (Total)

| ลำดับที่ | สารเคมี | วิธีวิเคราะห์ |
|----------|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 120 | Xylene (Total) | Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,26) |
| 121 | Zinc | 1) Digestion, Flame Atomic Absorption Spectrometric Method ^(7,15) 2) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^(7,16) 3) Digestion, Inductively Coupled Plasma Method ^(7,14) |

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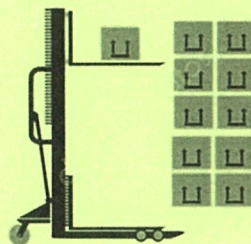
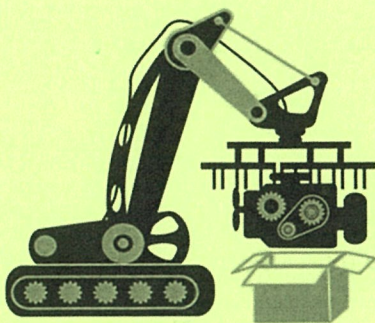
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ภาคผนวก ฉ

ใบอนุญาตเป็นผู้ตรวจวัดและวิเคราะห์สภาวะการทำงานเกี่ยวกับ
ความร้อน แสงสว่าง เสียง และสารเคมีอันตรายในบรรยากาศ





กรมสวัสดิการและคุ้มครองแรงงาน

ใบออกใบ

เป็นผู้ให้บริการตรวจวัดระดับความเข้มข้นของสารเคมีอันตราย

ในบรรยากาศของสถานที่ทำงาน และสถานที่เก็บรักษาวัสดุอันตราย

ใบอนุญาตเลขที่ ๐๒๐๑-๐๓-๒๕๖๔-๐๐๐๓

อนุญาตให้.....บริษัท เทคโนโลยีสิ่งแวดล้อมไทย จำกัด

เลขทะเบียนนิติบุคคล.....๐๑๒๕๕๓๗๐๐๘๕๗๔

ตั้งอยู่เลขที่ ๑/๖ ซอยรวมคำแหง ๑๔๕ แขวงสะพานสูง เขตสะพานสูง กรุงเทพมหานคร

เป็นนิติบุคคลให้ใช้บริการด้านความปลอดภัย อาชีวอนามัย และสภาพแวดล้อมในการทำงาน ตามกฎกระทรวง กว้านวดมตรฐกในกฎบริหารงาน, จัดการ และดำเนินการด้านความปลอดภัย อาชีวอนามัย และสภาพแวดล้อมในการทำงานเกี่ยวกับสารเคมีอันตราย พ.ศ.๒๕๕๖ ในกรณีที่เป็นผู้ให้บริการตรวจวัดระดับความปลอดภัย อาชีวอนามัย และสภาพแวดล้อมในการทำงาน และสถานที่เก็บรักษาสารเคมีอันตราย ของสารเคมีอันตรายในบรรยากาศของสถานที่ทำงาน และสถานที่เก็บรักษาสารเคมีอันตราย ประกอบกับกฎกระทรวงการขึ้นทะเบียนและการอนุญาตให้บริการเพื่อส่งเสริมความปลอดภัย อาชีวอนามัย และสภาพแวดล้อมในการทำงาน พ.ศ. ๒๕๖๔ แห่งพระราชบัญญัติความปลอดภัย อาชีวอนามัย และสภาพแวดล้อมในการทำงาน พ.ศ. ๒๕๕๕ โดยมีหลักการ จำนวน ๒๒ ข้อ

๑๔ ธันวาคม พ.ศ. ๒๕๖๔ ถึงวันที่ ๑๓ ธันวาคม พ.ศ. ๒๕๖๕

ให้ไว้ ณ วันที่ ๑๕ ธันวาคม พ.ศ. ๒๕๕๕

ผู้ตรวจราชการกรม ปฏิบัติราชการแทน
อธิบดีกรมสวัสดิการและคุ้มครองแรงงาน

รายชื่อบุคลากรแนบท้ายใบอนุญาต

เป็นนิติบุคคลให้บริการสร้างระดับความเข้มข้นของสารเคมีอันตรายในบรรยากาศของสถานทำงาน

และสถานที่เก็บรักษาสารเคมีอันตราย

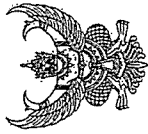
ของบริษัท เทคโนโลยีสิ่งแวดล้อมไทย จำกัด

ใบอนุญาติเลขที่ ๐๒๐๑-๐๓-๒๕๖๕-๐๐๐๓

วันที่ ๑๔ ธันวาคม พ.ศ. ๒๕๖๕ ถึงวันที่ ๑๓ มกราคม พ.ศ. ๒๕๖๖

ไฟว์ ณ วันที่ ๑๔ ธันวาคม พ.ศ. ๒๕๖๕

ผู้ตรวจราชการกรม ปฏิบัติราชการแทน
อธิบดีกรมสวัสดิการและคุ้มครองแรงงาน



แบบ ก.ก.บญ
ร.ค.คคค

กรมสวัสดิการและคุ้มครองแรงงาน

ใบอนุญาต

เป็นผู้ใช้บริการวิเคราะห์ระดับความเข้มข้นของสารเคมีอันตราย
ในบรรยากาศของสถานที่ทำงาน และสถานที่เก็บรักษาสารเคมีอันตราย

ใบอนุญาตเลขที่ ๑๒๐๒๖-๐๓๖-๒๕๖๔-๐๑๐๓

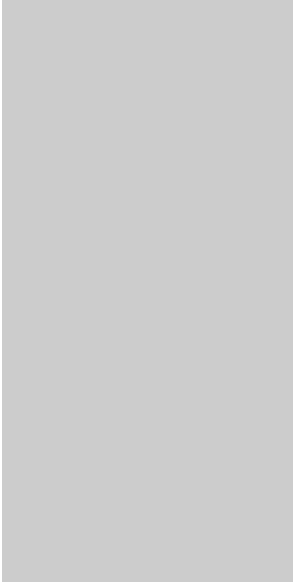
อนุญาตให้.....บริษัท เทคโนโลยีสิ่งแวดล้อมไทย จำกัด.....
เลขทะเบียนนิติบุคคล.....๐๑๒๕๕๕๙๙๐๙๕๙๑๑.....
ตั้งอยู่เลขที่ ๑/๖ ซอยรามคำแหง ๓๔๕ แขวงสะพานสูง เขตสะพานสูง กรุงเทพมหานคร.....
เป็นนิติบุคคลผู้ให้บริการด้านความปลอดภัย อาชีวอนามัย และสภาพแวดล้อมในการทำงาน ตามกฎหมายว่าด้วย
กฎหมายว่าด้วยความปลอดภัย อาชีวอนามัย และสภาพแวดล้อมในการทำงาน พ.ศ. ๒๕๕๖ ในการเป็นผู้ให้บริการตรวจวัดและวิเคราะห์ระดับความ
เข้มข้นของสารเคมีอันตรายในบรรยากาศของสถานที่ทำงาน และสถานที่เก็บรักษาสารเคมีอันตราย
ประกอบกับกฎกระทรวงกำหนดการอนุญาตให้บริการเพื่อส่งเสริมความปลอดภัย อาชีวอนามัย
และสภาพแวดล้อมในการทำงาน พ.ศ. ๒๕๖๔ แห่งพระราชบัญญัติความปลอดภัย อาชีวอนามัย
และสภาพแวดล้อมในการทำงาน พ.ศ. ๒๕๕๔ โดยมีบุคลากรหรือวิทยากร จำนวน ๘ ราย

ทั้งนี้ ตั้งแต่วันที่ ๑๔ ธันวาคม พ.ศ. ๒๕๖๔ ถึงวันที่ ๑๓ ธันวาคม พ.ศ. ๒๕๖๗

ให้ไว้ ณ วันที่ ๑๔ ธันวาคม พ.ศ. ๒๕๖๔

ผู้ตรวจราชการกรม ปฏิบัติราชการแทน
อธิบดีกรมสวัสดิการและคุ้มครองแรงงาน

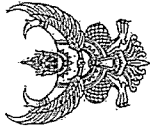
รายชื่อบุคลากรแบบท้ายใบอนุญาต
เป็นนิติบุคคลผู้ให้บริการวิเคราะห์ระดับความเข้มข้นของสารเคมีอันตรายในบรรยากาศของสถานที่ทำงาน
และสถานที่เก็บรักษาสารเคมีอันตราย
ของ บริษัท เทคโนโลยีสิ่งแวดล้อมไทย จำกัด
ใบอนุญาตเลขที่ ๑๒๐๒๖-๐๓๖-๒๕๖๔-๐๑๐๓



ทั้งนี้ ตั้งแต่วันที่ ๑๔ ธันวาคม พ.ศ. ๒๕๖๔ ถึงวันที่ ๑๓ ธันวาคม พ.ศ. ๒๕๖๗

ให้ไว้ ณ วันที่ ๑๔ ธันวาคม พ.ศ. ๒๕๖๔

ผู้ตรวจราชการกรม ปฏิบัติราชการแทน
อธิบดีกรมสวัสดิการและคุ้มครองแรงงาน



แบบ กบ.บญ
ฉ.1/คส

กรมสวัสดิการและคุ้มครองแรงงาน

ใบอนุญาต

เป็นผู้ให้บริการตรวจวัดและวิเคราะห์สภาพการทำงานเกี่ยวกับระดับความร้อน

ใบอนุญาตเลขที่ ๐๔๐๑-๐๓-๒๕๖๕-๐๐๐๓

อนุญาตให้.....บริษัท เทคโนโลยีสิ่งแวดล้อมไทย จำกัด.....

เลขทะเบียนนิติบุคคล.....๐๑๒๕๕๗๗๐๔๕๗๘.....
ตั้งอยู่เลขที่ ๑๔/๖ ซอยร่มไผ่แฉ่ง ๑๔๕ แขวงสะพานสูง เขตสะพานสูง กรุงเทพมหานคร
เป็นนิติบุคคลผู้ให้บริการด้านความปลอดภัย อาชีวอนามัย และสภาพแวดล้อมในการทำงาน ตามกฎหมายว่าด้วย
กฎหมายว่าด้วยโรงงานในกรณีนี้ให้บริษัท เทคโนโลยีสิ่งแวดล้อมไทย จำกัด (มหาชน) ดำเนินการตรวจวัดและวิเคราะห์
ในกระบวนการดำเนินงานเกี่ยวกับระดับความร้อน แสงสว่าง และเสียง พ.ศ. ๒๕๕๙ ในกรณีตรวจวัดและวิเคราะห์
สภาวะแวดล้อมที่เกี่ยวข้องกับระดับความร้อน ประกอบกับกฎกระทรวงการขึ้นทะเบียนและการอนุญาตให้บริการ
เพื่อส่งเสริมความปลอดภัย อาชีวอนามัย และสภาพแวดล้อมในการทำงาน พ.ศ. ๒๕๖๔ แห่งพระราชบัญญัติ
ความปลอดภัย อาชีวอนามัย และสภาพแวดล้อมในการทำงาน พ.ศ. ๒๕๕๔ โดยมีบุคลากร จำนวน ๕ ราย

ทั้งนี้ ตั้งแต่วันที่ ๑๔ ธันวาคม พ.ศ. ๒๕๖๔ ถึงวันที่ ๑๓ ธันวาคม พ.ศ. ๒๕๖๗

ให้ไว้ ณ วันที่ ๑๔ ธันวาคม พ.ศ. ๒๕๖๔

ผู้ตรวจราชการกรม ปฏิบัติราชการแทน
อธิบดีกรมสวัสดิการและคุ้มครองแรงงาน

รายชื่อบุคลากรแนบท้ายใบอนุญาต
เป็นผู้ให้บริการตรวจวัดและวิเคราะห์สภาพการทำงานเกี่ยวกับความร้อน
ของบริษัท เทคโนโลยีสิ่งแวดล้อมไทย จำกัด
ใบอนุญาตเลขที่ ๐๔๐๑-๐๓-๒๕๖๕-๐๐๐๓

ทั้งนี้ ตั้งแต่วันที่ ๑๔ ธันวาคม พ.ศ. ๒๕๖๔ ถึงวันที่ ๑๓ ธันวาคม พ.ศ. ๒๕๖๗

ให้ไว้ ณ วันที่ ๑๔ ธันวาคม พ.ศ. ๒๕๖๔

ผู้ตรวจราชการกรม ปฏิบัติราชการแทน
อธิบดีกรมสวัสดิการและคุ้มครองแรงงาน



แบบ กอ.บญ
จัดชุดล

กรมสวัสดิการและคุ้มครองแรงงาน

ใบอนุญาต

เป็นผู้ให้บริการตรวจวัดและวิเคราะห์ผลการทำงานเกี่ยวกับระดับเสียง

ใบอนุญาตเลขที่ ๐๔๐๓-๐๓-๒๕๖๔-๐๐๑๓

อนุญาตให้.....บริษัท.....บริษัท.....บริษัท.....
เลขทะเบียนนิติบุคคล.....๐๑๒๕๕๕๐๐๘๕๗๓.....
ตั้งอยู่ เลขที่ ๑/๖ หมู่ ๕ ตำบล ๑๕๕ หมู่ ๕ ตำบล ๑๕๕ หมู่ ๕ ตำบล ๑๕๕
เป็นนิติบุคคลผู้ให้บริการด้านความปลอดภัย อาชีวอนามัย และสภาพแวดล้อมในการทำงาน ตามกฎหมาย
กำหนดมาตรฐานในการบริหาร การ จัดการ และดำเนินการด้านความปลอดภัย อาชีวอนามัย และสภาพแวดล้อม
ในการดำเนินงานเกี่ยวกับความเสี่ยง ประเมินความเสี่ยง และความเสี่ยง พ.ศ. ๒๕๕๕ ในการตรวจวัดและวิเคราะห์ผลการ
ทำงานเกี่ยวกับระดับเสียง ประกอบกับกฎกระทรวงการขึ้นทะเบียนและการอนุญาตให้บริการ เพื่อส่งเสริมความ
ปลอดภัย อาชีวอนามัย และสภาพแวดล้อมในการทำงาน พ.ศ. ๒๕๖๔ แห่งพระราชบัญญัติความปลอดภัย
อาชีวอนามัย และสภาพแวดล้อมในการทำงาน พ.ศ. ๒๕๕๔ โดยมีผลการ จำนวน ๕ ราย

ทั้งนี้ ตั้งแต่วันที่ ๑๔ ธันวาคม พ.ศ. ๒๕๖๔ ถึงวันที่ ๑๓ ธันวาคม พ.ศ. ๒๕๖๗

ให้ไว้ ณ วันที่ ๑๔ ธันวาคม พ.ศ. ๒๕๖๔

ผู้ตรวจราชการกรม ปฏิบัติราชการแทน
อธิบดีกรมสวัสดิการและคุ้มครองแรงงาน

รายชื่อบุคลากรแบบท้ายใบอนุญาต
เป็นนิติบุคคลผู้ให้บริการตรวจวัดและวิเคราะห์ผลการทำงานเกี่ยวกับเสียง
ของบริษัท เทคโนโลยีสิ่งแวดล้อมไทย จำกัด
ใบอนุญาตเลขที่ ๐๔๐๓-๐๓-๒๕๖๔-๐๐๑๓

ทั้งนี้ ตั้งแต่วันที่ ๑๔ ธันวาคม พ.ศ. ๒๕๖๔ ถึงวันที่ ๑๓ ธันวาคม พ.ศ. ๒๕๖๗

ให้ไว้ ณ วันที่ ๑๔ ธันวาคม พ.ศ. ๒๕๖๔

ผู้ตรวจราชการกรม ปฏิบัติราชการแทน
อธิบดีกรมสวัสดิการและคุ้มครองแรงงาน



ใบอนุญาตเลขที่ ๐๕๐๒-๐๓-๒๕๖๔-๐๐๐๓

[illegible]

วันที่ ๑๔ ธันวาคม พ.ศ. ๒๕๖๔ ถึงวันที่ ๑๗ ธันวาคม พ.ศ. ๒๕๖๔

ให้ไว้ ณ วันที่ ๑๔ ธันวาคม พ.ศ. ๒๕๖๔

ผู้ตรวจราชการกรม ปฏิบัติราชการแทน
อธิบดีกรมสวัสดิการและคุ้มครองแรงงาน

รายชื่อบุคลากรในหน่วยในอนุญาโต
เป็นนิติบุคคลให้บริการตรวจวิเคราะห์ผลการทางานเกี่ยวกับแหล่งวาง
ของบริษัท เทคโนโลยีสิ่งแวดล้อมไทย จำกัด
ใบอนุญาตเลขที่ ๐๔๐๖-๐๓-๒๕๖๕-๐๐๓

ทั้งนี้ ตั้งแต่วันที่ ๑๔ ธันวาคม พ.ศ. ๒๕๖๔ ถึงวันที่ ๑๓ ธันวาคม พ.ศ. ๒๕๖๕

ให้ไว้ ณ วันที่ ๑๔ ธันวาคม พ.ศ. ๒๕๖๔

ผู้ตรวจราชการกรม ปฏิบัติราชการแทน
อธิบดีกรมสวัสดิการและคุ้มครองแรงงาน