



**เอกสารแนบ 16**  
**เอกสารอนุญาตห้องปฏิบัติการ**



ที่ อก ๐๓๐๑(๑)/ ๖ ๒ ๕ ๕ ,

กรมโรงงานอุตสาหกรรม  
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท  
เขตราชเทวี กรุงเทพฯ ๑๐๕๐๐

๒๕ กรกฎาคม ๒๕๖๔

เรื่อง ต่ออายุหนังสือรับทะเบียนห้องปฏิบัติการวิเคราะห์และชนิดสารเคมีของห้องปฏิบัติการวิเคราะห์เอกชน  
เรียน กรรมการผู้จัดการ บริษัท เอสดี เอ็นไวเทค จำกัด  
อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารเคมีของห้องปฏิบัติการวิเคราะห์เอกชน  
ลงวันที่ ๑๙ พฤษภาคม ๒๕๖๔

สิ่งที่ส่งมาด้วย ๑. รายชื่อผู้ควบคุมห้องปฏิบัติการวิเคราะห์เอกชน จำนวน ๒๗ ราย

๒. รายชื่อเจ้าหน้าที่ห้องปฏิบัติการวิเคราะห์เอกชน จำนวน ๔๐ ราย

๓. ขอบข่ายสารเคมีที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม

ตามคำขอที่อ้างถึง บริษัท เอสดี เอ็นไวเทค จำกัด ขอต่ออายุหนังสือรับขึ้นทะเบียน  
ห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ๖-๑๕๒ สลганที่ดังเลขที่ ๖ ขอยกมาวงกว้าง ๕ ตำบลบางเขน  
อำเภอเมืองนนทบุรี จังหวัดนนทบุรี ต่อกรมโรงงานอุตสาหกรรม นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้บริษัท เอสดี เอ็นไวเทค จำกัด จำกัด ต่ออายุหนังสือ  
รับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน โดยมีองค์ประกอบดังนี้

- ก. ผู้ควบคุมห้องปฏิบัติการวิเคราะห์เอกชน จำนวน ๒๗ ราย ตามสิ่งที่ส่งมาด้วย ๑
- ข. เจ้าหน้าที่ห้องปฏิบัติการวิเคราะห์เอกชน จำนวน ๔๐ ราย ตามสิ่งที่ส่งมาด้วย ๒
- ค. ขอบข่ายชนิดสารเคมีที่ได้รับขึ้นทะเบียนให้วิเคราะห์ในน้ำ/น้ำเสีย น้ำใต้ดิน อากาศเสีย  
สิ่งปฏิกูลหรือวัสดุที่ไม่ใช้แล้ว และดิน ตามสิ่งที่ส่งมาด้วย ๓

หนังสือฉบับนี้จะสลับอายุในวันที่ ๕ กรกฎาคม ๒๕๖๔ หากประสงค์ต่ออายุหนังสือรับขึ้น  
ทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ให้ยื่นคำขอต่ออายุพร้อมเอกสารประกอบคำต่อกรมโรงงานอุตสาหกรรม  
ภายใน ๖๐ วัน ก่อนวันสิ้นสุดอายุของหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

ผู้อำนวยการวิจัยและพัฒนากลุ่มพืชไร่  
บุรีศรีราชทานพบน้องส้มโรงงานอุตสาหกรรม

กองวิจัยและพัฒนากลุ่มพืชไร่โรงงาน  
กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบพืชและทะเบียนห้องปฏิบัติการ  
โทร. ๐ ๒๕๓๐ ๖๓๑๒ ต่อ ๒๑๐๓-๕  
โทรสาร ๐ ๒๕๓๐ ๖๓๑๒ ต่อ ๒๑๕๔  
ไปรษณีย์อิเล็กทรอนิกส์ saraban@diw.mail.go.th



“อุตสาหกรรมก้าวไกล ประเทศไทยก้าวหน้า ร่วมกันพัฒนา อุตสาหกรรมสีเขียว”



ที่ อก ๐๓๑๐(๑)/๘๐ ๑ ๒



กรมโรงงานอุตสาหกรรม  
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท  
เขตราชเทวี กรุงเทพฯ ๑๐๔๐๐

## ๒๖ กันยายน ๒๕๖๔

เรื่อง ยกเลิกบุคลากรของห้องปฏิบัติการวิเคราะห์  
เรียน กรรมการผู้จัดการ บริษัท เซลส์ แอนด์ เอ็นไวเทค จำกัด  
อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารเคมีของห้องปฏิบัติการวิเคราะห์เอกชน  
ลงวันที่ ๑๖ กันยายน ๒๕๖๔

ตามคำขอที่อ้างถึง บริษัท เซลส์ แอนด์ เอ็นไวเทค จำกัด ห้องปฏิบัติการวิเคราะห์เอกชน  
เลขทะเบียน ๖-๑๕๒ สถานที่ตั้งเลขที่ ๖ ซอยงามวงศ์วาน ๕ ตำบลบางเขน อำเภอเมืองนนทบุรี จังหวัดนนทบุรี  
ขอยกเลิกบุคลากร ความละเอียดแจ้งแล้ว นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้ยกเลิกผู้ควบคุมห้องปฏิบัติการวิเคราะห์เอกชน  
จำนวน ๑ ราย ได้แก่ นางสาวฉัตรวิ ฝัดเหว้ม ทะเบียนเลขที่ ๖-๑๕๒-ค-๐๐๑๐๐

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ



ผู้อำนวยการวิจัยและพัฒนาระบบโรงงาน  
ปฏิบัติการตามแผนงานด้านโรงงานอุตสาหกรรม

กองวิจัยและเตือนภัยมลพิษโรงงาน

กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบและทะเบียนห้องปฏิบัติการ

โทร. ๐ ๒๔๓๐ ๖๓๑๒ ต่อ ๒๑๐๓-๕

โทรสาร ๐ ๒๔๓๐ ๖๓๑๒ ต่อ ๒๑๙๔

ไปรษณีย์อิเล็กทรอนิกส์ saraban@dlw.mail.go.th



“อุตสาหกรรมก้าวไกล ประเทศไทยก้าวหน้า ร่วมกันพัฒนา อุตสาหกรรมสีเขียว”



๓๖)  
๓๗)  
๓๘)  
๓๙)  
๔๐)

ทะเบียนเลขที่ ๖-๑๕๒-จ-๐๐๔๕  
ทะเบียนเลขที่ ๖-๑๕๒-จ-๐๐๔๖  
ทะเบียนเลขที่ ๖-๑๕๒-จ-๐๐๔๗  
ทะเบียนเลขที่ ๖-๑๕๒-จ-๐๐๔๘  
ทะเบียนเลขที่ ๖-๑๕๒-จ-๐๐๔๙



เอกสารแนบท้ายหนังสือต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน  
บริษัท เฮอร์ แอนด์ เอ็นไวเทค จำกัด  
ที่ อท ๐๓๐(๑)/ ๒๒๕๕ ลงวันที่ ๒๕ กรกฎาคม ๒๕๖๕

ขอช่วยสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๑๐๗ รายการ  
แนบท้ายเสีย จำนวน ๒๗ รายการ

| ลำดับที่ | สารมลพิษ                | วิธีวิเคราะห์                                                                                                                                            |
|----------|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| 16       | Nickel                  | 1) Digestion, Flame Atomic Absorption Spectrometric Method <sup>(4)</sup><br>2) Digestion, Inductively Coupled Plasma Method <sup>(4)</sup>              |
| 17       | Oil & Grease            | 1) Liquid-Liquid, Partition-Gravimetric Method <sup>(4)</sup><br>2) Soxhlet Extraction Method <sup>(4)</sup>                                             |
| 18       | pH                      | Electrometric Method <sup>(4)</sup>                                                                                                                      |
| 19       | Phenols                 | Distillation, Direct Photometric Method <sup>(4)</sup>                                                                                                   |
| 20       | Selenium                | 1) Digestion, Hydride Generation Atomic Absorption Spectrometric Method <sup>(4)</sup><br>2) Digestion, Inductively Coupled Plasma Method <sup>(4)</sup> |
| 21       | Sulfide                 | 1) Iodometric Method <sup>(4)</sup><br>2) Methylene Blue Method <sup>(4)</sup>                                                                           |
| 22       | Temperature             | Laboratory and Field Methods <sup>(4)</sup>                                                                                                              |
| 23       | Total Dissolved Solids  | Dried at 180 °C <sup>(4)</sup>                                                                                                                           |
| 24       | Total Kjeldahl Nitrogen | 1) Macro-Kjeldahl Method <sup>(4)</sup><br>2) Semi-Micro-Kjeldahl Method <sup>(4)</sup>                                                                  |
| 25       | Total Suspended Solids  | Dried from 103 to 105 °C <sup>(4)</sup>                                                                                                                  |
| 26       | Trivalent Chromium      | Calculation <sup>(4)</sup>                                                                                                                               |
| 27       | Zinc                    | 1) Digestion, Flame Atomic Absorption Spectrometric Method <sup>(4)</sup><br>2) Digestion, Inductively Coupled Plasma Method <sup>(4)</sup>              |

น้ำได้ดิน จำนวน 19 รายการ

| ลำดับที่ | สารมลพิษ | วิธีวิเคราะห์                                                                                                                                                                                                                     |
|----------|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1        | Aluminum | 1) Digestion, Flame Atomic Absorption Spectrometric Method <sup>(4)</sup><br>2) Digestion, Inductively Coupled Plasma Method <sup>(4)</sup><br>3) Digestion, Electrothermal Atomic Absorption Spectrometric Method <sup>(4)</sup> |
| 2        | Antimony | 1) Digestion, Flame Atomic Absorption Spectrometric Method <sup>(4)</sup><br>2) Digestion, Inductively Coupled Plasma Method <sup>(4)</sup><br>3) Digestion, Electrothermal Atomic Absorption Spectrometric Method <sup>(4)</sup> |

3 Arsenic...

| ลำดับที่ | สารมลพิษ                  | วิธีวิเคราะห์                                                                                                                                                                                            |
|----------|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1        | Arsenic                   | 1) Digestion, Hydride Generation Atomic Absorption Spectrometric Method <sup>(4)</sup><br>2) Digestion, Inductively Coupled Plasma Method <sup>(4)</sup>                                                 |
| 2        | Barium                    | 1) Digestion, Flame Atomic Absorption Spectrometric Method <sup>(4)</sup><br>2) Digestion, Inductively Coupled Plasma Method <sup>(4)</sup>                                                              |
| 3        | Biochemical Oxygen Demand | 1) 5-Day BOD Test, Azide Modification Method <sup>(4)</sup><br>2) 5-Day BOD Test, Membrane-Electrode Method <sup>(4)</sup>                                                                               |
| 4        | Cadmium                   | 1) Digestion, Flame Atomic Absorption Spectrometric Method <sup>(4)</sup><br>2) Digestion, Inductively Coupled Plasma Method <sup>(4)</sup>                                                              |
| 5        | Chemical Oxygen Demand    | 1) Closed Reflux, Titrimetric Method <sup>(4)</sup><br>2) Open Reflux Method <sup>(4)</sup>                                                                                                              |
| 6        | Chromium                  | 1) Digestion, Flame Atomic Absorption Spectrometric Method <sup>(4)</sup><br>2) Digestion, Inductively Coupled Plasma Method <sup>(4)</sup>                                                              |
| 7        | Color                     | ADMI Weighted-Ordinate Spectrophotometric Method <sup>(4)</sup>                                                                                                                                          |
| 8        | Copper                    | 1) Digestion, Flame Atomic Absorption Spectrometric Method <sup>(4)</sup><br>2) Digestion, Inductively Coupled Plasma Method <sup>(4)</sup>                                                              |
| 9        | Cyanide                   | Total Cyanide after Distillation, Colorimetric Method <sup>(4)</sup><br>Distillation, Colorimetric Method <sup>(2)</sup><br>DPD Colorimetric Method <sup>(4)</sup><br>Colorimetric Method <sup>(4)</sup> |
| 10       | Formaldehyde              | 1) Digestion, Flame Atomic Absorption Spectrometric Method <sup>(4)</sup><br>2) Digestion, Inductively Coupled Plasma Method <sup>(4)</sup>                                                              |
| 11       | Free Chlorine             | 1) Digestion, Flame Atomic Absorption Spectrometric Method <sup>(4)</sup><br>2) Digestion, Inductively Coupled Plasma Method <sup>(4)</sup>                                                              |
| 12       | Hexavalent Chromium       | 1) Digestion, Flame Atomic Absorption Spectrometric Method <sup>(4)</sup><br>2) Digestion, Inductively Coupled Plasma Method <sup>(4)</sup>                                                              |
| 13       | Lead                      | 1) Digestion, Flame Atomic Absorption Spectrometric Method <sup>(4)</sup><br>2) Digestion, Inductively Coupled Plasma Method <sup>(4)</sup>                                                              |
| 14       | Manganese                 | 1) Digestion, Flame Atomic Absorption Spectrometric Method <sup>(4)</sup><br>2) Digestion, Inductively Coupled Plasma Method <sup>(4)</sup>                                                              |
| 15       | Mercury                   | Digestion, Cold-Vapor Atomic Absorption Spectrometric Method <sup>(4)</sup>                                                                                                                              |

๑๖

16 Nickel...

| ลำดับที่ | สารมลพิษ  | วิธีวิเคราะห์                                                                                                                                                                                                                     |
|----------|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12       | Lead      | 1) Digestion, Flame Atomic Absorption Spectrometric Method <sup>(4)</sup><br>2) Digestion, Inductively Coupled Plasma Method <sup>(4)</sup><br>3) Digestion, Electrothermal Atomic Absorption Spectrometric Method <sup>(4)</sup> |
| 13       | Manganese | 1) Digestion, Flame Atomic Absorption Spectrometric Method <sup>(4)</sup><br>2) Digestion, Inductively Coupled Plasma Method <sup>(4)</sup><br>3) Digestion, Electrothermal Atomic Absorption Spectrometric Method <sup>(4)</sup> |
| 14       | Mercury   | Digestion, Cold-Vapor Atomic Absorption Spectrometric Method <sup>(4)</sup>                                                                                                                                                       |
| 15       | Nickel    | 1) Digestion, Flame Atomic Absorption Spectrometric Method <sup>(4)</sup><br>2) Digestion, Inductively Coupled Plasma Method <sup>(4)</sup><br>3) Digestion, Electrothermal Atomic Absorption Spectrometric Method <sup>(4)</sup> |
| 16       | pH        | Electrometric Method <sup>(4)</sup>                                                                                                                                                                                               |
| 17       | Selenium  | 1) Digestion, Flame Atomic Absorption Spectrometric Method <sup>(4)</sup><br>2) Digestion, Inductively Coupled Plasma Method <sup>(4)</sup><br>3) Digestion, Electrothermal Atomic Absorption Spectrometric Method <sup>(4)</sup> |
| 18       | Silver    | 1) Digestion, Flame Atomic Absorption Spectrometric Method <sup>(4)</sup><br>2) Digestion, Inductively Coupled Plasma Method <sup>(4)</sup><br>3) Digestion, Electrothermal Atomic Absorption Spectrometric Method <sup>(4)</sup> |
| 19       | Zinc      | 1) Digestion, Flame Atomic Absorption Spectrometric Method <sup>(4)</sup><br>2) Digestion, Inductively Coupled Plasma Method <sup>(4)</sup><br>3) Digestion, Electrothermal Atomic Absorption Spectrometric Method <sup>(4)</sup> |

อากาศเสีย...

| ลำดับที่ | สารมลพิษ       | วิธีวิเคราะห์                                                                                                                                                                                                                                  |
|----------|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3        | Arsenic        | 1) Digestion, Electrothermal Atomic Absorption Spectrometric Method <sup>(4)</sup><br>2) Digestion, Hydride Generation Atomic Absorption Spectrometric Method <sup>(4)</sup><br>3) Digestion, Inductively Coupled Plasma Method <sup>(4)</sup> |
| 4        | Barium         | 1) Digestion, Flame Atomic Absorption Spectrometric Method <sup>(4)</sup><br>2) Digestion, Inductively Coupled Plasma Method <sup>(4)</sup><br>3) Digestion, Electrothermal Atomic Absorption Spectrometric Method <sup>(4)</sup>              |
| 5        | Beryllium      | 1) Digestion, Flame Atomic Absorption Spectrometric Method <sup>(4)</sup><br>2) Digestion, Inductively Coupled Plasma Method <sup>(4)</sup><br>3) Digestion, Electrothermal Atomic Absorption Spectrometric Method <sup>(4)</sup>              |
| 6        | Cadmium        | 1) Digestion, Flame Atomic Absorption Spectrometric Method <sup>(4)</sup><br>2) Digestion, Inductively Coupled Plasma Method <sup>(4)</sup><br>3) Digestion, Electrothermal Atomic Absorption Spectrometric Method <sup>(4)</sup>              |
| 7        | Chromium       | 1) Digestion, Flame Atomic Absorption Spectrometric Method <sup>(4)</sup><br>2) Digestion, Inductively Coupled Plasma Method <sup>(4)</sup><br>3) Digestion, Electrothermal Atomic Absorption Spectrometric Method <sup>(4)</sup>              |
| 8        | Chromium (III) | Calculation <sup>(4)</sup>                                                                                                                                                                                                                     |
| 9        | Chromium (VI)  | Colorimetric Method <sup>(4)</sup>                                                                                                                                                                                                             |
| 10       | Copper         | 1) Digestion, Flame Atomic Absorption Spectrometric Method <sup>(4)</sup><br>2) Digestion, Inductively Coupled Plasma Method <sup>(4)</sup><br>3) Digestion, Electrothermal Atomic Absorption Spectrometric Method <sup>(4)</sup>              |
| 11       | Iron           | 1) Digestion, Flame Atomic Absorption Spectrometric Method <sup>(4)</sup><br>2) Digestion, Inductively Coupled Plasma Method <sup>(4)</sup><br>3) Digestion, Electrothermal Atomic Absorption Spectrometric Method <sup>(4)</sup>              |

| ลำดับที่ | สารมลพิษ           | วิธีวิเคราะห์                                                                                                                                                                                                                                                                           |
|----------|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 9        | Copper             | 1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>[5]</sup><br>2) Isokinetic Sampling, Digestion, Direct Air-Acetylene Flame Method <sup>[5]</sup>                                                                                                              |
| 10       | Cresol             | Adsorption Sampling, Gas Chromatographic Method <sup>[5]</sup>                                                                                                                                                                                                                          |
| 11       | Hydrogen Chloride  | 1) Absorption Sampling, Ion Chromatographic Method <sup>[5]</sup><br>2) Isokinetic Sampling, Ion Chromatographic Method <sup>[5]</sup>                                                                                                                                                  |
| 12       | Hydrogen Fluoride  | 1) Absorption Sampling, Ion Chromatographic Method <sup>[5]</sup><br>2) Isokinetic Sampling, Ion Chromatographic Method <sup>[5]</sup>                                                                                                                                                  |
| 13       | Hydrogen Sulfide   | Absorption Sampling, Iodometric Method <sup>[5]</sup>                                                                                                                                                                                                                                   |
| 14       | Lead               | 1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>[5]</sup><br>2) Isokinetic Sampling, Digestion, Direct Air-Acetylene Flame Method <sup>[5]</sup>                                                                                                              |
| 15       | Manganese          | 3) Isokinetic Sampling, Digestion, Graphite Furnace Atomic Absorption Spectrometric Method <sup>[5]</sup><br>1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>[5]</sup><br>2) Isokinetic Sampling, Digestion, Direct Air-Acetylene Flame Method <sup>[5]</sup> |
| 16       | Mercury            | Isokinetic Sampling, Digestion, Cold-Vapor Atomic Absorption Spectrometric Method <sup>[5]</sup>                                                                                                                                                                                        |
| 17       | Nickel             | 1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>[5]</sup><br>2) Isokinetic Sampling, Digestion, Direct Air-Acetylene Flame Method <sup>[5]</sup><br>Ringelmann's Method <sup>[1]</sup>                                                                        |
| 18       | Opacity            | Instrumental Analyzer Method <sup>[5]</sup>                                                                                                                                                                                                                                             |
| 19       | Oxides of Nitrogen | 1) Isokinetic Sampling, Digestion, Hydride Generation/Atomic Absorption Spectrometric Method <sup>[5]</sup>                                                                                                                                                                             |
| 20       | Selenium           | 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>[5]</sup>                                                                                                                                                                                                     |

๑๖

3) Isokinetic...

อากาศเสีย (ปล่อยระยะไกล) จำนวน 25 รายการ

| ลำดับที่ | สารมลพิษ        | วิธีวิเคราะห์                                                                                                                                                                                                                                                                                                   |
|----------|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1        | Antimony        | 1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>[5]</sup><br>2) Isokinetic Sampling, Digestion, Direct Air-Acetylene Flame Method <sup>[5]</sup><br>3) Isokinetic Sampling, Digestion, Graphite Furnace Atomic Absorption Spectrometric Method <sup>[5]</sup>                         |
| 2        | Arsenic         | 1) Isokinetic Sampling, Digestion, Hydride Generation/Atomic Absorption Spectrometric Method <sup>[5]</sup><br>2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>[5]</sup><br>3) Isokinetic Sampling, Digestion, Graphite Furnace Atomic Absorption Spectrometric Method <sup>[5]</sup> |
| 3        | Beryllium       | 1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>[5]</sup><br>2) Isokinetic Sampling, Digestion, Direct Air-Acetylene Flame Method <sup>[5]</sup>                                                                                                                                      |
| 4        | Cadmium         | 1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>[5]</sup><br>2) Isokinetic Sampling, Digestion, Direct Air-Acetylene Flame Method <sup>[5]</sup><br>3) Isokinetic Sampling, Digestion, Graphite Furnace Atomic Absorption Spectrometric Method <sup>[5]</sup>                         |
| 5        | Carbon monoxide | Instrumental Analyzer Method <sup>[5]</sup>                                                                                                                                                                                                                                                                     |
| 6        | Chlorine        | 1) Absorption Sampling, Ion Chromatographic Method <sup>[5]</sup><br>2) Isokinetic Sampling, Ion Chromatographic Method <sup>[5]</sup>                                                                                                                                                                          |
| 7        | Chromium        | 1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>[5]</sup><br>2) Isokinetic Sampling, Digestion, Direct Air-Acetylene Flame Method <sup>[5]</sup>                                                                                                                                      |
| 8        | Cobalt          | 1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>[5]</sup><br>2) Isokinetic Sampling, Digestion, Direct Air-Acetylene Flame Method <sup>[5]</sup><br>3) Isokinetic Sampling, Digestion, Graphite Furnace Atomic Absorption Spectrometric Method <sup>[5]</sup>                         |

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9 Copper...

| ลำดับที่ | สารมลพิษ  | วิธีวิเคราะห์                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|----------|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3        | Barium    | 6) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method <sup>(7.11)</sup><br>1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method <sup>(3.6.10)</sup><br>2) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>(3.6.9)</sup><br>3) Waste Extraction, Digestion, Graphite Furnace Atomic Absorption Spectrometric Method <sup>(3.6.11)</sup><br>4) Digestion, Flame Atomic Absorption Spectrometric Method <sup>(7.10)</sup><br>5) Digestion, Inductively Coupled Plasma Method <sup>(7.9)</sup><br>6) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method <sup>(7.11)</sup> |
| 4        | Beryllium | 1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method <sup>(3.6.10)</sup><br>2) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>(3.6.9)</sup><br>3) Waste Extraction, Digestion, Graphite Furnace Atomic Absorption Spectrometric Method <sup>(3.6.11)</sup><br>4) Digestion, Flame Atomic Absorption Spectrometric Method <sup>(7.10)</sup><br>5) Digestion, Inductively Coupled Plasma Method <sup>(7.9)</sup><br>6) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method <sup>(7.11)</sup>                                                                                            |
| 5        | Cadmium   | 1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method <sup>(3.6.10)</sup><br>2) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>(3.6.9)</sup><br>3) Waste Extraction, Digestion, Graphite Furnace Atomic Absorption Spectrometric Method <sup>(3.6.11)</sup><br>4) Digestion, Flame Atomic Absorption Spectrometric Method <sup>(7.10)</sup><br>5) Digestion, Inductively Coupled Plasma Method <sup>(7.9)</sup><br>6) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method <sup>(7.11)</sup>                                                                                            |

6 Chromium...

| ลำดับที่ | สารมลพิษ                    | วิธีวิเคราะห์                                                                                                                                                                                                                          |
|----------|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 21       | Sulfur dioxide              | 3) Isokinetic Sampling, Digestion, Graphite Furnace Atomic Absorption Spectrometric Method <sup>(5)</sup><br>1) Absorption Sampling, Barium-Thorin Titrimetric Method <sup>(5)</sup><br>2) Instrumental Analyzer Method <sup>(5)</sup> |
| 22       | Sulfuric acid               | Isokinetic Sampling, Barium-Thorin Titrimetric Method <sup>(5)</sup>                                                                                                                                                                   |
| 23       | Tin                         | 1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>(5)</sup><br>2) Isokinetic Sampling, Digestion, Direct Air-Acetylene Flame Method <sup>(5)</sup>                                                             |
| 24       | Total Suspended Particulate | Isokinetic Sampling, Gravimetric Method <sup>(5)</sup>                                                                                                                                                                                 |
| 25       | Xylene                      | Absorption Sampling, Gas Chromatographic Method <sup>(5)</sup>                                                                                                                                                                         |

สิ่งปฏิกูลหรือวัสดุที่ไม่ใช้แล้ว จำนวน 17 รายการ

| ลำดับที่ | สารมลพิษ | วิธีวิเคราะห์                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|----------|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1        | Antimony | 1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method <sup>(3.6.10)</sup><br>2) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>(3.6.9)</sup><br>3) Waste Extraction, Digestion, Graphite Furnace Atomic Absorption Spectrometric Method <sup>(3.6.11)</sup><br>4) Digestion, Flame Atomic Absorption Spectrometric Method <sup>(7.10)</sup><br>5) Digestion, Inductively Coupled Plasma Method <sup>(7.9)</sup><br>6) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method <sup>(7.11)</sup> |
| 2        | Arsenic  | 1) Waste Extraction, Digestion, Hydride Generation/Atomic Absorption Spectrometric Method <sup>(3.6.12)</sup><br>2) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>(3.6.9)</sup><br>3) Waste Extraction, Digestion, Graphite Furnace Atomic Absorption Spectrometric Method <sup>(3.6.11)</sup><br>4) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method <sup>(7.12)</sup><br>5) Digestion, Inductively Coupled Plasma Method <sup>(7.9)</sup>                                                                  |

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6 Digestion...

| ลำดับที่ | สารมลพิษ       | วิธีวิเคราะห์                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|----------|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 6        | Chromium       | 1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method <sup>(3.6.10)</sup><br>2) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>(3.6.9)</sup><br>3) Waste Extraction, Digestion, Graphite Furnace Atomic Absorption Spectrometric Method <sup>(3.6.11)</sup><br>4) Digestion, Flame Atomic Absorption Spectrometric Method <sup>(7.10)</sup><br>5) Digestion, Inductively Coupled Plasma Method <sup>(7.9)</sup><br>6) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method <sup>(7.11)</sup><br>Calculation <sup>(3.6.7,8,9,10,11,13)</sup><br>1) Waste Extraction, Colorimetric Method <sup>(3.13)</sup><br>2) Alkaline Digestion, Colorimetric Method <sup>(8.13)</sup><br>1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method <sup>(3.6.10)</sup><br>2) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>(3.6.9)</sup><br>3) Waste Extraction, Digestion, Graphite Furnace Atomic Absorption Spectrometric Method <sup>(3.6.11)</sup><br>4) Digestion, Flame Atomic Absorption Spectrometric Method <sup>(7.10)</sup><br>5) Digestion, Inductively Coupled Plasma Method <sup>(7.9)</sup><br>6) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method <sup>(7.11)</sup><br>1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method <sup>(3.6.10)</sup><br>2) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>(7.9)</sup><br>3) Waste Extraction, Digestion, Graphite Furnace Atomic Absorption Spectrometric Method <sup>(3.6.11)</sup><br>4) Digestion, Flame Atomic Absorption Spectrometric Method <sup>(7.10)</sup><br>5) Digestion, Inductively Coupled Plasma Method <sup>(7.9)</sup><br>6) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method <sup>(7.11)</sup><br>1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method <sup>(3.6.10)</sup><br>2) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>(7.9)</sup><br>3) Waste Extraction, Digestion, Graphite Furnace Atomic Absorption Spectrometric Method <sup>(3.6.11)</sup><br>4) Digestion, Flame Atomic Absorption Spectrometric Method <sup>(7.10)</sup><br>5) Digestion, Inductively Coupled Plasma Method <sup>(7.9)</sup><br>6) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method <sup>(7.11)</sup><br>1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method <sup>(3.6.10)</sup><br>2) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>(7.9)</sup><br>3) Waste Extraction, Digestion, Graphite Furnace Atomic Absorption Spectrometric Method <sup>(3.6.11)</sup><br>4) Digestion, Flame Atomic Absorption Spectrometric Method <sup>(7.10)</sup><br>5) Digestion, Inductively Coupled Plasma Method <sup>(7.9)</sup><br>6) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method <sup>(7.11)</sup> |
| 7        | Chromium (III) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 8        | Chromium (VI)  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 9        | Cobalt         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 10       | Copper         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

11 Lead...

| ลำดับที่ | สารมลพิษ | วิธีวิเคราะห์                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|----------|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 11       | Lead     | 1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method <sup>(3.6.10)</sup><br>2) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>(3.6.9)</sup><br>3) Waste Extraction, Digestion, Graphite Furnace Atomic Absorption Spectrometric Method <sup>(3.6.11)</sup><br>4) Digestion, Flame Atomic Absorption Spectrometric Method <sup>(7.10)</sup><br>5) Digestion, Inductively Coupled Plasma Method <sup>(7.9)</sup><br>6) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method <sup>(7.11)</sup><br>1) Waste Extraction, Digestion, Cold-Vapor Atomic Absorption Spectrometric Method <sup>(3.14)</sup><br>2) Digestion, Cold-Vapor Atomic Absorption Spectrometric Method <sup>(1.5)</sup><br>1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method <sup>(3.6.10)</sup><br>2) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>(3.6.9)</sup><br>3) Waste Extraction, Digestion, Graphite Furnace Atomic Absorption Spectrometric Method <sup>(3.6.11)</sup><br>4) Digestion, Flame Atomic Absorption Spectrometric Method <sup>(7.10)</sup><br>5) Digestion, Inductively Coupled Plasma Method <sup>(7.9)</sup><br>6) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method <sup>(7.11)</sup><br>Electrometric Method <sup>(17.18)</sup><br>1) Waste Extraction, Digestion, Hydride Generation/Atomic Absorption Spectrometric Method <sup>(3.6.16)</sup><br>2) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>(3.6.9)</sup><br>3) Waste Extraction, Digestion, Graphite Furnace Atomic Absorption Spectrometric Method <sup>(3.6.11)</sup><br>4) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method <sup>(7.16)</sup><br>5) Digestion, Inductively Coupled Plasma Method <sup>(7.9)</sup> |
| 12       | Mercury  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 13       | Nickel   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 14       | pH       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 15       | Selenium |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

6) Digestion...

| ลำดับที่ | สารมลพิษ       | วิธีวิเคราะห์                                                                                                                                                                                                                                            |
|----------|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3        | Arsenic        | 1) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method <sup>(7.12)</sup><br>2) Digestion, Inductively Coupled Plasma Method <sup>(7.9)</sup><br>3) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method <sup>(7.11)</sup> |
| 4        | Barium         | 1) Digestion, Flame Atomic Absorption Spectrometric Method <sup>(7.10)</sup><br>2) Digestion, Inductively Coupled Plasma Method <sup>(7.9)</sup><br>3) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method <sup>(7.11)</sup>              |
| 5        | Beryllium      | 1) Digestion, Flame Atomic Absorption Spectrometric Method <sup>(7.10)</sup><br>2) Digestion, Inductively Coupled Plasma Method <sup>(7.9)</sup><br>3) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method <sup>(7.11)</sup>              |
| 6        | Cadmium        | 1) Digestion, Flame Atomic Absorption Spectrometric Method <sup>(7.10)</sup><br>2) Digestion, Inductively Coupled Plasma Method <sup>(7.9)</sup><br>3) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method <sup>(7.11)</sup>              |
| 7        | Chromium       | 1) Digestion, Flame Atomic Absorption Spectrometric Method <sup>(7.10)</sup><br>2) Digestion, Inductively Coupled Plasma Method <sup>(7.9)</sup><br>3) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method <sup>(7.11)</sup>              |
| 8        | Chromium (III) | Calculation <sup>(7.8,9,10,11,13)</sup>                                                                                                                                                                                                                  |
| 9        | Chromium (VI)  | Alkaline Digestion, Colorimetric Method <sup>(8.13)</sup>                                                                                                                                                                                                |
| 10       | Copper         | 1) Digestion, Flame Atomic Absorption Spectrometric Method <sup>(7.10)</sup><br>2) Digestion, Inductively Coupled Plasma Method <sup>(7.9)</sup>                                                                                                         |
| 11       | Iron           | 1) Digestion, Flame Atomic Absorption Spectrometric Method <sup>(7.10)</sup><br>2) Digestion, Inductively Coupled Plasma Method <sup>(7.9)</sup><br>3) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method <sup>(7.11)</sup>              |

12 Lead...

| ลำดับที่ | สารมลพิษ | วิธีวิเคราะห์                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|----------|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 16       | Silver   | 6) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method <sup>(7.11)</sup><br>1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method <sup>(3.6,10)</sup><br>2) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>(3.6,9)</sup><br>3) Waste Extraction, Digestion, Graphite Furnace Atomic Absorption Spectrometric Method <sup>(3.6,11)</sup><br>4) Digestion, Flame Atomic Absorption Spectrometric Method <sup>(7.10)</sup><br>5) Digestion, Inductively Coupled Plasma Method <sup>(7.9)</sup><br>6) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method <sup>(7.11)</sup> |
| 17       | Zinc     | 1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method <sup>(3.6,10)</sup><br>2) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>(3.6,9)</sup><br>3) Waste Extraction, Digestion, Graphite Furnace Atomic Absorption Spectrometric Method <sup>(3.6,11)</sup><br>4) Digestion, Flame Atomic Absorption Spectrometric Method <sup>(7.10)</sup><br>5) Digestion, Inductively Coupled Plasma Method <sup>(7.9)</sup><br>6) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method <sup>(7.11)</sup>                                                                                            |

ดิน จำนวน 19 รายการ

| ลำดับที่ | สารมลพิษ | วิธีวิเคราะห์                                                                                                                                                                                                                               |
|----------|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1        | Aluminum | 1) Digestion, Flame Atomic Absorption Spectrometric Method <sup>(7.10)</sup><br>2) Digestion, Inductively Coupled Plasma Method <sup>(7.9)</sup><br>3) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method <sup>(7.11)</sup> |
| 2        | Antimony | 1) Digestion, Flame Atomic Absorption Spectrometric Method <sup>(7.10)</sup><br>2) Digestion, Inductively Coupled Plasma Method <sup>(7.9)</sup><br>3) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method <sup>(7.11)</sup> |

3 Arsenic...

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16. United...

| ลำดับที่ | สารเคมี   | วิธีวิเคราะห์                                                                                                                                                                                                                                            |
|----------|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12       | Lead      | 1) Digestion, Flame Atomic Absorption Spectrometric Method <sup>(7:10)</sup><br>2) Digestion, Inductively Coupled Plasma Method <sup>(7:9)</sup><br>3) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method <sup>(7:11)</sup>              |
| 13       | Manganese | 1) Digestion, Flame Atomic Absorption Spectrometric Method <sup>(7:10)</sup><br>2) Digestion, Inductively Coupled Plasma Method <sup>(7:9)</sup><br>3) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method <sup>(7:11)</sup>              |
| 14       | Mercury   | Digestion, Cold-Vapor Atomic Absorption Spectrometric Method <sup>(15)</sup>                                                                                                                                                                             |
| 15       | Nickel    | 1) Digestion, Flame Atomic Absorption Spectrometric Method <sup>(7:10)</sup><br>2) Digestion, Inductively Coupled Plasma Method <sup>(7:9)</sup><br>3) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method <sup>(7:11)</sup>              |
| 16       | pH        | Electrometric Method <sup>(18)</sup>                                                                                                                                                                                                                     |
| 17       | Selenium  | 1) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method <sup>(7:10)</sup><br>2) Digestion, Inductively Coupled Plasma Method <sup>(7:9)</sup><br>3) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method <sup>(7:11)</sup> |
| 18       | Silver    | 1) Digestion, Flame Atomic Absorption Spectrometric Method <sup>(7:10)</sup><br>2) Digestion, Inductively Coupled Plasma Method <sup>(7:9)</sup><br>3) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method <sup>(7:11)</sup>              |
| 19       | Zinc      | 1) Digestion, Flame Atomic Absorption Spectrometric Method <sup>(7:10)</sup><br>2) Digestion, Inductively Coupled Plasma Method <sup>(7:9)</sup><br>3) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method <sup>(7:11)</sup>              |

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อุทัย



## เอกสารของกรมสวัสดิการและคุ้มครองแรงงาน

ใบอนุญาต  
เป็นนิติบุคคลผู้ให้บริการตรวจวัดและวิเคราะห์ระดับความเข้มข้นของสารเคมีอันตราย  
ในบรรยากาศของสถานที่ทำงานและสถานที่เก็บรักษาสารเคมีอันตราย



กรมสวัสดิการและคุ้มครองแรงงาน  
ใบอนุญาต

เป็นนิติบุคคลผู้ให้บริการตรวจวัดระดับความเข้มข้นของสารเคมีอันตราย  
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ใบอนุญาตเลขที่ ๑๒๐๑-๐๓-๒๕๖๕-๐๐๕๒

อนุญาตให้...บริษัท เฮลท์ แอนด์ เอ็นไวรอนเม้นท์ จำกัด

เลขทะเบียนนิติบุคคล...๐๑๐๕๕๓๙๐๐๗๙๙๙

ตั้งอยู่เลขที่...๖ ซอยงามวงศ์วาน ๕ ตำบลบางเขน อำเภอเมืองนนทบุรี จังหวัดนนทบุรี

เป็นนิติบุคคลผู้ให้บริการด้านความปลอดภัย อาชีวอนามัย และสภาพแวดล้อมในการทำงาน ตามกฎกระทรวง  
กำหนดมาตรฐานในการบริหาร จัดการ และดำเนินการด้านความปลอดภัย อาชีวอนามัย และสภาพแวดล้อม  
ในการทำงานเกี่ยวกับสารเคมีอันตราย พ.ศ. ๒๕๕๖ ในการตรวจวัดระดับความเข้มข้นของสารเคมีอันตราย  
ในบรรยากาศของสถานที่ทำงานและสถานที่เก็บรักษาสารเคมีอันตราย ประกอบกับกฎกระทรวงการขึ้นทะเบียน  
และการอนุญาตให้บริการเพื่อส่งเสริมความปลอดภัย อาชีวอนามัย และสภาพแวดล้อมในการทำงาน พ.ศ. ๒๕๖๔ โดยมีบุคลากร  
จำนวน ๔๕ ราย และรายการเครื่องมือตรวจวัด จำนวน ๖๖ เครื่อง ดังรายละเอียดแนบท้ายใบอนุญาตนี้

ทั้งนี้ ตั้งแต่วันที่ ๑๔ มิถุนายน พ.ศ. ๒๕๖๘ ถึงวันที่ ๑๓ มิถุนายน พ.ศ. ๒๕๗๑

ให้ไว้ ณ วันที่ ๒๓ พฤษภาคม พ.ศ. ๒๕๖๘



ผู้ตรวจราชการกรม ปฏิบัติราชการแทน  
อธิบดีกรมสวัสดิการและคุ้มครองแรงงาน

รายชื่อบุคลากรแนบท้ายใบอนุญาต  
เป็นนิติบุคคลผู้ให้บริการตรวจวัดระดับความเข้มข้นของสารเคมีอันตรายในบรรยากาศของสถานที่ทำงาน  
และสถานที่เก็บรักษาสารเคมีอันตราย  
ของ บริษัท เฮลท์ แอนด์ เอ็นไวรอนเม้นท์ จำกัด  
ใบอนุญาตเลขที่ ๑๒๐๑-๐๓-๒๕๖๕-๐๐๕๒



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รายชื่อบุคลากร (เพิ่มเติม)

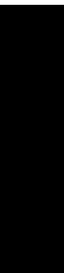
แนบท้ายใบอนุญาตเป็นนิติบุคคลผู้ให้บริการตรวจวัดระดับความเข้มข้นของสารเคมีอันตราย

ในบรรยากาศของสถานที่ทำงานและสถานที่เก็บรักษาสารเคมีอันตราย

ของบริษัท เซลล์ แอนด์ เอ็นไวรอนเม้นท์ จำกัด

ใบอนุญาตเลขที่ ๐๒๐๑-๐๓-๒๕๖๕-๐๐๕๒

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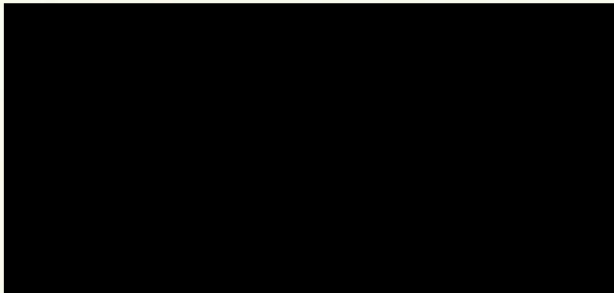
ทั้งนี้ ตั้งแต่วันที่ ๑๓ พฤศจิกายน พ.ศ. ๒๕๖๕ ถึงวันที่ ๑๓ มิถุนายน พ.ศ. ๒๕๖๕

ให้ไว้ ณ วันที่ ๑๓ พฤศจิกายน พ.ศ. ๒๕๖๕



รองอธิบดี ปฏิบัติราชการแทน

อธิบดีกรมสวัสดิการและคุ้มครองแรงงาน



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ทั้งนี้ ตั้งแต่วันที่ ๑๔ มิถุนายน พ.ศ. ๒๕๖๘ ถึงวันที่ ๑๓ มิถุนายน พ.ศ. ๒๕๖๙

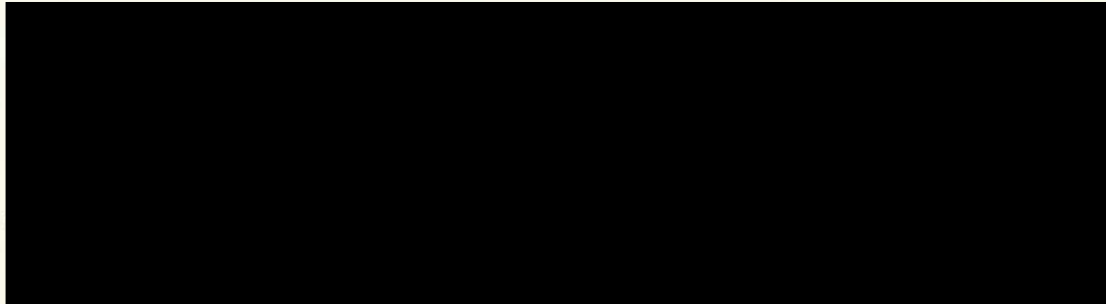
ให้ไว้ ณ วันที่ ๑๓ พฤษภาคม พ.ศ. ๒๕๖๘



ผู้ตรวจราชการกรม ปฏิบัติราชการแทน  
อธิบดีกรมสวัสดิการและคุ้มครองแรงงาน

รายชื่อบุคลากรแนบท้ายใบอนุญาต  
เป็นนิติบุคคลผู้ให้บริการวิเคราะห์ระดับความเข้มข้นของสารเคมีอันตราย  
และสถานที่เก็บรักษาสารเคมีอันตราย  
ของบริษัท เฮลท์ แอนด์ เอ็นไวรอนเม้นท์ จำกัด  
ใบอนุญาตเลขที่ ๐๖๐๒-๐๓-๒๕๖๕-๐๐๓๗

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แบบ กบ.บญ  
นิติบุคคล



กรมสวัสดิการและคุ้มครองแรงงาน  
ใบอนุญาต  
เป็นนิติบุคคลผู้ให้บริการวิเคราะห์ระดับความเข้มข้นของสารเคมีอันตราย  
ในบรรยากาศของสถานที่ทำงานและสถานที่เก็บรักษาสารเคมีอันตราย

ใบอนุญาตเลขที่ ๐๖๐๒-๐๓-๒๕๖๕-๐๐๓๗

อนุญาตให้...บริษัท เฮลท์ แอนด์ เอ็นไวรอนเม้นท์ จำกัด

เลขทะเบียนนิติบุคคล...๐๑๐๕๕๓๙๐๗๙๙๙๙

ตั้งอยู่เลขที่...๖ ซอยงามวงศ์วาน ๕ ตำบลบางเขน อำเภอเมืองนนทบุรี จังหวัดนนทบุรี

เป็นนิติบุคคลผู้ให้บริการด้านความปลอดภัย อาชีวอนามัย และสภาพแวดล้อมในการทำงาน ตามกฎกระทรวง  
กำหนดมาตรฐานในการบริหาร จัดการ และดำเนินการด้านความปลอดภัย อาชีวอนามัย และสภาพแวดล้อม  
ในการทำงานเกี่ยวกับสารเคมีอันตราย พ.ศ. ๒๕๕๖ ในการวิเคราะห์ระดับความเข้มข้นของสารเคมีอันตราย  
ในบรรยากาศของสถานที่ทำงานและสถานที่เก็บรักษาสารเคมีอันตราย ประกอบกับกฎกระทรวงการขึ้นทะเบียน  
และการอนุญาตให้บริการเพื่อส่งเสริมความปลอดภัย อาชีวอนามัย และสภาพแวดล้อมในการทำงาน พ.ศ. ๒๕๖๔  
แห่งพระราชบัญญัติความปลอดภัย อาชีวอนามัย และสภาพแวดล้อมในการทำงาน พ.ศ. ๒๕๕๔ โดยมีบุคลากร  
จำนวน ๕๓ ราย และรายการเครื่องมือวิเคราะห์ จำนวน ๑๒ เครื่อง ดังรายละเอียดแนบท้ายใบอนุญาตนี้

ทั้งนี้ ตั้งแต่วันที่ ๑๔ มิถุนายน พ.ศ. ๒๕๖๘ ถึงวันที่ ๑๓ มิถุนายน พ.ศ. ๒๕๗๑

ให้ไว้ ณ วันที่ ๒๓ พฤษภาคม พ.ศ. ๒๕๖๘



ผู้ตรวจราชการกรม ปฏิบัติราชการแทน  
อธิบดีกรมสวัสดิการและคุ้มครองแรงงาน

รายชื่อบุคลากร (เพิ่มเติม)

แนบท้ายใบอนุญาตเป็นนิติบุคคลให้บริการวิเคราะห์ระดับความเข้มข้นของสารเคมีอันตราย  
ในบรรยากาศของสถานที่ทำงานและสถานที่เก็บรักษาสารเคมีอันตราย

ของบริษัท เฮลท์ แอนด์ เอ็นไวรอนเม้นท์ จำกัด  
ใบอนุญาตเลขที่ ๐๒๐๒-๐๓-๒๕๖๕-๐๐๓๗

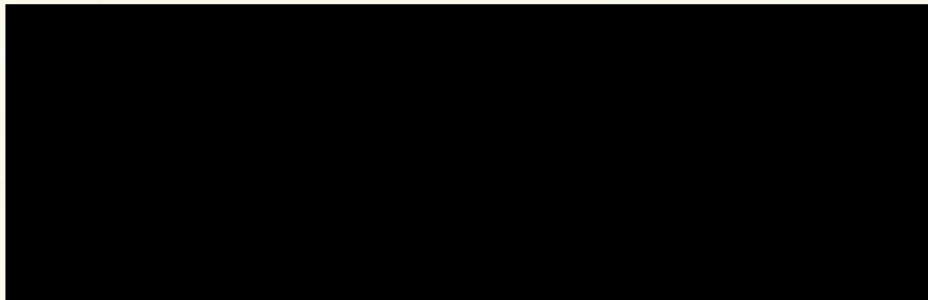
๑. นายณัฐวิธ สุขสิงห์

ตั้งแต่วันที่ ๑๓ พฤศจิกายน พ.ศ. ๒๕๖๘ ถึงวันที่ ๑๓ มิถุนายน พ.ศ. ๒๕๗๑

ให้ไว้ ณ วันที่ ๑๓ พฤศจิกายน พ.ศ. ๒๕๖๘



รองอธิบดี ปฏิบัติราชการแทน  
อธิบดีกรมสวัสดิการและคุ้มครองแรงงาน



ตั้งแต่วันที่ ๑๔ มิถุนายน พ.ศ. ๒๕๖๘ ถึงวันที่ ๑๓ มิถุนายน พ.ศ. ๒๕๗๑

ให้ไว้ ณ วันที่ ๒๓ พฤษภาคม พ.ศ. ๒๕๖๘



ผู้ตรวจราชการกรม ปฏิบัติราชการแทน  
อธิบดีกรมสวัสดิการและคุ้มครองแรงงาน

# ใบรับรองการสอบเทียบเครื่องมือ Calibration



## ENVIR SERVICE CO., LTD. (HEAD OFFICE)

42 Ramintra 14, Yeak 9 Tha Raeng, Bang Khen, Bangkok 10230 Thailand  
Tax ID: 0105555170865 Tel: 02-943-5814-5  
Tel: 02-943-8201 www.envirservice.co.th

## Certificate of Calibration

Method 5 Pre-Test Calibration - Liters (L)

### UUT Meter Console Information

Model #: CAF Express  
Serial #: 09X-5337-63M  
DGM Model #: CHNT G1.6  
DGM Serial #: 00000209

### Calibration Conditions

Bar. Pressure (mm Hg): 757.8  
Ambient Temperature (°C): 25.4  
Relative Humidity (%): 75  
Altitude (m): 1.83  
Bar. Pressure Corr. (mm Hg): 757.6

### Factors/Conversions

Std. Temp. (K): 293.15  
Std. Press. (mm Hg): 760  
K<sub>1</sub> (K/mm Hg): 0.3857

### Reference Equipment

Calibration Meter Model: DGMR-SK25R-QS8  
Cal. Due Date: 18-Apr-25  
Serial No.: A2504177  
Gamma: 1.0000

### UUT Meter (DGM)

### Reference Meter (WTM)

| Run Time (seconds) | Orifice, ΔH (mm H <sub>2</sub> O) | Volume          |                 |                | Meter Temperature (°C) |                 | Meter Pressure (in H <sub>2</sub> O) | Volume (L)      |                 |                | Outlet Temperature (°C) |                 |
|--------------------|-----------------------------------|-----------------|-----------------|----------------|------------------------|-----------------|--------------------------------------|-----------------|-----------------|----------------|-------------------------|-----------------|
|                    |                                   | Initial (L)     | Final (L)       | Total (L)      | Initial                | Final           |                                      | Initial         | Final           | Total          | Initial                 | Final           |
| Θ                  | P <sub>m(g)</sub>                 | V <sub>mi</sub> | V <sub>mf</sub> | V <sub>m</sub> | t <sub>mi</sub>        | t <sub>mf</sub> | P <sub>w</sub>                       | V <sub>wi</sub> | V <sub>wf</sub> | V <sub>w</sub> | t <sub>wi</sub>         | t <sub>wf</sub> |
| 840.00             | 13.00                             | 57.4            | 215.6           | 158.2          | 25.0                   | 25.0            | 0.3                                  | 0.00            | 157.20          | 157.20         | 25.0                    | 25.0            |
| 630.00             | 25.00                             | 215.6           | 380.2           | 164.6          | 25.0                   | 26.0            | 0.5                                  | 0.00            | 163.23          | 163.23         | 25.0                    | 25.0            |
| 450.00             | 50.00                             | 380.2           | 550.0           | 169.8          | 26.0                   | 26.0            | 0.6                                  | 0.00            | 168.25          | 168.25         | 25.0                    | 25.0            |
| 390.00             | 80.00                             | 550.0           | 723.0           | 173.0          | 26.0                   | 27.0            | 2.0                                  | 0.00            | 170.92          | 170.92         | 25.0                    | 25.0            |
| 300.00             | 120.00                            | 722.2           | 894.2           | 172.0          | 28.0                   | 28.0            | 2.4                                  | 0.00            | 171.02          | 171.02         | 25.0                    | 25.0            |

| Reference Meter (L) |                     | UUT Meter (L)       |                     | Correction Factor |          | ΔH @ (mm H <sub>2</sub> O) | Variance          |
|---------------------|---------------------|---------------------|---------------------|-------------------|----------|----------------------------|-------------------|
| Std. Vol.           | Std. Flow           | Std. Vol.           | Std. Flow           | Value             | Variance | 0.0212 SCMM                |                   |
| V <sub>w(Std)</sub> | Q <sub>w(Std)</sub> | V <sub>m(Std)</sub> | V <sub>w(Std)</sub> | Y                 | ΔY       | ΔH@                        | ΔΔH@              |
| 154.19              | 11.01               | 155.25              | 11.0                | 0.9932            | 0.0002   | 47.5                       | -0.812            |
| 160.18              | 15.26               | 161.45              | 15.3                | 0.9922            | -0.0008  | 47.7                       | -0.680            |
| 165.15              | 22.02               | 166.67              | 22.0                | 0.9909            | -0.0021  | 45.8                       | -2.532            |
| 168.35              | 25.90               | 170.02              | 25.9                | 0.9902            | -0.0028  | 53.4                       | 5.069             |
| 168.61              | 33.72               | 168.85              | 33.7                | 0.9986            | 0.0056   | 47.3                       | -1.045            |
|                     |                     |                     |                     | 0.9930            | = Y Avg. | 48.3                       | = ΔH@ Avg. Metric |

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 ΔH<sub>0</sub>, orifice pressure differential that equates to 0.0212m<sup>3</sup>/min at standard temperature and pressure, acceptable tolerance of individual values from the average is ±0.2inches (5.1mm) H<sub>2</sub>O.

Pass/Fail Judgment : **Pass**



บริษัท เอ็นไวร์ เซอร์วิส จำกัด  
ENVIR SERVICE CO., LTD.

Date: 21 Oct 25

Calibrate By: [Signature]

Approved By: [Signature]

The instruments listed and described on this certificate have been calibrated against standards traceable to the National Institute of Standards and Technology (N.I.S.T.) and in reference to EPA Method 5, Section 10.3.1.

### Nomenclature

$P_0$  - Barometric Pressure  
DGM - Dry Gas Meter  
 $K_1$  - Constant based on standard temp and press  
 $\Theta$  - Run time, in minutes  
 $P_m$  -  $\Delta H$  (Meter Pressure, gauge)  
 $V_m$  - Volume collected by test meter, corrected for STP  
 $Q_{m(sld)}$  - Calculated flow rate of test meter  
 $K'$  - Critical orifice coefficient  
 $P_w$  - Measured pressure of reference meter  
 $T_w$  - Temperature measured in reference meter

### Equations

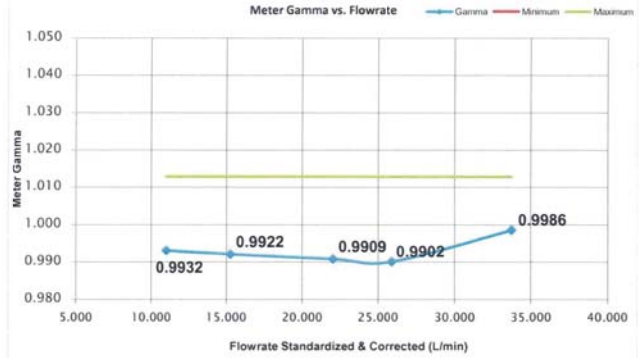
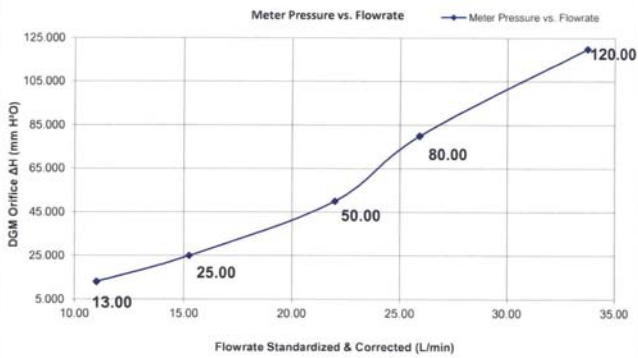
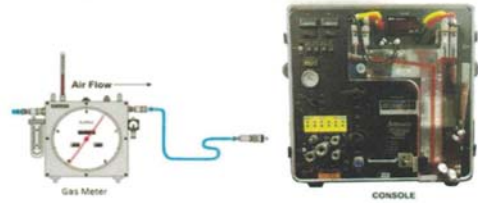
$$V_{w(sld)} = Y * K_1 \frac{V_w * (P_{bar} + \frac{P_{m(sld)}}{13.6})}{T_w}$$

$$V_{m(sld)} = \frac{K_1 V_w (P_{bar} + \frac{\Delta H}{13.6})}{T_m}$$

$$K_1 = \frac{T_{std}}{P_{std}} \quad Y = \frac{V_{w(sld)}}{V_{m(sld)}} \quad Q_{w(sld)} = \frac{V_{w(sld)}}{\Theta}$$

$$Metric \Delta H_0 = \frac{P_{m(sld)} * 0.0011696 * (P_{bar} + \frac{P_{m(sld)}}{13.6})}{T_m} * \left( \frac{T_w * \Theta}{V_w * P_{bar}} \right)^2$$

### Calibration Train



## Certificate of Calibration

### Method 5 Console Sensor Calibration - Metric Units

#### Console Information

Model #: CAF Express  
Serial #: 09X-5337-63M  
Units: Metric

#### Calibration Conditions

Phar (mm. Hg): 757.8  
Humidity (%): 75  
Tamb (°C): 25.4  
Elevation (m): 1.8  
Corr. Phar (mm. Hg): 757.6

#### Reference Devices

TC Calibrator Model: HH501DK  
Serial No. #: 20000005  
Barometer Model: 736930  
Reference #: EBARODIALSPE01  
Pressure Model: 718 30G  
Reference #: 9543013

### Temperature Display Calibration Data

| Reference Point <sup>1</sup> | #    | Test Thermocouple Calibrations |      |       |        | Reference Point |                     |
|------------------------------|------|--------------------------------|------|-------|--------|-----------------|---------------------|
|                              |      | Stack                          | Aux  | Probe | Filter | Exit            | Status <sup>2</sup> |
|                              |      | °C                             | °C   | °C    | °C     | °C              | Pass/Fail           |
| 1                            | 1    | -17                            | -17  | -17   | -16    | -17             | PASS                |
| 2                            | 38   | 37                             | 38   | 38    | 38     | 37              | PASS                |
| 3                            | 93   | 93                             | 94   | 94    | 94     | 94              | PASS                |
| 4                            | 149  | 149                            | 150  | 150   | 150    | 150             | PASS                |
| 5                            | 260  | 259                            | 260  | 260   | 259    | 260             | PASS                |
| 6                            | 371  | 371                            | 372  | 372   | 372    | 372             | PASS                |
| 7                            | 482  | 482                            | 483  | 482   | 482    | 483             | PASS                |
| 8                            | 593  | 593                            | 593  | 594   | 594    | 594             | PASS                |
| 9                            | 816  | 816                            | 816  | 816   | 817    | 817             | PASS                |
| 10                           | 1038 | 1039                           | 1039 | 1039  | 1039   | 1039            | PASS                |

Overall Audit Status: PASS

### NIST Reference Thermocouple ID: 12702001

| Ref Point | Theoretical Temp. | DGM Thermocouple Sensor Reading | $\Delta T_{\text{res}}$ |
|-----------|-------------------|---------------------------------|-------------------------|
| #         | °C                | °C                              | °C                      |
| 1         | 2.2               | 2                               | 0.07%                   |
| 2         | 25.4              | 25                              | 0.08%                   |

Internal temperature thermocouple is not audited to EPA standards and should not be used as an official reference for ambient temperature.

Approved By: [Signature]  
Date: 21 Oct 25

Calibrate By: [Signature]

### Notes

- <sup>1</sup> Suggested, minimum reference points are 10 (0, 100, 200, 300, 500, 700, 900, 1100, 1500, 1900 °F), can test for more.
- <sup>2</sup> For valid test results, the maximum difference between temperature and reference readings should be less than ±0.4 °F (±0.2 °C) for all thermocouples except for the stack thermocouple which should be less than ±1.5% absolute temperature from the reference reading and the exit thermocouple which should be less than ±2 °F (±1 °C) from the reference reading (EPA Method 2, Section 6.3 and EPA Method 5, Sections 6.1.1, 7.4.1, 7.4.1.8).
- <sup>3</sup> Do not change this cell value. It is instead based on input from Cell Hg at the top of this sheet under "Calibration Conditions".
- <sup>4</sup> Absolute temperature difference and other formulas are calculated based on unit input from cell C8 at the top of this sheet under "Meter Console Information".
- <sup>5</sup> For valid test results, the maximum difference between console and reference barometric pressure readings should be less than ±0.1 in. Hg (±2.5 mm Hg). (EPA Method 5, Section 6.1.2)
- <sup>6</sup> For valid test results, the maximum difference between console and reference vacuum readings should be less than ±0.5 in. Hg (±12.5 mm Hg).
- <sup>7</sup> For valid test results, the maximum difference between console and reference vacuum readings should be less than ±0.05 in. Hg (±1.25 mm Hg), or 5% of full scale.



ENVIRO SERVICE CO., LTD. (HEAD OFFICE)  
42 Ramittra 14, Yeak 9 Tha Raeng, Bang Khien, Bangkok 10230 Thailand  
Tax ID: 0105555170865 Tel: 02-943-5814-5  
Tel: 02-943-8201 www.enviro-service.co.th

## Console Sensor Calibration Data Sheet

### Console Information

Model #: CAF Express  
Serial #: X-5337-63M  
Units: Metric  
Type: English<sup>1</sup>  
Pbar (mm. Hg): 757.8  
Humidity (%): 75.0  
Tamb (°C): 25.4  
Corr. Pbar (mm. Hg): 757.6

### Calibration Conditions

Reference Devices  
TC Simulator Model: HH501DK  
Reference #: 20000005  
Barometer Model: 736930  
Reference #: EBARODIALSPE01  
Digital Pressure Calibrator Model: 718 30G  
Reference #: 9543013

### Pressure Gauge / Manometer Calibration Data

| Console Vacuum Calibration |                               |                          |       | Reference Point<br>Status <sup>5</sup> |
|----------------------------|-------------------------------|--------------------------|-------|----------------------------------------|
| Reference Point<br>#       | Reference<br>Vacuum<br>in. Hg | Console Vacuum<br>in. Hg | ΔH    |                                        |
| 1                          | -5.0                          | -5.0                     | -5.5  | PASS                                   |
| 2                          | -15.0                         | -15.0                    | -15.5 | PASS                                   |
| 3                          | -20.0                         | -20.0                    | -20.5 | PASS                                   |

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Tel: 02-943-8201 www.enviro-service.co.th

## Console Sensor Audit QA Sheet

### Meter Console Information (UUT)

Model #: CAF Express  
Serial #: 09X-5337-63M  
Units: Metric  
Pbar (mm. Hg): 757.8  
Humidity (%): 75  
Amb. Temp. (°C): 25.4  
Altitude (m): 1.8  
Corrected Pbar (mm. Hg): 757.6  
Reference Devices  
TC Simulator Model: HH501DK  
Serial No. #: 20000005  
Barometer Model: 736930  
Reference #: EBARODIALSPE01  
DP Calibrator Model: 718 30G  
Reference #: 9543013

### Calibration Conditions

Reference Devices  
TC Simulator Model: HH501DK  
Serial No. #: 20000005  
Barometer Model: 736930  
Reference #: EBARODIALSPE01  
DP Calibrator Model: 718 30G  
Reference #: 9543013

### Audit Data

| Reference Point | Reference Temp.<br>°C | Thermocouple Probe Audit |       |        |       |     |  | Reference Point Status <sup>1</sup> |
|-----------------|-----------------------|--------------------------|-------|--------|-------|-----|--|-------------------------------------|
|                 |                       | Stack                    | Probe | Filler | Dryer | Aux |  |                                     |
| Room            | 25.1                  | 25                       | 26    | 26     | 26    | 26  |  | PASS                                |
| Ice Water       | 1.8                   | 2                        | 2     | 2      | 2     | 2   |  | PASS                                |

| Console Vacuum Audit |                            |                          |    | Reference Point<br>Status <sup>3</sup> |
|----------------------|----------------------------|--------------------------|----|----------------------------------------|
| Reference Point<br># | Reference Vacuum<br>in. Hg | Console Vacuum<br>in. Hg | ΔH |                                        |
| 1                    | 17.0                       | 17.5                     |    | PASS                                   |



Calibrate By: [Redacted] Approved By: [Redacted] Date: 2017 Oct 25

### Notes

- <sup>1</sup>For valid test results, the maximum difference between test and reference readings should be less than 5.4 °F (3 °C), for all thermocouples except for the stack thermocouple which should be less than 1.5% absolute temperature from the reference reading and the exit thermocouple which should be less than 2°F (1 °C) from the reference reading (EPA Method 2, Section 6.3 and EPA Method 5, Sections 6.1.1, 6.1.7, 6.1.8)
- <sup>2</sup>For valid test results, the maximum difference between console and reference barometric pressure readings should be less than 0.1 in. Hg (2.5 mm Hg), (EPA Method 5, Section 6.1.2)
- <sup>3</sup>For valid test results, the maximum difference between console and reference vacuum readings should be less than 0.5 in. Hg (12.5 mm Hg)
- I certify that the above Thermocouple, Barometric, and Vacuum Sensors were calibrated and audited in accordance with US EPA Methods, CFR 40 Part 60.

| Reference Point <sup>1</sup><br># | ΔH Manometer Calibration         |                                           |                                           | Reference Point<br>Status <sup>2</sup> |
|-----------------------------------|----------------------------------|-------------------------------------------|-------------------------------------------|----------------------------------------|
|                                   | Reference<br>mm H <sub>2</sub> O | Positive (+) Pilot<br>mm H <sub>2</sub> O | Negative (-) Pilot<br>mm H <sub>2</sub> O |                                        |
| 1                                 | -200.000                         | 0.0                                       | -200.0                                    | PASS                                   |
| 2                                 | -150.000                         | 0.0                                       | -150.0                                    | PASS                                   |
| 3                                 | -100.000                         | 0.0                                       | -100.0                                    | PASS                                   |
| 4                                 | -80.000                          | 0.0                                       | -80.0                                     | PASS                                   |
| 5                                 | -50.000                          | 0.0                                       | -50.0                                     | PASS                                   |
| 6                                 | 0.000                            | 0.0                                       | 0.0                                       | PASS                                   |
| 7                                 | 50.000                           | 80.0                                      | 0.0                                       | PASS                                   |
| 8                                 | 80.000                           | 80.0                                      | 0.0                                       | PASS                                   |
| 9                                 | 100.000                          | 100.0                                     | 0.0                                       | PASS                                   |
| 10                                | 150.000                          | 150.0                                     | 0.0                                       | PASS                                   |
| 11                                | 200.000                          | 200.0                                     | 0.0                                       | PASS                                   |
| ΔH Overall Audit Status           |                                  |                                           |                                           | PASS                                   |

| Reference Point <sup>1</sup><br># | ΔP Manometer Calibration         |                                           |                                           | Reference Point<br>Status <sup>2</sup> |
|-----------------------------------|----------------------------------|-------------------------------------------|-------------------------------------------|----------------------------------------|
|                                   | Reference<br>mm H <sub>2</sub> O | Positive (+) Pilot<br>mm H <sub>2</sub> O | Negative (-) Pilot<br>mm H <sub>2</sub> O |                                        |
| 1                                 | -200.000                         | 0.0                                       | -200.0                                    | PASS                                   |
| 2                                 | -150.000                         | 0.0                                       | -150.0                                    | PASS                                   |
| 3                                 | -100.000                         | 0.0                                       | -100.0                                    | PASS                                   |
| 4                                 | -80.000                          | 0.0                                       | -80.0                                     | PASS                                   |
| 5                                 | -50.000                          | 0.0                                       | -50.0                                     | PASS                                   |
| 6                                 | 0.000                            | 0.0                                       | 0.0                                       | PASS                                   |
| 7                                 | 50.000                           | 80.0                                      | 0.0                                       | PASS                                   |
| 8                                 | 80.000                           | 80.0                                      | 0.0                                       | PASS                                   |
| 9                                 | 100.000                          | 100.0                                     | 0.0                                       | PASS                                   |
| 10                                | 150.000                          | 150.0                                     | 0.0                                       | PASS                                   |
| 11                                | 200.000                          | 200.0                                     | 0.0                                       | PASS                                   |
| ΔP Overall Audit Status           |                                  |                                           |                                           | PASS                                   |

Calibrate By: [Redacted] Approved By: [Redacted] Date: 2017 Oct 25

### Notes

- <sup>1</sup>Suggested, minimum reference points are 10 (0, 100, 200, 300, 500, 700, 900, 1100, 1500, 1900 °F), can test for more.
- <sup>2</sup>For valid test results, the maximum difference between test and reference readings should be less than 5.4 °F (3 °C), for all thermocouples except for the stack thermocouple which should be less than 1.5% absolute temperature from the reference reading and the exit thermocouple which should be less than 2°F (1 °C) from the reference reading (EPA Method 2, Section 6.3 and EPA Method 5, Sections 6.1.1, 6.1.7, 6.1.8)
- <sup>3</sup>Do not change this cell value. It is instead based on input from Cell Hg at the top of this sheet under "Calibration Conditions"
- <sup>4</sup>Absolute temperature difference and other formulas are calculated based on input from Cell C8 at the top of this sheet under "Meter Console Information"
- <sup>5</sup>For valid test results, the maximum difference between console and reference barometric pressure readings should be less than 0.1 in. Hg (2.5 mm Hg), (EPA Method 5, Section 6.1.2)
- <sup>6</sup>For valid test results, the maximum difference between console and reference vacuum readings should be less than 0.5 in. Hg (12.5 mm Hg)
- <sup>7</sup>For valid test results, the maximum difference between console and reference vacuum readings should be less than 0.05 in. H<sub>2</sub>O (1.25 mm H<sub>2</sub>O), or 5% of full scale
- I certify that the above Thermocouple Sensors were calibrated in accordance with US EPA Methods 2 and 5, CFR 40 Part 60.

## CALIBRATION RESULTS FOR NOZZLE VALIDATION

Calibrated Date: 14 July 2025  
Calibrated Due on: 15 June 2026

Report No: NS-202500001

### Sampling System Equipment Information

Nozzle Model: \_\_\_\_\_

Nozzle Number: Nozzle 1

Nozzle Type: Stainless Steel

### Calibration Condition

Mitutoyo Model: 500-193 S/N 1103676

Calibration Device: Digital Caliper, 0-300 mm

Reference No: MIZ52898

### Calibration Report

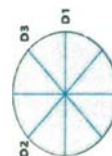
| Nozzle ID | Nozzle Diameter |          |          | Different<br>$\Delta D$<br>mm | (D1 + D2 + D3) / 3<br>Davg<br>mm |
|-----------|-----------------|----------|----------|-------------------------------|----------------------------------|
|           | mm              | D1<br>mm | D2<br>mm |                               |                                  |
| NS-4      | 3.17            | 3.17     | 3.17     | 0.000                         | 3.170                            |
| NS-6      | 4.76            | 4.77     | 4.76     | 0.006                         | 4.763                            |
| NS-8      | 6.35            | 6.36     | 6.36     | 0.006                         | 6.363                            |
| NS-10     | 7.94            | 7.92     | 7.92     | 0.006                         | 7.916                            |
| NS-12     | 9.52            | 9.50     | 9.50     | 0.006                         | 9.503                            |
| NS-14     | 11.11           | 11.09    | 11.09    | 0.006                         | 11.086                           |
| NS-16     | 12.70           | 12.65    | 12.65    | 0.006                         | 12.646                           |

Where:

D1, D2, D3 = There difference nozzle diameters, mm, diameter must be within 0.025 mm

$\Delta D$  = Maximum difference between any two diameters, must be  $\leq 0.100$  mm

Davg =  $(D1 + D2 + D3) / 3$



Calibrate By: \_\_\_\_\_

Approved by: \_\_\_\_\_

บริษัท เอ็นวิร์ เซอร์วิส จำกัด  
ENVIR SERVICE CO., LTD

## Sampling Probe and Pitot Validation

### Sampling System Equipment Information

Probe Sheet

Probe Number

Pitot tube Type

Validation method

Standard Probe 1 in. and 1/2 in. Sampling Nozzle

### Validation Conditions and Equipment

Digital Calipers

Reference No.

Digital Inclinator

Reference No.

Temperature

Barometric Pressure

Sampling Probe Validation with Tune up

Measure and Align with 1/2" Sampling Nozzle (12.7 mm)



$L_1 = 1.83$  cm (1.805 cm or 3/4 in.)

$L_2 = 4.57$  cm (5.08 cm or 2.0 in.)

$D_1 = 0.952$  cm (3/8 in.)

$A = 2.34$  cm (2.1 D1  $\leq A \leq 3D_1$ )

$A/D_1 = 1.231$  cm (1.05 P<sub>A</sub> / D<sub>1</sub>  $\leq A \leq 1.5$ )

### Pitot Tube Validations and Engles measurement Result

Measure Result after Maintenance and Adjustable

P<sub>A</sub> Size

$\alpha_1 = 3.01^\circ \leq 10^\circ$

$\beta_1 = 2.80^\circ \leq 5^\circ$

P<sub>A</sub> Size

$\alpha_2 = -1.90^\circ \leq 10^\circ$

$\beta_2 = 1.50^\circ \leq 5^\circ$

Engles measurement

Calculated Result

Standard Range

$W = 0.14^\circ$

$Z = 1.80^\circ$

$W < 0.08$  cm (1/32 in.)

$Z < 0.032$  cm (1/8 in.)

Can be use 0.84 for C<sub>pt</sub>(s) if the type of face-opening misalignment show above with respect the base in value of C<sub>pt</sub>(s) Solong as standard range

บริษัท เอ็นวิร์ เซอร์วิส จำกัด  
ENVIR SERVICE CO., LTD

Validation By: \_\_\_\_\_

Approved By: \_\_\_\_\_

Date: 7 Aug 25

Function : Temperature measurement  
Calibration point : 104, 150, 180 °C  
Certificate No. : MT25-5941-R1  
Page : 2 of 2  
Result : Without adjustment  
Resolution : 0.5 °C

## Certificate of Calibration

Certificate No. : MT25-5941-R1  
Page : 1 of 2

### Supplement to Calibration Report Cert.No.MT25-5941

Customer : Health & Envitech Co.,Ltd.  
Address : 6 Ngamwongwan Rd., Soi 5, T. Bangkhen, A. Muang Nontaburi 11000

Description : Hot Air Oven  
Manufacturer : Memmert  
Model : UNB 400  
Serial No. : C410.3046  
Identification No. : LB-HE-030  
Calibration Place : Laboratory (ชั้น 2)

Order No. : 2567/25  
Received date : Aug 08, 2025  
Calibration date : Aug 08, 2025  
Environment Condition :  
Temperature : (25 $\pm$ 10) °C  
Humidity : (50 $\pm$ 30) %RH

Calibration Method : Calibration were conducted using In-house calibration procedure CP-MT-006 According to comparison with LXI Data Acquisition Switch Unit with sensor. The calibration methods based on Euramet Calibration Guide No.20 - guidelines on the Calibration of Temperature and/or Humidity Controlled Enclosures.

### Reference Standard Instruments :

| Instrument                          | Model   | Serial No. | Certificate No. | Due Date     |
|-------------------------------------|---------|------------|-----------------|--------------|
| Data Acquisition System with Sensor | DAQ970A | MY58029718 | MT24-6593       | Aug 24, 2025 |

The effect that the result relate only to the items calibrated. It was found accurate as shown on date and place of calibration only.

Traceability : This measurement are traceable to the International System of Unit (SI), through National Institute of Metrology Thailand (NIMT)

The reported expanded uncertainty of measurement was based on standard uncertainty multiplied by coverage factor  $k = 2$ , providing a level of confidence of not less than 95%

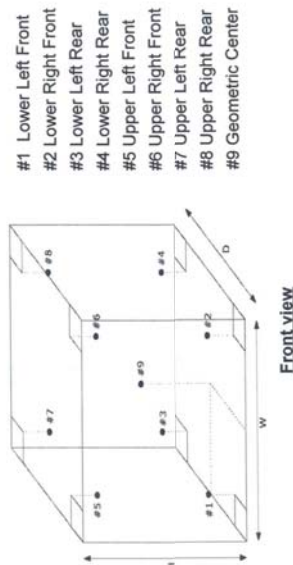


Calibrated by :   
Approved by :   
Issue date : Aug 25, 2025

This calibration certificate shall not be reproduced other than in full except with the prior written approval of Inctech Metrological Center Co.,Ltd

| Calibration point (°C) | Temperature of UUC* at each position (°C) |         |         |         |         |         |         |         |         | Uncertainty of measurement (+/- °C) |
|------------------------|-------------------------------------------|---------|---------|---------|---------|---------|---------|---------|---------|-------------------------------------|
|                        | Ch.1                                      | Ch.2    | Ch.3    | Ch.4    | Ch.5    | Ch.6    | Ch.7    | Ch.8    | Ch.9    |                                     |
| 104                    | 104.529                                   | 104.358 | 104.252 | 103.873 | 104.338 | 104.437 | 104.148 | 104.279 | 104.276 | 0.44                                |
| 150                    | 150.062                                   | 149.911 | 150.070 | 150.043 | 150.211 | 150.365 | 150.320 | 150.333 | 150.108 | 0.44                                |
| 180                    | 180.398                                   | 180.244 | 180.317 | 180.083 | 180.472 | 180.339 | 180.261 | 179.950 | 180.041 | 0.44                                |

| Setting temperature (°C) | Indicating Temperature (°C) | Measured stability (+/- °C) | Measured uniformity (°C) | Overall variation (°C) |
|--------------------------|-----------------------------|-----------------------------|--------------------------|------------------------|
| 103.0                    | 103.0                       | 0.14                        | 0.40                     | 0.89                   |
| 149.0                    | 149.0                       | 0.20                        | 0.37                     | 0.68                   |
| 179.0                    | 179.0                       | 0.21                        | 0.61                     | 0.79                   |



UUC\* = Unit under calibration  
Uniformity = Maximum and Minimum difference of measured temperature at any probes and the measured temperature at the reference and same time.  
Overall Variation = Difference of temperature value between the maximum and minimum any time.  
Stability = One half of the maximum difference of measured temperatures at any one probe.

Calibration object

Multi range instrument

|                              |                     |            |
|------------------------------|---------------------|------------|
| Model                        | BP210D              |            |
| Serial Number                | 70406076            |            |
| QM Ident. no   Inventory no. | LB - HE - 003   --- |            |
| Range                        | 1                   | 2          |
| Maximum capacity (Max. load) | 80.00000 g          | 210.0000 g |
| Measured up to               | 80.00000 g          | 210.0000 g |
| Scale interval               | 0.00001 g           | 0.0001 g   |

Place of calibration

|                                                       |                            |
|-------------------------------------------------------|----------------------------|
| Address                                               | According to page 1        |
| Department   Cost center                              | QC and RD Department   --- |
| Building   Floor                                      | ---   1st Floor            |
| Room                                                  | Laboratory Room.           |
| Maximum temperature variation at place of calibration | 5 K                        |

Calibration procedure

EURAMET Calibration Guide No. 18, Version 4.0 (1/2015) - Guidelines on the Calibration of Non-Automatic Weighing Instruments

Test equipment

| Test equipment type          | Test equipment ID                                             | Valid until |
|------------------------------|---------------------------------------------------------------|-------------|
| Thermometer                  | Testo 174(Traceable to Si unit through ENTECH)                | 11 Nov 2025 |
| Test weight set OIML R111 E2 | Certificate No.M2508149S_E2(Traceable to Si unit through TCS) | 19 Aug 2027 |



Accredited by

NSC-TISI-TIS 17025  
Calibration 0426

Calibration certificate

Calibration Certificate No. 255C10411

|                        |                                              |                                                                                                                                                                    |
|------------------------|----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Object                 | Electronic non-automatic weighing instrument | This calibration certificate documents the traceability to national standards.                                                                                     |
| Manufacturer           | Sartorius                                    | Uncertainties of measurements are taken into account when only statements of compliance are made.                                                                  |
| Type                   | BP210D                                       | This certificate was prepared by Sartorius Corporation in accordance to the current ISO/IEC 17025:2017 standard and Sartorius Work Instruction (Method) SOP WI 08. |
| Serial   QM Ident. no. | 70406076   LB - HE - 003                     | This certificate relate and apply this equipment only.                                                                                                             |

Customer Health & Envitech Co., Ltd.

6 Ngamwongwan Soi 5,Tumbon Bangkokhen  
Muang Nontaburi Nontaburi 11000 Thailand.

Order no. 271531

Number of pages 6

Date of calibration 16 Oct 2025

This calibration certificate may not be reproduced other than in full except with the permission of NSC-TISI-TIS-17025 and the issuing laboratory. Calibration certificates without signature are not valid.

The user is obliged to have the object recalibrated at appropriate intervals.

|               |             |                                         |                  |
|---------------|-------------|-----------------------------------------|------------------|
| Date of issue | 16 Oct 2025 | Approval of the Calibration Certificate | Person in charge |
|               |             |                                         |                  |

## Range 2

### Adjustment Status

The measuring device was internally adjusted before the calibration.

### Environmental and measuring conditions

|                                                                                                              |                                                                                                   |
|--------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|
| Date of calibration                                                                                          | 16 Oct 2025                                                                                       |
| Temperature at place of calibration   Temp. diff.<br><i>T</i> <sub>weights</sub> - <i>T</i> <sub>place</sub> | 25.8 °C   0.4 K                                                                                   |
| Measuring conditions                                                                                         | The installation site is suitable. The device is level. Balance was loaded up to Max before test. |
| Comments                                                                                                     | Humidity 45.0 %RH                                                                                 |

### Measurement results | Measurement uncertainties

| Repeatability              |            | Eccentricity                                      |            |
|----------------------------|------------|---------------------------------------------------|------------|
| Test load (nominal): 100 g |            | Test load (nominal):                              |            |
| 100 g                      |            | 100 g                                             |            |
| 1                          | 100.0000 g | Center                                            | 100.0000 g |
| 2                          | 100.0000 g | Front left                                        | 99.9999 g  |
| 3                          | 100.0000 g | Back left                                         | 100.0001 g |
| 4                          | 100.0000 g | Back right                                        | 100.0001 g |
| 5                          | 100.0000 g | Front right                                       | 99.9999 g  |
| 6                          | 100.0000 g | Maximum deviation from centric loading indication |            |
| 7                          | 100.0001 g | Δ <sub>ecc</sub>   max = 0.0001 g                 |            |
| 8                          | 100.0000 g |                                                   |            |
| 9                          | 100.0000 g |                                                   |            |
| 10                         | 100.0000 g |                                                   |            |
| <i>s</i> = 0.00003 g       |            |                                                   |            |

#### Error of indication

| Testload   | Indication | Error     | Expansion factor | Uncertainty           | Uncertainty relative                 |
|------------|------------|-----------|------------------|-----------------------|--------------------------------------|
| <i>L</i>   | <i>I</i>   | <i>E</i>  | <i>k</i>         | <i>U</i> ( <i>E</i> ) | <i>U</i> <sub>rel</sub> ( <i>E</i> ) |
| 0.01000 g  | 0.01000 g  | 0.00000 g | 2.00             | 0.000024 g            | 0.24 %                               |
| 0.10000 g  | 0.10000 g  | 0.00000 g | 2.00             | 0.000037 g            | 0.037 %                              |
| 1.00000 g  | 1.00000 g  | 0.00000 g | 2.00             | 0.000037 g            | 0.0037 %                             |
| 2.00003 g  | 2.00003 g  | 0.00000 g | 2.00             | 0.000050 g            | 0.0025 %                             |
| 5.00002 g  | 5.00002 g  | 0.00000 g | 2.00             | 0.000050 g            | 0.0010 %                             |
| 10.00001 g | 10.00003 g | 0.00002 g | 2.00             | 0.000069 g            | 0.00069 %                            |
| 19.99999 g | 20.00001 g | 0.00002 g | 2.00             | 0.000069 g            | 0.00035 %                            |
| 50.00001 g | 50.00005 g | 0.00004 g | 2.00             | 0.000091 g            | 0.00018 %                            |
| 100.0000 g | 100.0000 g | 0.00000 g | 2.00             | 0.00017 g             | 0.00017 %                            |
| 150.0000 g | 150.0000 g | 0.00000 g | 2.00             | 0.00028 g             | 0.00019 %                            |
| 200.0000 g | 200.0000 g | 0.00000 g | 2.00             | 0.00028 g             | 0.00014 %                            |

Maximum error of indication |E|<sub>max</sub> = 0.00000 g

*U*<sub>rel</sub>(*E*) is the quotient of *U*(*E*) and test load *L*. The uncertainty of measurement *U*(*E*) is valid only if error *E* is considered. You will find reference notes on the uncertainty of measurement in use under: Appendix to the calibration certificate | Interpretation of measurement results.

Expansion factor, determined in accordance with the European Calibration Guideline EURAMET - cg-18, V4.0. There is a 95 % probability that the value of the measurand will be in the assigned value range.

#### End of calibration certificate

## Range 1

### Adjustment Status

The measuring device was internally adjusted before the calibration.

### Environmental and measuring conditions

|                                                                                                              |                                                                                                   |
|--------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|
| Date of calibration                                                                                          | 16 Oct 2025                                                                                       |
| Temperature at place of calibration   Temp. diff.<br><i>T</i> <sub>weights</sub> - <i>T</i> <sub>place</sub> | 25.8 °C   0.4 K                                                                                   |
| Measuring conditions                                                                                         | The installation site is suitable. The device is level. Balance was loaded up to Max before test. |
| Comments                                                                                                     | Humidity 45.0 %RH                                                                                 |

### Measurement results | Measurement uncertainties

| Repeatability                   |           | Eccentricity          |            |
|---------------------------------|-----------|-----------------------|------------|
| Test load (nominal): 1 g   50 g |           | Test load (nominal):  |            |
| 1 g                             |           | 50 g                  |            |
| 1                               | 1.00000 g | 50.00004 g            | 50.00005 g |
| 2                               | 0.99999 g | 50.00005 g            | 50.00003 g |
| 3                               | 1.00000 g | 50.00005 g            | 50.00007 g |
| 4                               | 1.00000 g | 50.00005 g            | 50.00005 g |
| 5                               | 0.99999 g | 50.00003 g            |            |
| 6                               | 0.99999 g | 50.00004 g            |            |
| 7                               | 1.00000 g | 50.00005 g            |            |
| 8                               | 0.99999 g | 50.00005 g            |            |
| 9                               | 1.00000 g | 50.00004 g            |            |
| 10                              | 1.00000 g | 50.00005 g            |            |
| <i>s</i> = 0.000005 g           |           | <i>s</i> = 0.000007 g |            |

#### Error of indication

| Testload   | Indication | Error      | Expansion factor | Uncertainty           | Uncertainty relative                 |
|------------|------------|------------|------------------|-----------------------|--------------------------------------|
| <i>L</i>   | <i>I</i>   | <i>E</i>   | <i>k</i>         | <i>U</i> ( <i>E</i> ) | <i>U</i> <sub>rel</sub> ( <i>E</i> ) |
| 0.01000 g  | 0.01000 g  | 0.00000 g  | 2.00             | 0.000024 g            | 0.24 %                               |
| 0.10000 g  | 0.10000 g  | 0.00000 g  | 2.00             | 0.000037 g            | 0.037 %                              |
| 1.00000 g  | 1.00000 g  | 0.00000 g  | 2.00             | 0.000037 g            | 0.0037 %                             |
| 2.00003 g  | 2.00002 g  | -0.00001 g | 2.00             | 0.000050 g            | 0.0025 %                             |
| 5.00002 g  | 5.00002 g  | 0.00000 g  | 2.00             | 0.000050 g            | 0.0010 %                             |
| 10.00001 g | 10.00003 g | 0.00002 g  | 2.00             | 0.000069 g            | 0.00069 %                            |
| 19.99999 g | 20.00001 g | 0.00002 g  | 2.00             | 0.000069 g            | 0.00035 %                            |
| 50.00001 g | 50.00005 g | 0.00004 g  | 2.00             | 0.000093 g            | 0.00031 %                            |
| 100.0000 g | 100.0000 g | 0.00000 g  | 2.00             | 0.00017 g             | 0.00018 %                            |
| 150.0000 g | 150.0000 g | 0.00000 g  | 2.00             | 0.00017 g             | 0.00018 %                            |
| 200.0000 g | 200.0000 g | 0.00000 g  | 2.00             | 0.00018 g             | 0.00023 %                            |

Maximum error of indication |E|<sub>max</sub> = 0.00006 g

*U*<sub>rel</sub>(*E*) is the quotient of *U*(*E*) and test load *L*. The uncertainty of measurement *U*(*E*) is valid only if error *E* is considered. You will find reference notes on the uncertainty of measurement in use under: Appendix to the calibration certificate | Interpretation of measurement results.

Expansion factor, determined in accordance with the European Calibration Guideline EURAMET - cg-18, V4.0. There is a 95 % probability that the value of the measurand will be in the assigned value range.

# Uncertainty of measurement in use

## Range 2

Device adjusted before measurement Yes  
Temperature deviation considered 5 K  
Temperature coefficient considered  $1 \cdot 10^{-6}/K$

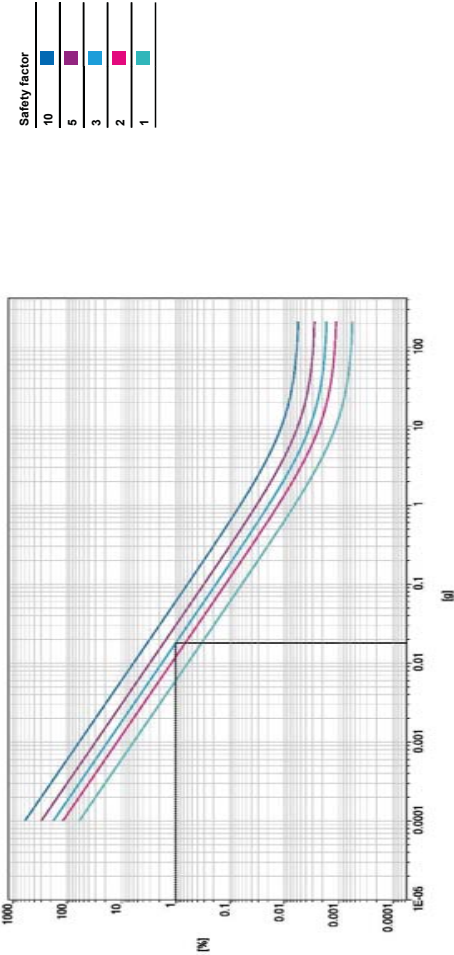
### Uncertainty of the weighing result $U_{g_l}(W)$

$$U_{g_l}(W) = 0.000060 \text{ g} + 5.28 \cdot 10^{-6} \cdot R$$

Reference note: The current uncertainty of measurement is calculated by entering of the reading  $R$  into this formula. In relation to this, there is no need for a correction of the indication error. The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied with an expansion factor of 2, determined in accordance with the European Calibration Guideline EURAMET CG-18, V4.0. There is a 95 % probability that the value of the measurand will be in the assigned value range.

| Indication in % from max load | Net indication $R$ | Uncertainty $U_{g_l}(W)$ | Uncertainty relative $U_{g_l}(W)_{rel}$ |
|-------------------------------|--------------------|--------------------------|-----------------------------------------|
| 1 %                           | 2.10000 g          | 0.000071 g               | 0.0034 %                                |
| 25 %                          | 52.50000 g         | 0.00034 g                | 0.00064 %                               |
| 50 %                          | 105.0000 g         | 0.00061 g                | 0.00059 %                               |
| 75 %                          | 157.5000 g         | 0.00089 g                | 0.00057 %                               |
| 100 %                         | 210.0000 g         | 0.0012 g                 | 0.00056 %                               |

Graphic realization of the relative uncertainty of measurement | process accuracy



### Displayed example

Process accuracy 1.00 %  
Safety factor 3  
Minimum sample weight 0.01794 g

# Uncertainty of measurement in use

## Range 1

Device adjusted before measurement Yes  
Temperature deviation considered 5 K  
Temperature coefficient considered  $1 \cdot 10^{-6}/K$

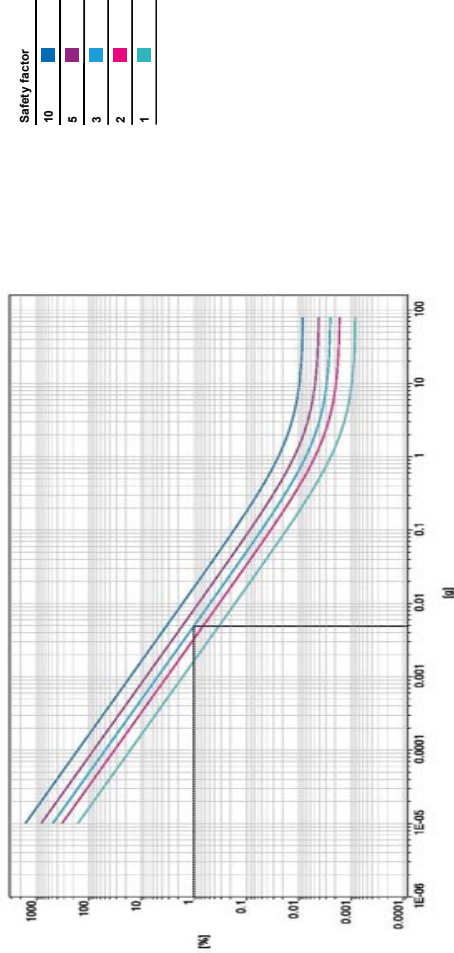
### Uncertainty of the weighing result $U_{g_l}(W)$

$$U_{g_l}(W) = 0.000016 \text{ g} + 8.08 \cdot 10^{-6} \cdot R$$

Reference note: The current uncertainty of measurement is calculated by entering of the reading  $R$  into this formula. In relation to this, there is no need for a correction of the indication error. The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied with an expansion factor of 2, determined in accordance with the European Calibration Guideline EURAMET CG-18, V4.0. There is a 95 % probability that the value of the measurand will be in the assigned value range.

| Indication in % from max load | Net indication $R$ | Uncertainty $U_{g_l}(W)$ | Uncertainty relative $U_{g_l}(W)_{rel}$ |
|-------------------------------|--------------------|--------------------------|-----------------------------------------|
| 1 %                           | 0.80000 g          | 0.000022 g               | 0.0028 %                                |
| 25 %                          | 20.00000 g         | 0.00018 g                | 0.00089 %                               |
| 50 %                          | 40.00000 g         | 0.00034 g                | 0.00085 %                               |
| 75 %                          | 60.00000 g         | 0.00050 g                | 0.00083 %                               |
| 100 %                         | 80.00000 g         | 0.00066 g                | 0.00083 %                               |

Graphic realization of the relative uncertainty of measurement | process accuracy



### Displayed example

Process accuracy 1.00 %  
Safety factor 3  
Minimum sample weight 0.00491 g



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## Analyzer Performance Test

Calibrated Date: 25 April 2025

### Instruments Information

Analyzer Type : CO Analyzer  
Model : 48C  
Manufacturer : Thermo Environmental  
Serial Number : 48C-70168-365

### Calibrator Unit

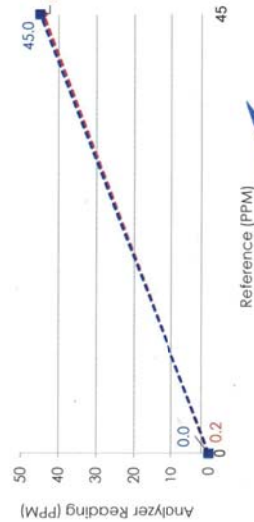
Dilutor Model : Dasibi Model 5008  
Serial Number : 705  
ZERO AIR Generator : API MODEL 701  
Serial Number : 1924  
Standard Gas Concentration  
Nitric Oxide (NO) 55.47 PPM  
Sulphur Dioxide (SO2) 55.11 PPM  
Carbon Monoxide (CO) 4.535 PPM  
Cylinder number EB0129027  
Expire Date: 29 Oct. 2027

Environment : Temperature 25.5 °C Humidity: 51 %RH

### Calibration Report

|        | Zero            |               |             | Span            |               |        |
|--------|-----------------|---------------|-------------|-----------------|---------------|--------|
|        | Reference (PPM) | Reading (PPM) | Drift (PPM) | Reference (PPM) | Reading (PPM) | Drift% |
| Before | 0.0             | 0.2           | 0.2         | 45.0            | 44.3          | -1.6   |
| After  | 0.0             | 0.0           | 0.0         | 45.0            | 45.0          | 0.0    |

Single Point Calibration Chart



Calibrate By :

Approve by :

ENVIR SERVICE CO., LTD.

## Analyzer Performance Test

Calibrated Date: 25 April 2025

### Instruments Information

Analyzer Type : SO2 Analyzer High Level  
Model : 43CHL  
Manufacturer : Thermo Environmental  
Serial Number : 43CHL-59690-324

### Calibrator Unit

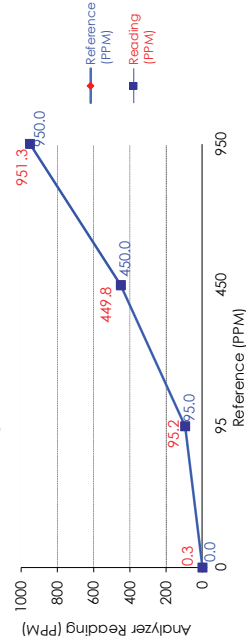
Dilutor Model : Dasibi Model 5008  
Serial Number : 705  
ZERO AIR Generator : API MODEL 701  
Serial Number : 1924  
Standard Gas Concentration  
Nitric Oxide (NO) 957.2 PPM  
Sulphur Dioxide (SO2) 960.7 PPM  
Carbon Monoxide (CO) 960.4 PPM  
Cylinder number EB0128898  
Expire Date: 29 Oct. 2027

Environment : Temperature 25.5 °C Humidity: 51 %RH

### Calibration Report

| Point No. | Calibration Results |               |       |
|-----------|---------------------|---------------|-------|
|           | Reference (PPM)     | Reading (PPM) | Error |
| 1         | 0.0                 | 0.3           | 0.3   |
| 2         | 95.0                | 95.2          | 0.2   |
| 3         | 450.0               | 449.8         | -0.2  |
| 4         | 950.0               | 951.3         | 1.3   |

Single Point Calibration Chart



Calibrate By :

Approve by :

M

Maintenance Protocol  
PlasmaQuant PQ 9100 (Elite)  
ICP-OES



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Analyzer Performance Test

Calibrated Date: 25 April 2025

Instruments Information

Analyzer Type : NO-NO<sub>2</sub>-NO<sub>x</sub> Analyzer High Level  
Model : 42CHL  
Manufacturer : Thermo Environmental  
Serial Number : 42CHL-0527613257

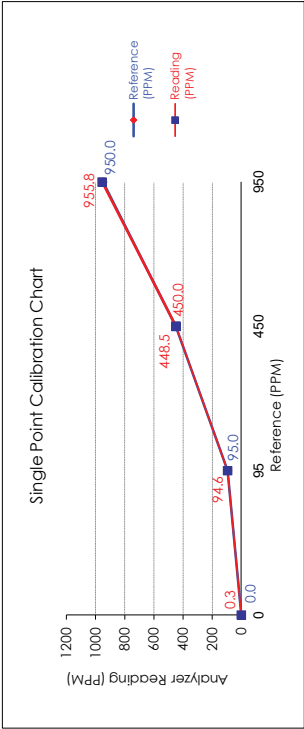
Calibrator Unit

Dilutor Model : Dasibi Model 5008  
Serial Number : 705  
ZERO AIR Generator : API MODEL 701  
Serial Number : 1924  
Standard Gas Concentration  
Nitric Oxide (NO) 957.2 PPM  
Sulphur Dioxide (SO<sub>2</sub>) 960.7 PPM  
Carbon Monoxide (CO) 960.4 PPM  
Cylinder number EB0128898  
Expire Date: 29 Oct. 2027

Environment : Temperature 25.5 °C Humidity: 51 %RH

Calibration Report

| Point No. | Calibration Results |               |       |
|-----------|---------------------|---------------|-------|
|           | Reference (PPM)     | Reading (PPM) | Error |
| 1         | 0.0                 | 0.3           | 0.3   |
| 2         | 95.0                | 94.6          | -0.4  |
| 3         | 450.0               | 448.5         | -1.5  |
| 4         | 950.0               | 955.8         | 5.8   |



Calibrate By :

Approve by :

M

M

# 1 Customer and service data

|                                                |                                                                         |
|------------------------------------------------|-------------------------------------------------------------------------|
| Customer address                               |                                                                         |
| Company                                        | Health & Envitech Co., Ltd.                                             |
| Department                                     |                                                                         |
| Address<br>(street, number,<br>zip code, city) | 6 Ngamwongwan Soi 5, Tumbon Bangkokhen, Muangnontaburi, Nontaburi 11000 |
| Phone                                          |                                                                         |
| E-mail                                         |                                                                         |
| Customer number                                |                                                                         |
| Order number                                   |                                                                         |

## Device data (model and serial number)

|                     |                                          |
|---------------------|------------------------------------------|
| ICP OES             | PQ9100 s/n 13585100362BA0592             |
| Mobile cooling unit | Labtech smart H150-3000. s/n 23070644722 |
| Autosampler         | -                                        |

## Analytik Jena representative information

|         |                                           |
|---------|-------------------------------------------|
| Name    |                                           |
| Company | Analytik Jena Instruments (Thailand) Ltd. |

## Maintenance date

|      |            |
|------|------------|
| Date | 6 Jun 2025 |
|------|------------|

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3 Maintenance work on the base unit

Update firmware and software

|                                                                                                                                                                             | Complies                            | Does not comply          |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|--------------------------|
| Save device parameters and neon table                                                                                                                                       | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Check the firmware version and FPGA                                                                                                                                         | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Check the version of the ASpect PQ software                                                                                                                                 | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Update software, FPGA and firmware                                                                                                                                          | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Approval for firmware and software updates was given by the customer.                                                                                                       |                                     |                          |
| The customer's was informed that the Operational Qualification (OO) and software validation may have to be repeated for validated systems after a firmware/software update. |                                     |                          |
| Update ASpect PQ                                                                                                                                                            | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| ▪ Current version                                                                                                                                                           | 1.3.2.0                             |                          |
| ▪ Version after update                                                                                                                                                      | —                                   |                          |
| Update FPGA                                                                                                                                                                 | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| ▪ Current version                                                                                                                                                           | h0a; h06                            |                          |
| ▪ Version after update                                                                                                                                                      | —                                   |                          |
| Updating the firmware                                                                                                                                                       | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| ▪ Current version                                                                                                                                                           | 1.46                                |                          |
| ▪ Version after update                                                                                                                                                      | —                                   |                          |
| Record running time (in hours)                                                                                                                                              | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| ▪ Base unit                                                                                                                                                                 | 621                                 |                          |
| ▪ RF generator                                                                                                                                                              | 440 h. 23 min                       |                          |

Service the rear of the device

|                            | Complies                            | Does not comply          |
|----------------------------|-------------------------------------|--------------------------|
| Replace the air filter mat | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

2 Maintenance with subsequent Operational Qualification (OO)

- If an Operational Qualification (OO) is carried out after maintenance, there is no need to check analytical parameters in the maintenance report.
- The analytical parameters are then checked in the separate OO report.

| Maintenance with subsequent Operational Qualification (OO) | Yes                      | No                                  |
|------------------------------------------------------------|--------------------------|-------------------------------------|
|                                                            | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

Comments:

### Service the spectrometer

|                                                                            |  | Complies                            | Does not comply          |
|----------------------------------------------------------------------------|--|-------------------------------------|--------------------------|
| Clean and lubricate the spindle of the prism and grating with a little oil |  | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

### Check gas flows at the gas box

| Gas flow                  | Rated value           | Actual value | Complies                            | Does not comply          |
|---------------------------|-----------------------|--------------|-------------------------------------|--------------------------|
| Nebulizer gas flow        | 0.5 L/min $\pm$ 15 %  | 0.542        | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Auxiliary gas flow        | 0.5 L/min $\pm$ 15 %  | 0.540        | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Cone gas flow             | 1,7 ... 2,8 L/min     | 2.47         | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Oxygen is used (optional) |                       |              | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Oxygen flow               | 00.5 L/min $\pm$ 15 % | N/A          | <input type="checkbox"/>            | <input type="checkbox"/> |

Comments:

Plasma gas = 12.7 L/min

### Service the sample introduction system

|                                                                                                                                                                                                                                                                    | Complies                            | Does not comply          |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|--------------------------|
| Remove, disassemble and clean the torch                                                                                                                                                                                                                            | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| <ul style="list-style-type: none"> <li>Check the surface of the glass parts (injector, inner tube, outer tube and glass holder) for damage, heavily coated and broken parts. Replace glass parts, if necessary</li> <li>Clean glass parts in aqua regia</li> </ul> |                                     |                          |
| Check the sealing rings, replace if necessary                                                                                                                                                                                                                      | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| <ul style="list-style-type: none"> <li>Sealing rings in torch holder (3 pieces) and torch shuttle (2 pieces)</li> <li>Sealing rings in injector and mixing chamber mount</li> </ul>                                                                                |                                     |                          |
| (Check sealing rings for porous and hardened areas, replace if necessary)                                                                                                                                                                                          |                                     |                          |
| Check pump tubing (sample, waste), replace if necessary                                                                                                                                                                                                            | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Check peristaltic pump, disassemble and lubricate if necessary                                                                                                                                                                                                     | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Check the nebulizer for damage and clean it                                                                                                                                                                                                                        | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Remove and clean the mixing chamber                                                                                                                                                                                                                                | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Check the sealing ring of the mixing chamber                                                                                                                                                                                                                       | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Check and clean torch height adjustment drive                                                                                                                                                                                                                      | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Lubricate the linear drive with a little oil                                                                                                                                                                                                                       | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Check the igniting pin for signs of wear                                                                                                                                                                                                                           | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

Comments:

### Service the plasma compartment

|                                                                                                    | Complies                            | Does not comply          |
|----------------------------------------------------------------------------------------------------|-------------------------------------|--------------------------|
| Disassemble the cone, check geometry and clean it if necessary                                     | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Take out the windows (axial/radial) and clean or replace them                                      |                                     |                          |
| Replacing the sealing rings                                                                        |                                     |                          |
| Check the surface of the first mirror, clean or replace it if necessary                            | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Check the air outlet for deposits and blockages, clean it if necessary                             | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Remove the cover plate below the plasma compartment and clean it                                   | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Renew the filter mat                                                                               |                                     |                          |
| Check the coil for its material condition, position, geometry and for the tightness of connections | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Clean or replace bonnet                                                                            | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Check RF deflector spring, replace it if necessary                                                 | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

|                                            | Complies                            | Does not comply          |
|--------------------------------------------|-------------------------------------|--------------------------|
| Check the functionality of the washing cup | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Check the hose connections for leaks       | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

#### 4 Maintenance work on accessories

##### Service the mobile cooling unit

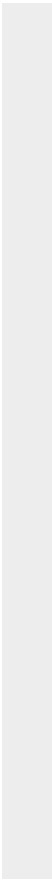
|                                                                                                          | Complies                            | Does not comply          |
|----------------------------------------------------------------------------------------------------------|-------------------------------------|--------------------------|
| Vacuum or clean the condenser                                                                            | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Record the condition of the cooling water before maintenance:                                            |                                     |                          |
| Particles and discoloration present: <input type="checkbox"/> yes <input checked="" type="checkbox"/> No | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| cooling water flow rate                                                                                  | 1.51                                |                          |
| Cooling water primary pressure                                                                           | 60 psi                              |                          |
| Conductivity of the cooling wa-<br>ter                                                                   | 130 us/cm                           |                          |
| Clean the water filter on the base unit (if filter is installed)                                         | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Renew cooling water                                                                                      | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| ■ Prepare cooling water according to Analytik Jena's specifications                                      |                                     |                          |
| ■ Use cooling water additive from Analytik Jena                                                          |                                     |                          |
| Check filling level of cooling water, top up if required                                                 | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

##### Cooling water circuit after maintenance

|                                                       | Rated value         | Actual value | Complies                            | Does not comply          |
|-------------------------------------------------------|---------------------|--------------|-------------------------------------|--------------------------|
| cooling water flow rate                               | 1.5 to 2.0 L/min    | 1.52         | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Cooling water primary pressure                        | max. 6 bar (85 psi) | 60 psi       | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Conductivity of the cooling wa-<br>ter                | 50 to 200 µS/cm     | 99 us/cm     | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Cooling water temperature (in<br>mobile cooling unit) | 18 °C               | 18 C         | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

##### Service the autosampler

|                                                                                | Complies                            | Does not comply          |
|--------------------------------------------------------------------------------|-------------------------------------|--------------------------|
| Check cannula and tubing to the base unit                                      | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Check pump tubing (washing solution, waste), replace if necessary              | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Clean the covers, rack mount and accessories                                   | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Check the condition of the toothed belts for cracks, gaps and changes in color | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Check the peristaltic pump for smooth operation                                | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

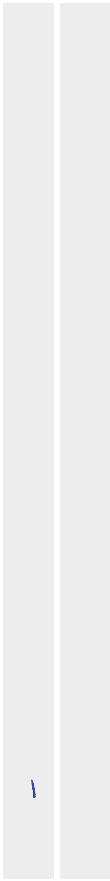


5.3 Check of neon energy

The plasma must be ignited for this test (CCD cooling active).

|             | Rated value<br>(Steps) | Actual value<br>(Steps) | Complies                            | Does not comply          |
|-------------|------------------------|-------------------------|-------------------------------------|--------------------------|
| 585.2462 nm | > 4000 ct/s            | 15930                   | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 594.4807 nm | > 3000 ct/s            | 6071                    | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 640.2217 nm | > 3000 ct/s            | 17668                   | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 849.5322 nm | > 3000 ct/s            | 6207                    | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 607.4311 nm | > 3000 ct/s            | 6462                    | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 659.8923 nm | > 3000 ct/s            | 6163                    | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 743.8864 nm | > 3000 ct/s            | 7258                    | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 703.2381 nm | > 10000 ct/s           | 14105                   | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

Comments:



5.4 Adjustment of transfer optics (Mn 257.610 nm)

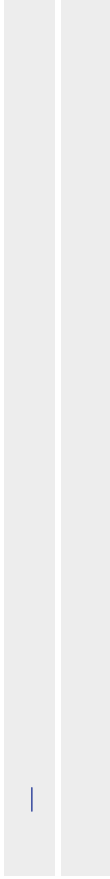
| Adjust detection (axial) | Complies                                 | Does not comply          |
|--------------------------|------------------------------------------|--------------------------|
| X offset                 | <input checked="" type="checkbox"/> -0.4 | <input type="checkbox"/> |
| Y offset                 | <input checked="" type="checkbox"/> -0.4 | <input type="checkbox"/> |

5 Checking basic functions and device parameters

5.1 Check of correction functions

|                  | Rated value<br>(Steps) | Actual value<br>(Steps) | Complies                            | Does not comply          |
|------------------|------------------------|-------------------------|-------------------------------------|--------------------------|
| As (193.6950 nm) | ± 500                  | -55                     | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Cu (324.7540 nm) | ± 500                  | 27                      | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Na (588.9953 nm) | ± 500                  | -28                     | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| K (766.4908 nm)  | ± 500                  | 4                       | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

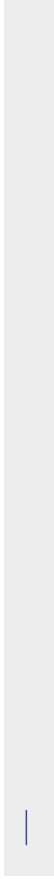
Comments:



5.2 Check of safety circuits

|                                                                                      | Complies                            | Does not comply          |
|--------------------------------------------------------------------------------------|-------------------------------------|--------------------------|
| Safety circuit for torch position                                                    | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Safety circuit for door of plasma compartment                                        | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Safety circuit for interrupted cooling water flow (cooling water flow < 0.85 L/min ) | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Safety circuit for suction power (check the setting Par[85])                         | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Value Par[85]:                                                                       | 4626                                |                          |
| Safety circuit for argon inlet pressure (p < 4 bar) *                                | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| * if sensor is installed (Par[116] = 1)                                              |                                     |                          |

Comments:



| Line             | Peak position before correction | Peak position after correction | Difference Rated value | Difference Actual value |
|------------------|---------------------------------|--------------------------------|------------------------|-------------------------|
| Zn 213.8560 nm   | 181.0 ± -0.3                    | 181.0 ± -0.3                   | ± 1.0                  | 0                       |
| Mn (257.6100 nm) | 181.0 ± -0.1                    | 181.0 ± -0.1                   | ± 1.0                  | 0                       |
| Cu (324.7540 nm) | 181.0 ± -0.2                    | 181.0 ± -0.2                   | ± 1.0                  | 0                       |
| Li 670.7910 nm   | 181.0 ± 0.1                     | 181.0 ± 0.2                    | ± 1.0                  | 0                       |

Comments:

### Robustness factor

Calculation according to the following formula:

$$F_r = \frac{\text{intensity } Mg_{280.271} / \text{intensity } BG_{Mg_{280.271}}}{\text{intensity } Mg_{285.213} / \text{intensity } BG_{Mg_{285.213}}}$$

| Intensity / calculated factor | Value  |
|-------------------------------|--------|
| Intensity Mg 280.271          | 856308 |
| Intensity BG Mg 280.271       | 6775   |
| Intensity Mg 285.213          | 195139 |
| Intensity BG Mg 285.213       | 19698  |
| F <sub>r</sub>                | 12.75  |

Comments:

| Adjust detection (axial)  |         | Complies                            | Does not comply          |
|---------------------------|---------|-------------------------------------|--------------------------|
| Intensity value           | 4876323 | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Adjust detection (radial) |         |                                     |                          |
| X offset                  | 15      | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Y offset                  | 0       | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Intensity value           | 860058  | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

Comments:

### 5.5 Verification of the wavelength accuracy, generator robustness and analytical performance

- Requirements
  - Start ASpect PQ
  - Perform measurements with the standard sample introduction kit
  - Load the sequence 'maintenance\_PO9100'
  - Plasma burn-in time 15 min
  - 1 mg/L multi-element solution (Merck standard IV for ICP) in 3 % HNO<sub>3</sub>
  - Plasma conditions 12 L/min plasma gas, 0.5 L/min auxiliary gas, 0.6 L/min nebulizer gas
  - Plasma power 1200 W
  - Measurement time 10 s
- Start the sequence 'maintenance\_PO9100' (duration approx. 40 min).  
The sequence automatically loads the methods that are necessary to determine the data.

### Wavelength accuracy

- Open the spectra display of the measured lines one after the other. Read off the peak position (peak position before correction). Carry out the peak correction by clicking on **[Find peak center]** and read off the peak position again (peak position after correction). Calculate the difference between the two values (peak position before correction - peak position after correction).

|                  |                                       | Rated value | Actual value |
|------------------|---------------------------------------|-------------|--------------|
| Mn (257.6100 nm) | Relative standard deviation (RSD) [%] | < 2         | 0.30         |
|                  | Limit of detection LOD [mg/L]         | < 0.0004    | 0.000038     |
|                  | Recovery [%]                          | 100 ± 10    | 100.3        |
|                  | Relative standard deviation (RSD) [%] | < 1.5       | 0.59         |
| Cu (324.7540 nm) | Limit of detection LOD [mg/L]         | < 0.0015    | 0.000244     |
|                  | Recovery [%]                          | 100 ± 10    | 101.3        |
|                  | Relative standard deviation (RSD) [%] | < 1.5       | 0.34         |
|                  | Limit of detection LOD [mg/L]         | < 0.003     | 0.000366     |
| Li 670.7910 nm   | Recovery [%]                          | 100 ± 10    | 99.3         |
|                  | Relative standard deviation (RSD) [%] | < 1.5       | 0.41         |
|                  |                                       |             |              |
|                  |                                       |             |              |

Comments:

|  |
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|  |

|                           |                                       |             |              |  |
|---------------------------|---------------------------------------|-------------|--------------|--|
| Analytical performance    |                                       |             |              |  |
| PlasmaQuant PQ 9100 Elite |                                       |             |              |  |
| Zn 213.8560 nm            | Limit of detection LOD [mg/L]         | Rated value | Actual value |  |
|                           |                                       | < 0.0015    |              |  |
|                           | Recovery [%]                          | 100 ± 10    |              |  |
|                           | Relative standard deviation (RSD) [%] | < 2         |              |  |
| Mn (257.6100 nm)          | Limit of detection LOD [mg/L]         | < 0.0002    |              |  |
|                           | Recovery [%]                          | 100 ± 10    |              |  |
|                           | Relative standard deviation (RSD) [%] | < 1.5       |              |  |
|                           |                                       | N/A         |              |  |
| Cu (324.7540 nm)          | Limit of detection LOD [mg/L]         | < 0.0010    |              |  |
|                           | Recovery [%]                          | 100 ± 10    |              |  |
|                           | Relative standard deviation (RSD) [%] | < 1.5       |              |  |
|                           |                                       |             |              |  |
| Li 670.7910 nm            | Limit of detection LOD [mg/L]         | < 0.0025    |              |  |
|                           | Recovery [%]                          | 100 ± 10    |              |  |
|                           | Relative standard deviation (RSD) [%] | < 1.5       |              |  |
|                           |                                       |             |              |  |
| PlasmaQuant PQ 9100       |                                       |             |              |  |
| Zn 213.8560 nm            | Limit of detection LOD [mg/L]         | Rated value | Actual value |  |
|                           |                                       | <0.002      | 0.000054     |  |
|                           | Recovery [%]                          | 100 ± 10    | 98.8         |  |
|                           |                                       |             |              |  |

## 7 Completing maintenance

|                                                                                                                                                   |                                 | Complies   | Does not comply |
|---------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|------------|-----------------|
| Maintenance on the analyzer has been completed.                                                                                                   |                                 |            |                 |
| The functionality and analytical performance of the device was checked in the presence of the user. The device meets its technical specification. |                                 |            |                 |
| Name                                                                                                                                              | Function                        | Date       | Signature       |
|                                                                                                                                                   | Representative Customer         | 6 Jun 2025 |                 |
|                                                                                                                                                   | Representative Analytik Jena AG | 6 Jun 2025 |                 |
|                                                                                                                                                   |                                 |            |                 |
|                                                                                                                                                   |                                 |            |                 |

## 6 Comments and objections

Comments and possible objections raised during installation and commissioning are to be recorded in writing in this section.

|  |
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We hereby certify that the instrument under mentioned has been certainly calibrated according to our calibration standard and the testing result in the calibration procedure has been good enough within the tolerance regulated in our specification.

Reference Standard

| Standard Gas Concentrations | Reference No. | Due Date  |
|-----------------------------|---------------|-----------|
| Nitrogen (Zero) ppm         | 8241          | 20-Apr-27 |
| Cabon monoxide 45 ppm       | EB0129027     | 29-Oct-27 |
| Cabon dioxide 850 ppm       | 3805/21       | 20-Aug-27 |

Result of Calibration

Calibration Results (Before Adjustment)

| Parameter of Standard | STD Values | UUC   | Drift | Drift% |
|-----------------------|------------|-------|-------|--------|
| Nitrogen (Zero)       | 0.0        | 0.4   | -0.4  | -2.00  |
| Cabon monoxide        | 45.0       | 44.1  | 0.9   | 2.04   |
| Cabon dioxide         | 850.0      | 844.5 | 5.5   | 0.65   |

Calibration Results (After Adjustment)

| Parameter of Standard | STD Values | UUC   | Drift | Drift% |
|-----------------------|------------|-------|-------|--------|
| Nitrogen (Zero)       | 0.0        | 0.0   | 0.0   | 0.00   |
| Cabon monoxide        | 45.0       | 44.8  | 0.2   | 0.45   |
| Cabon dioxide         | 850.0      | 849.1 | 0.9   | 0.11   |

STD = Standard  
UUC = Unit Under Calibration

Calibration & Test Certificate

FOR

Equipment Name : Air Quality Monitor  
Manufacturer : Quest Technology  
Model : AQ-5000  
Serial Number : 1527  
Location of Calibration : In Lab  
Customer Name : HEALTH & ENVTECH CO., LTD.  
6 Soi Ngamwongwan 5, Bang Khen, Nonthaburi,  
Nonthaburi 11000  
Received Date : Oct 26, 2025  
Calibration Date : Oct 30, 2025  
Recommended Due Date : N/A

Parameter of Calibration : Gas Calibration (Nitrogen (Zero) ppm),  
Carbon monoxide 45 ppm  
Carbon dioxide 850 ppm

CONDITION AS RECEIVED : Normal

Environmental Conditions  
Ambient Temperature : (25 ± 2) °C  
Relative Humidity : (50 ± 15) %RH  
Result : Adjustment (See data attached in page 2 to the end of certificate)

1. The report applies to the item and shall not be reproduced except in full, without written approval by Calibration Laboratory, Envir Service Co., Ltd.
2. The working standard is indicated in page 2 of this certificate.
3. This result of this report only to the item calibrated.

Date of Calibration : Oct 30, 2025  
Valid to : Oct 29, 2026

Calibrated By

(Technician)

(Technician Manager)



Certificate No.: C06260017

Page 2 of 3

Calibration Results:  
Without Adjustment

Wavelength Accuracy (nm), The spectral bandwidth of Std at 1.5 nm and UUC at 1.4 nm

| Standard Wavelength | Unit Under Calibration | Correction | Uncertainty |
|---------------------|------------------------|------------|-------------|
| 360.93              | 360.92                 | 0.01       | 0.13        |
| 418.59              | 418.58                 | 0.01       | 0.13        |
| 460.02              | 460.00                 | 0.02       | 0.13        |
| 536.59              | 536.50                 | 0.09       | 0.13        |
| 684.40              | 684.68                 | -0.28      | 0.13        |

Photometric Accuracy (Absorbance)

| Wavelength | Standard absorbance | Unit Under Calibration | Correction | Uncertainty |
|------------|---------------------|------------------------|------------|-------------|
| 420 nm     | 0.0000              | 0.0000                 | 0.0000     | 0.0045      |
|            | 0.5772              | 0.5762                 | 0.0010     | 0.0045      |
|            | 0.7198              | 0.7179                 | 0.0019     | 0.0045      |
|            | 1.0394              | 1.0377                 | 0.0017     | 0.0045      |
| 440 nm     | 0.0000              | 0.0000                 | 0.0000     | 0.0045      |
|            | 0.5608              | 0.5598                 | 0.0010     | 0.0045      |
|            | 0.7062              | 0.7043                 | 0.0019     | 0.0045      |
|            | 1.0189              | 1.0171                 | 0.0018     | 0.0045      |
| 485 nm     | 0.0000              | 0.0000                 | 0.0000     | 0.0045      |
|            | 0.5214              | 0.5201                 | 0.0013     | 0.0045      |
|            | 0.6652              | 0.6633                 | 0.0019     | 0.0045      |
|            | 0.9577              | 0.9560                 | 0.0017     | 0.0045      |
| 546.1 nm   | 0.0000              | 0.0000                 | 0.0000     | 0.0045      |
|            | 0.5192              | 0.5181                 | 0.0011     | 0.0045      |
|            | 0.6907              | 0.6893                 | 0.0014     | 0.0045      |
|            | 0.9949              | 0.9929                 | 0.0020     | 0.0045      |
| 590 nm     | 0.0000              | 0.0000                 | 0.0000     | 0.0045      |
|            | 0.5530              | 0.5516                 | 0.0014     | 0.0045      |
|            | 0.7555              | 0.7541                 | 0.0014     | 0.0045      |
|            | 1.0761              | 1.0744                 | 0.0017     | 0.0045      |
| 635 nm     | 0.0000              | 0.0000                 | 0.0000     | 0.0045      |
|            | 0.5604              | 0.5592                 | 0.0012     | 0.0045      |
|            | 0.7418              | 0.7406                 | 0.0012     | 0.0045      |
|            | 1.0467              | 1.0453                 | 0.0014     | 0.0045      |

บริษัท เคเอสเอ็ม เทคโนโลยี จำกัด  
DKSH Technology Limited  
2533 หมู่ 10 ถนนสุขุมวิท แขวงคลองเตย เขตคลองเตย กรุงเทพมหานคร 10110  
Phone: +66 2839 7000 Email: info.calibration@dksh.com Website: www.dksh.com/scientific-thailand

Delivering Growth - In Asia and Beyond.

CAL-FM-C06-17: 30 Jun 2025



Certificate of Calibration

Equipment:

SPECTROPHOTOMETER

Certificate No.: C06260017

Manufacturer:

Analytik jena

Job No.: WO-00101617

Model:

SPECORD 50PLUS

Issued Date: 12 January 2026

Serial No.:

232H1012

Page: 1 of 3

ID No.:

LB-HE-073

Condition of the item: Normal

Customer:

Health & Envitech Co., Ltd.

6 Ngamwongwan Soi 5, Tumbon Bangkokhen,

Mueangnontaburi, Nontaburi 11000 Thailand

Environment Condition:

Temperature 24.2 °C ± 0.4 °C

Relative Humidity 54.2 % ± 1.6 %

Calibration Place:

Health & Envitech Co., Ltd. ( Lab ๕๓ 2 )

6 Ngamwongwan Soi 5, Tumbon Bangkokhen,

Mueangnontaburi, Nontaburi 11000 Thailand

Calibration By:

Mr. Atchai Ngamchanat

Calibration Date:

12 January 2026

The Method Used:

In house method, CAL-WI-24, base on ASTM E 275-08 and ASTM E 387-04

This certificate is traceable to the CRM maintained by National Institute of Standards and Technology (NIST) through Starna Scientific Limited.

The standard for Wavelength Certificate No. 118106 and 118118

The standard for Photometric Certificate No. 118123 and 118113

The standard for Stray light Certificate No. 118110 and 118112

The standard for Spectral resolution Certificate No. 118104

Person in charge

Authorized signatory

This certificate is issued the units of measurement according to the International System of Units (SI). It provides traceability of measurement to international or national standard or other recognized national standard laboratories.

The measurement uncertainty stated is the expanded uncertainty which is obtained from the standard uncertainty multiplied by the coverage factor (k=2) to provide a level of confidence of approximately 95%. It is determined in accordance with Evaluation of measurement data - Guide to the expression of uncertainty in measurement (JCGM 100).

These results may be affected by deviations from specified conditions. The results relate only to the items tested, calibrated or sampled. The report shall not be reproduced except in full without approval of DKSH Technology Limited.

บริษัท เคเอสเอ็ม เทคโนโลยี จำกัด  
DKSH Technology Limited  
2533 หมู่ 10 ถนนสุขุมวิท แขวงคลองเตย เขตคลองเตย กรุงเทพมหานคร 10110  
Phone: +66 2839 7000 Email: info.calibration@dksh.com Website: www.dksh.com/scientific-thailand

Delivering Growth - In Asia and Beyond.

CAL-FM-C06-17: 30 Jun 2025



Statements of conformity:

This conformity certificate documents the validity of the following statements of conformity based on the measurement results of corresponding calibration certificate:

The error of temperature determined during calibration are under given measurement and environmental conditions and considering the expanded measurement uncertainty (coverage probability 95%) within the specification. The given measurement uncertainty already includes other all effects by according to the standard method, ASTM E 275-08 and ASTM E 387-04. Therefore, those parameters have not been assessed separately.

Tolerance and Decision rules:

Assessment of the conformity of the measurement device are done based on direct comparison of the relevant measurement results with the tolerances and decision rule are prescribed by the customer.

- Decision rule : ☐ Choice A Binary Statement for Simple Acceptance Rule ( $w = 0$ ), Specific Risk < 50% PFA,
- ☒ Choice B Non-binary statement with guard band ( $w = 1$  U), Pass or Fail Specific Risk < 2.5% PFA and Condition Pass or Condition Fail Specific Risk < 50% PFA,
- ☐ Choice C Customer defined. Customers may define arbitrary multiple of  $r$  to have applied as guard band ( $w = r$  U).
- : PFA – Probability of False Accept



Authorized signatory



Calibration Results:  
Without Adjustment

| Photometric Accuracy (Absorbance) |                      |                        |                |             |
|-----------------------------------|----------------------|------------------------|----------------|-------------|
| Wavelength                        | Standard absorbance  | Unit Under Calibration | Correction     | Uncertainty |
| 235 nm                            | 0.0000               | 0.0000                 | 0.0000         | 0.0080      |
|                                   | 0.7533               | 0.7493                 | 0.0040         | 0.0080      |
| 257 nm                            | 0.0000               | 0.0000                 | 0.0000         | 0.0080      |
|                                   | 0.8745               | 0.8713                 | 0.0032         | 0.0080      |
| 313 nm                            | 0.0000               | 0.0000                 | 0.0000         | 0.0080      |
|                                   | 0.2926               | 0.2924                 | 0.0002         | 0.0080      |
| 350 nm                            | 0.0000               | 0.0000                 | 0.0000         | 0.0080      |
|                                   | 0.6486               | 0.6475                 | 0.0011         | 0.0080      |
| Stray light *                     |                      |                        |                |             |
| Standard: cut-off                 | UUC: Wavelength (nm) | UUC: Transmission (%T) | Absorbance (A) |             |
| 260.95 +/- 0.11 nm                | 260.96               | 1.36                   | 1.8665         |             |
| 392.04 +/- 0.11 nm                | 392.04               | 1.34                   | 1.8729         |             |

| Spectral Resolution *            |        |        |       |      |
|----------------------------------|--------|--------|-------|------|
| Nominal Concentration 0.02 % v/v | Peak   | Trough | Ratio | SBW  |
| Standard Wavelength (nm)         | 268.74 | 266.81 | 1.44  | 2.00 |
| UUC: Wavelength (nm)             | 268.72 | 266.50 |       |      |
| Std Absorbance (A)               | 0.5137 | 0.3473 |       |      |
| UUC: Absorbance (A)              | 0.4991 | 0.3471 |       |      |

\* Calibration Marked "Not TISI Accredited" in this Certificate have been included for completeness.

The End of Certificate

**Without Adjustment**
**Photometric Accuracy (Absorbance)**

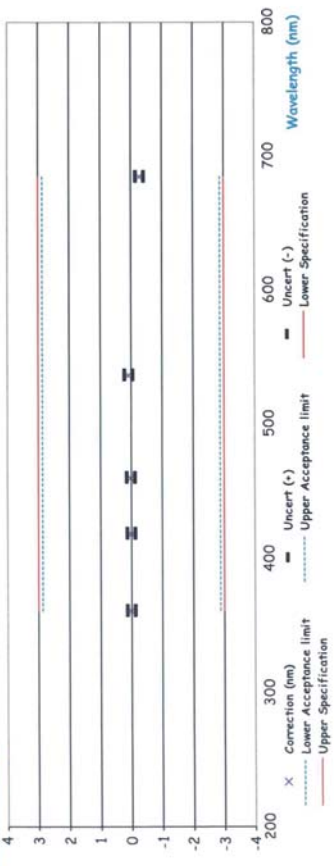
| Wavelength | Unit Under Calibration | Correction | Guard Band (w) | Tolerance (±) | Conformity |
|------------|------------------------|------------|----------------|---------------|------------|
| 420 nm     | 0.0000                 | 0.0000     | 0.0045         | 0.0150        | Pass       |
|            | 0.5762                 | 0.0010     | 0.0045         | 0.0150        | Pass       |
|            | 0.7179                 | 0.0019     | 0.0045         | 0.0150        | Pass       |
|            | 1.0377                 | 0.0017     | 0.0045         | 0.0150        | Pass       |
| 440 nm     | 0.0000                 | 0.0000     | 0.0045         | 0.0150        | Pass       |
|            | 0.5598                 | 0.0010     | 0.0045         | 0.0150        | Pass       |
|            | 0.7043                 | 0.0019     | 0.0045         | 0.0150        | Pass       |
|            | 1.0171                 | 0.0018     | 0.0045         | 0.0150        | Pass       |
| 465 nm     | 0.0000                 | 0.0000     | 0.0045         | 0.0150        | Pass       |
|            | 0.5201                 | 0.0013     | 0.0045         | 0.0150        | Pass       |
|            | 0.6633                 | 0.0019     | 0.0045         | 0.0150        | Pass       |
|            | 0.9560                 | 0.0017     | 0.0045         | 0.0150        | Pass       |
| 546.1 nm   | 0.0000                 | 0.0000     | 0.0045         | 0.0150        | Pass       |
|            | 0.5181                 | 0.0011     | 0.0045         | 0.0150        | Pass       |
|            | 0.6893                 | 0.0014     | 0.0045         | 0.0150        | Pass       |
|            | 0.9929                 | 0.0020     | 0.0045         | 0.0150        | Pass       |
| 590 nm     | 0.0000                 | 0.0000     | 0.0045         | 0.0150        | Pass       |
|            | 0.5516                 | 0.0014     | 0.0045         | 0.0150        | Pass       |
|            | 0.7541                 | 0.0014     | 0.0045         | 0.0150        | Pass       |
|            | 1.0744                 | 0.0017     | 0.0045         | 0.0150        | Pass       |
| 635 nm     | 0.0000                 | 0.0000     | 0.0045         | 0.0150        | Pass       |
|            | 0.5592                 | 0.0012     | 0.0045         | 0.0150        | Pass       |
|            | 0.7406                 | 0.0012     | 0.0045         | 0.0150        | Pass       |
|            | 1.0453                 | 0.0014     | 0.0045         | 0.0150        | Pass       |

The validity of the statements of conformity cannot be guaranteed for different places of use, environmental conditions or improper use.

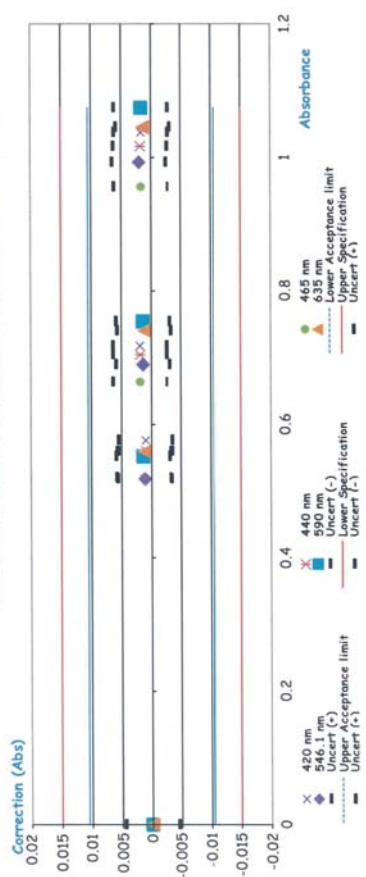
**Without Adjustment**
**Wavelength Accuracy (nm), The spectral bandwidth of Std at 1.5 nm and UUC at 1.4 nm**

| Unit Under Calibration | Correction | Guard Band (w) | Tolerance (±) | Conformity |
|------------------------|------------|----------------|---------------|------------|
| 360.92                 | 0.01       | 0.13           | 3.00          | Pass       |
| 418.58                 | 0.01       | 0.13           | 3.00          | Pass       |
| 460.00                 | 0.02       | 0.13           | 3.00          | Pass       |
| 536.50                 | 0.09       | 0.13           | 3.00          | Pass       |
| 684.68                 | -0.28      | 0.13           | 3.00          | Pass       |

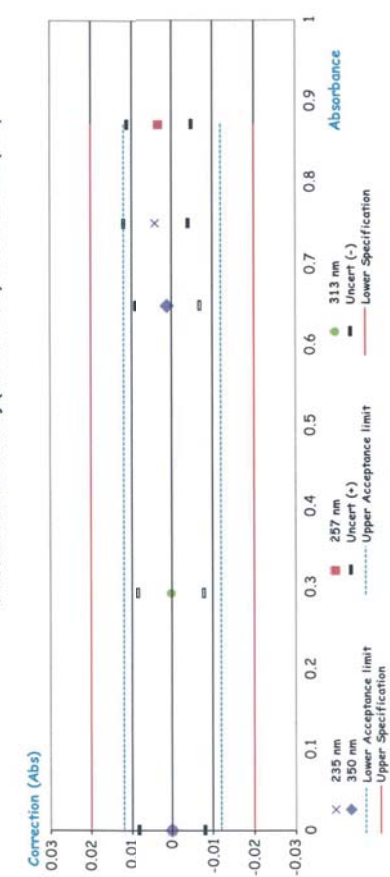
The validity of the statements of conformity cannot be guaranteed for different places of use, environmental conditions or improper use.



Photometric Accuracy (Absorbance) Tolerance 0.015 (Abs)



Photometric Accuracy (Absorbance) Tolerance 0.02 (Abs)



| Without Adjustment                |                        |            |                |               |
|-----------------------------------|------------------------|------------|----------------|---------------|
| Photometric Accuracy (Absorbance) |                        |            |                |               |
| Wavelength                        | Unit Under Calibration | Correction | Guard Band (w) | Tolerance (±) |
| 235 nm                            | 0.0000                 | 0.0000     | 0.0080         | 0.0200        |
| 257 nm                            | 0.0000                 | 0.0000     | 0.0080         | 0.0200        |
| 313 nm                            | 0.0000                 | 0.0000     | 0.0080         | 0.0200        |
| 350 nm                            | 0.0000                 | 0.0000     | 0.0080         | 0.0200        |

The validity of the statements of conformity cannot be guaranteed for different places of use, environmental conditions or improper use.

The End of Statements of Conformity

Equipment Qualification Plan To IC System

This Qualified has Included

Performance Qualifications (PQ)

To Instrument List on below

| Name and Model | Serial Number | Manufacturer |
|----------------|---------------|--------------|
| ICS-1000       | 07090143      | Dionex       |
| AS-1           | 09090418      | Dionex       |
| Chromeleon     | Version 6.80  | Dionex       |

This report confirms that the above instrument has been installed and performance test the actual record and measurement results are stated on the inside of Equipment Qualification Report.

Present to Customer Name: Health & Envitech Co.,Ltd.  
Department: Analytical Lab  
Address: 6 Soi Ngamwongwan 5, Bangkhen subdistrict, Mueang Nonthaburi District, Nonthaburi Province 11000  
Present By: Meshcotech Co.,Ltd.  
Instrument System ID: LB-HE-108

Authorised's signature/Date

Acceptor's Signature/Date



Checklist for Spectrophotometer

Worksheet number: WO-00101617  
S/N: 232H1012

| Instrument type: Spectrophotometer  |                          |                              | Model: SPECORD 50PLUS               |                          | S/N: 232H1012 |  |
|-------------------------------------|--------------------------|------------------------------|-------------------------------------|--------------------------|---------------|--|
| Check (receive)                     |                          | Checklist                    | Check (send)                        |                          | Note          |  |
| 12 Jan 2026                         |                          |                              | 12 Jan 2026                         |                          |               |  |
| Normal                              | Defective                |                              | Normal                              | Defective                |               |  |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> |                              | <input checked="" type="checkbox"/> | <input type="checkbox"/> |               |  |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | 1. Integrity of the tools    | <input checked="" type="checkbox"/> | <input type="checkbox"/> |               |  |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | 2. Cleanliness of tools      | <input checked="" type="checkbox"/> | <input type="checkbox"/> |               |  |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | 3. On-Off Switch             | <input checked="" type="checkbox"/> | <input type="checkbox"/> |               |  |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | 4. Keypad                    | <input checked="" type="checkbox"/> | <input type="checkbox"/> |               |  |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | 5. Display, Screen Contrast  | <input checked="" type="checkbox"/> | <input type="checkbox"/> |               |  |
| <input type="checkbox"/>            | <input type="checkbox"/> | 6. Battery Backup >= 2.5 VDC | <input type="checkbox"/>            | <input type="checkbox"/> | -             |  |
| <input type="checkbox"/>            | <input type="checkbox"/> | 7. Wavelength Control        | <input type="checkbox"/>            | <input type="checkbox"/> | -             |  |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | 8. Wavelength Check          | <input checked="" type="checkbox"/> | <input type="checkbox"/> |               |  |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | 9. UV < 3,000 hour           | <input checked="" type="checkbox"/> | <input type="checkbox"/> |               |  |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | 10. Visible < 5,000 hour     | <input checked="" type="checkbox"/> | <input type="checkbox"/> |               |  |
| <input type="checkbox"/>            | <input type="checkbox"/> | 11. Carousel Module          | <input type="checkbox"/>            | <input type="checkbox"/> | -             |  |

Recommend :

Mr.Atachai Ngamchanat  
Service Engineer



## Flow Rate Accuracy Result

Customer: Heath & Envitech Co., Ltd. Qualifier: Meshcotech Co., Ltd.  
 Department: Analytical Lab Procedure: SOP V5-FL v5r0  
 Manufacturer: Dionex Model: ICS-1000  
 Serial No: 07090143 System LB-HE-108  
 Standard Batch: N/A Traceable To: 5175-LFM  
 Expiry Date: September 01, 2026

The result reference to raw data on page: 1

| Theoretical<br>Flow Rate ml/min. | Observed<br>Flow Rate ml/min. | Average<br>Flow Rate ml/min. | Deviation ml/min.<br>% Error |
|----------------------------------|-------------------------------|------------------------------|------------------------------|
| 0.5000                           | 0.4973                        | 0.4969                       | 0.63                         |
|                                  | 0.4927                        |                              |                              |
|                                  | 0.4982                        |                              |                              |
|                                  | 0.4982                        |                              |                              |
|                                  | 0.4979                        |                              |                              |
| 1.0000                           | 1.0053                        | 1.0014                       | 0.14                         |
|                                  | 1.0042                        |                              |                              |
|                                  | 1.0048                        |                              |                              |
|                                  | 0.9943                        |                              |                              |
| 1.5000                           | 1.4942                        | 1.4969                       | 0.21                         |
|                                  | 1.4985                        |                              |                              |
|                                  | 1.4962                        |                              |                              |
|                                  | 1.4972                        |                              |                              |
| 2.0000                           | 1.9934                        | 1.9963                       | 0.19                         |
|                                  | 1.9942                        |                              |                              |
|                                  | 1.9933                        |                              |                              |
|                                  | 2.0057                        |                              |                              |
|                                  | 1.9948                        |                              |                              |

Acceptance criteria  
of absolute deviation  
Evaluate Result  $\leq 1\%$  **PASS**

Qualifier's signature:

Authorised by:

Date: 07/09/2025

Date: 07/09/2025

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PQR-PUMF



## Flow Rate Precision Result

Customer: Heath & Envitech Co., Ltd. Qualifier: Meshcotech Co., Ltd.  
 Department: Analytical Lab Procedure: SOP V5-FL v5r0  
 Manufacturer: Dionex Model: ICS-1000  
 Serial No: 07090143 System ID: LB-HE-108  
 Standard Batch: N/A Traceable To: 5175-LFM  
 Expiry Date: September 01, 2026

The result reference to raw data on page: 1

|         | Flow Rate<br>0.5000 ml/min | Flow Rate<br>1.0000 ml/min | Flow Rate<br>1.5000 ml/min | Flow Rate<br>2.0000 ml/min |
|---------|----------------------------|----------------------------|----------------------------|----------------------------|
| 1       | 0.4973                     | 1.0053                     | 1.4942                     | 1.9934                     |
| 2       | 0.4927                     | 1.0042                     | 1.4985                     | 1.9942                     |
| 3       | 0.4982                     | 1.0048                     | 1.4962                     | 1.9933                     |
| 4       | 0.4982                     | 0.9943                     | 1.4972                     | 2.0057                     |
| 5       | 0.4979                     | 0.9984                     | 1.4982                     | 1.9948                     |
| Average | 0.4969                     | 1.0014                     | 1.4969                     | 1.9963                     |
| %RSD    | 0.4738                     | 0.4841                     | 0.1163                     | 0.2656                     |

Acceptance criteria of %RSD  $\leq 1\%$

Evaluate Result **PASS**

Qualifier's signature:

Authorised by:

Date: 07/09/2025

Date: 07/09/2025

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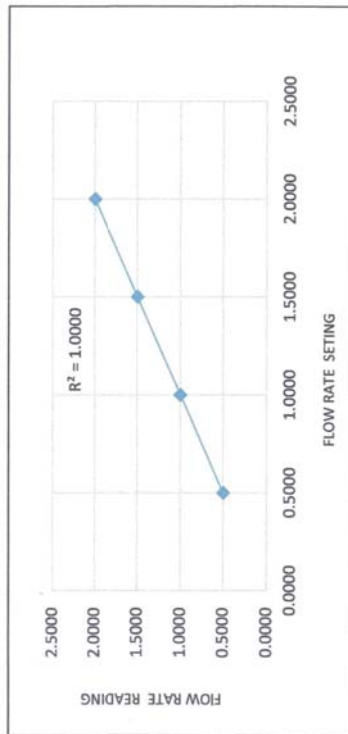


## Flow Rate Linearity Result

Customer: Heath & Envitech Co., Ltd.  
 Qualifier: Meshcotech Co., Ltd.  
 Department: Analytical Lab  
 Procedure: SOP V5-FL v5r0  
 Manufacturer: Dionex  
 Model: ICS-1000  
 Serial No: 07090143  
 System ID: LB-HE-108  
 Standard Batch: N/A  
 Traceable To: 5175-LFM  
 Expiry Date: September 01, 2026

The result reference to raw data on page: 1

|          | Flow Rate (ml/min) | Flow Rate (ml/min) | Flow Rate (ml/min) | Flow Rate (ml/min) |
|----------|--------------------|--------------------|--------------------|--------------------|
| 1        | 0.4973             | 1.0053             | 1.4942             | 1.9934             |
| 2        | 0.4927             | 1.0042             | 1.4985             | 1.9942             |
| 3        | 0.4982             | 1.0048             | 1.4962             | 1.9933             |
| 4        | 0.4982             | 0.9943             | 1.4972             | 2.0057             |
| 5        | 0.4979             | 0.9984             | 1.4982             | 1.9948             |
| Average  | 0.4969             | 1.0014             | 1.4969             | 1.9963             |
| R-Square |                    |                    |                    |                    |
| 1.0000   |                    |                    |                    |                    |



Acceptance criteria of  $R^2$  > 0.9960

Evaluate Result **PASS**

Qualifier's signature: [Redacted]

Date: 07/09/2025

Authorised by: [Redacted]

Date: 07/09/2025

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## Injection Precision Result

Customer: Heath & Envitech Co., Ltd.  
 Qualifier: Meshcotech Co., Ltd.  
 Department: Analytical Lab  
 Procedure: SOP V5-FL v5r0  
 Manufacturer: Dionex  
 Model: AS-1  
 Serial No: 09090418  
 System ID: LB-HE-108  
 Lot Number: 240701  
 Traceable To: 060254  
 Expiry Date: September 01, 2026

The result reference to raw data on page: 2-11

| Number of Injection | 20 µl    | Area of Injection | 20 µl |
|---------------------|----------|-------------------|-------|
| 1                   | 5545.576 |                   |       |
| 2                   | 5575.454 |                   |       |
| 3                   | 5593.324 |                   |       |
| 4                   | 5674.767 |                   |       |
| 5                   | 5554.282 |                   |       |
| 6                   | 5558.139 |                   |       |
| 7                   | 5492.733 |                   |       |
| 8                   | 5574.653 |                   |       |
| 9                   | 5588.276 |                   |       |
| 10                  | 5636.010 |                   |       |
| STDVE               | 49.831   |                   |       |
| Average             | 5579.321 |                   |       |
| %RSD                | 0.89     |                   |       |

Acceptance criteria of %RSD ≤ 1 %

Evaluate Result **PASS**

Qualifier's signature: [Redacted]

Date: 07/09/2025

Authorised by: [Redacted]

Date: 07/09/2025

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PQR-AUTPRE



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MESHCOOTECH CO.,LTD.

PQR-6

## Injection Carry Over Result

Customer: Heath & Envitech Co.,Ltd.  
Department: Analytical Lab  
Manufacturer: Dionex  
Serial No: 09090418  
Lot Number: 240701  
Expiry Date: September 01,2026

Qualifier: Meshcotech Co.,Ltd.  
Procedure: SOP V5-FL v5r0  
Model: AS-1  
System ID: LB-HE-108  
Traceable To: 060254

The result reference to raw data on page: 22-29

| Blank                    | Area      |
|--------------------------|-----------|
| Carry Over Blank 1 Rep 1 | 0         |
| Carry Over Blank 1 Rep 2 | 0         |
| Carry Over Blank 1 Rep 3 | 0         |
| Carry Over Blank 1 Rep 4 | 0         |
| Average Blank 1          | 0         |
| Carry Over Blank 2       | 0         |
| Carry Over Blank 3       | 0         |
| Standard                 | Area      |
| Carry Over Standard 1    | 66890.575 |
| Carry Over Standard 2    | 65494.864 |
| Average                  | 66192.720 |
| % Carry Over             | 0.00      |

Acceptation criteria of %Carry Over  $\leq 0.01\%$

Evaluate Result **PASS**

Qualifier's signature:

Date: 07/09/2025

Authorised by:

Date: 07/09/2025

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PQR-AUTCAR



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MESHCOOTECH CO.,LTD.

PQR-5

## Injection Precision Result

Customer: Heath & Envitech Co.,Ltd.  
Department: Analytical Lab  
Manufacturer: Dionex  
Serial No: 09090418  
Lot Number: 240701  
Expiry Date: September 01,2026

Qualifier: Meshcotech Co.,Ltd.  
Procedure: SOP V5-FL v5r0  
Model: AS-1  
System ID: LB-HE-108  
Traceable To: 060254

The result reference to raw data on page: 12-21

| Number of Injection 50 $\mu$ l | Area of Injection 50 $\mu$ l |
|--------------------------------|------------------------------|
| 1                              | 30224.244                    |
| 2                              | 30105.503                    |
| 3                              | 30043.474                    |
| 4                              | 29748.513                    |
| 5                              | 29911.895                    |
| 6                              | 29699.217                    |
| 7                              | 29799.576                    |
| 8                              | 29518.595                    |
| 9                              | 29631.382                    |
| 10                             | 30271.470                    |
| STDVE                          | 257.518                      |
| Average                        | 29895.387                    |
| %RSD                           | 0.86                         |

Acceptation criteria of %RSD  $\leq 1\%$

Evaluate Result **PASS**

Qualifier's signature:

Date: 07/09/2025

Authorised by:

Date: 07/09/2025

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PQR-AUTPRE



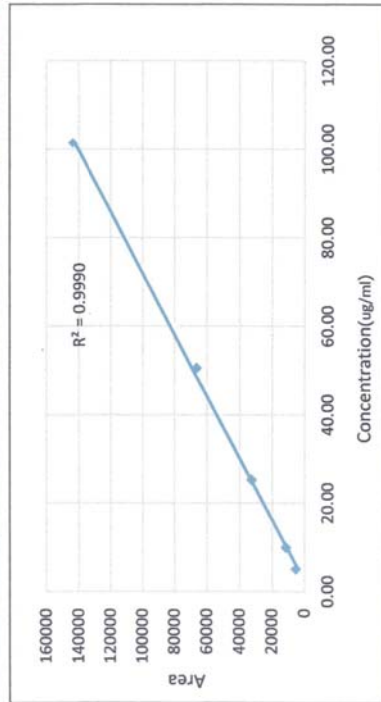
UV Linearity Result

Customer: Heath & Envitech Co.,Ltd.  
Department: Analytical Lab  
Manufacturer: Dionex  
Serial No: 07090143  
Lot Number: 240701  
Expiry Date: September 01,2026

Qualifier: Meshcotech Co.,Ltd.  
Procedure: SOP V5-GT v5r0  
Model: ICS-1000  
System ID: LB-HE-108  
Traceable To: 060254

The result reference to raw data on page: 30-34

|            | Concentration (ug/ml) | Area       |
|------------|-----------------------|------------|
| Standard 1 | 5.08                  | 5492.666   |
| Standard 2 | 10.00                 | 11549.378  |
| Standard 3 | 25.25                 | 32667.519  |
| Standard 4 | 50.53                 | 66456.280  |
| Standard 5 | 101.40                | 143780.020 |
| R-Square   |                       | 0.9990     |



Acceptation criteria of  $R^2$  >0.9960

Evaluate Result **PASS**

Qualifier's signature:

Date:

07/09/2025

Authorised by:

Date:

07/09/2025

PQR

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PQR-RESLIN



Detector CD Signal to Noise Test

Customer: Heath & Envitech Co.,Ltd.  
Department: Analytical Lab  
Manufacturer: Dionex  
Serial No: 07090143  
Lot Number: 240701  
Expiry Date: September 01,2026

Qualifier: Meshcotech Co.,Ltd.  
Procedure: SOP V5-GS v5r0 HPLC  
Model: ICS-1000  
System ID: LB-HE-108  
Traceable To: 060254

The result reference to raw data on page: 35

|                                    | Actual Reading | Signal to Noise |
|------------------------------------|----------------|-----------------|
| Standard Peak Response 1.63 Minute | 113.325        | 76.398          |
| Noise Response at 3-10 Minute      | 1.48           |                 |

Acceptation criteria  
Signal to Noise  $\geq$  50

Evaluate Result **PASS**

Qualifier's signature:

Date:

07/09/2025

Authorised by:

Date:

07/09/2025

PQR

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PQR-SIG2NOIS

