

ภาคผนวก ฉ

หนังสือขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์



ที่ อก ๐๓๓๐(๑)/ ๑๘๗ ๕

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๕๐๐

๐ ๙ กุมภาพันธ์ ๒๕๖๕

เรื่อง ค่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

เรียน กรรมการผู้จัดการ บริษัท ยูไนเต็ด แอนนาลิสต์ แอนด์ เอ็นจิเนียริ่ง คอนซัลแตนท์ จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน ลงวันที่ ๑๗ ธันวาคม ๒๕๖๔

- สิ่งที่ส่งมาด้วย
1. รายชื่อผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ จำนวน ๔๐ ราย
 2. รายชื่อเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๑๐๖ ราย
 3. ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม

ตามหนังสือที่อ้างถึง บริษัท ยูไนเต็ด แอนนาลิสต์ แอนด์ เอ็นจิเนียริ่ง คอนซัลแตนท์ จำกัด ค่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ๖-๑๕๕ สถานที่ตั้งเลขที่ ๓ ซอยอุดมสุข ๔๑ ถนนสุขุมวิท แขวงบางจาก เขตพระโขนง กรุงเทพมหานคร ต่อกรมโรงงานอุตสาหกรรม นั้น

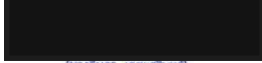
กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้บริษัท ยูไนเต็ด แอนนาลิสต์ แอนด์ เอ็นจิเนียริ่ง คอนซัลแตนท์ จำกัด ค่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน โดยมีองค์ประกอบดังนี้

- ก. ผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ จำนวน ๔๐ ราย ตามสิ่งที่ส่งมาด้วย ๑
ข. เจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๑๐๖ ราย ตามสิ่งที่ส่งมาด้วย ๒
ค. ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนไว้ในวิเคราะห์ในน้ำเสีย น้ำใต้ดิน อากาศเสีย สิ่งปฏิกูล หรือวัตถุที่ไม่ใช่แล้ว และดิน ตามสิ่งที่ส่งมาด้วย ๓

หนังสือฉบับนี้จะหมดอายุในวันที่ ๒ กุมภาพันธ์ ๒๕๖๕ หากประสงค์จะต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ให้ยื่นคำขอต่ออายุพร้อมเอกสารประกอบคำขอต่อกรมโรงงานอุตสาหกรรมภายใน ๓๐ วัน ก่อนวันสิ้นสุดของหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ทั้งนี้ สามารถยื่นคำขอผ่านระบบอิเล็กทรอนิกส์ได้ที่หน้าเว็บไซต์กรมโรงงานอุตสาหกรรม ตาม QR Code ที่ยหนังสือฉบับนี้

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ



(นางจันทรา เดชะศิริรักษ์)
ผู้อำนวยการกองประเมินและขึ้นทะเบียนโรงงาน
ปฏิบัติการทางเคมีและชีวเคมีกรมโรงงานอุตสาหกรรม



ยื่นคำขอผ่านระบบอิเล็กทรอนิกส์

กองวิจัยและเคียนมลพิษโรงงาน

กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษและทะเบียนห้องปฏิบัติการ

โทร. ๐ ๒๕๓๐ ๖๓๑๒ ถึง ๒๕๓๐๕๕

โทรสาร ๐ ๒๕๓๐ ๖๓๑๒ ถึง ๒๕๓๐๗

ไปรษณีย์อิเล็กทรอนิกส์ sarabangdw@gmail.go.th

-๒-

- ๑๖) นายสุกัญญา คุณอนากุล
๑๗) นางสาวศิริภาพร เหมอินทร์
๑๘) นางสาวนิตยา จำนิต
๑๙) นางสาวพรวิภา อึ้งจินดา
๒๐) นายณพนธ์ พันธุ์ชาติกุล

- ทะเบียนเลขที่ ๖-๑๕๕-๙-๐๐๐๖
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ทะเบียนเลขที่ ๖-๑๕๕-๙-๐๐๑๐



(นางจันทรา เดชะศิริรักษ์)
ผู้อำนวยการกองประเมินและขึ้นทะเบียนโรงงาน
ปฏิบัติการทางเคมีและชีวเคมีกรมโรงงานอุตสาหกรรม

เอกสารแนบท้ายหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
บริษัท ยูไนเต็ด แอนนาลิสต์ แอนด์ เอ็นจิเนียริ่ง คอนซัลแตนท์ จำกัด เลขทะเบียน ๖-๑๕๕
ที่ อก ๐๓๓๐(๑)/ ๑๘๗ ๕ ลงวันที่ ๐ ๙ กุมภาพันธ์ ๒๕๖๕

สิ่งที่ส่งมาด้วย ๑

ก. ผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ จำนวน ๔๐ ราย

- ๑) นางสาวกชวรรณ กัทธวิกุล
- ๒) นายณรงค์ ธีมพาลี
- ๓) นางสาวนิตยา บุญไชย
- ๔) นางปิยะพัชร สุทธิอนันต์
- ๕) นางมานิดา แฉ้วโย
- ๖) นางสาวบุญจรรณ วีระโยทัย
- ๗) นายพนิตน์ วรชัยวิชิตชัย
- ๘) นางสาวฉวีวรรณ บุญลา
- ๙) นายสุวิทย์ จอนนอก
- ๑๐) นางสาวไอลักษณ์ สมบูรณ์
- ๑๑) นางสาวบุษกร เลิศกาญจนา
- ๑๒) นางสาววิไลลักษณ์ ศรีสุข
- ๑๓) นางสาวปริยา จรัสโชติพันธ์
- ๑๔) นายศศิธร บรรจงโรจน์
- ๑๕) นายปฏิกรณ์ คณนา
- ๑๖) นายธีรวัฒน์ ธรรมัง
- ๑๗) นางสาวศิริพร ศรีประดิษฐ์
- ๑๘) นางสาวสวดี วีระ
- ๑๙) นางสาวนพวรรณ สุวราชัย
- ๒๐) นายภูษณ์ พานิชสิทธิ์ชัย
- ๒๑) นายณัฐวัฒน์ แสงสวัสดิ์
- ๒๒) นายเอกพันธ์ ปอดกนิษฐ์
- ๒๓) นางสาวศศิธร ศรีกุลสิทธิ์โชค
- ๒๔) นางสาวเจตจันทร์ ทำสอาด
- ๒๕) นางสาวสุวรรณ คงทอง
- ๒๖) นางสาววรรณ พัสสองชั้น
- ๒๗) นายวิรัช นิกแก้ว
- ๒๘) นายวิรัชพงศ์ เทพทนต์
- ๒๙) นายอนุสรณ์ สายดี
- ๓๐) นายกรวิทย์ เชื้อศิริกุล
- ๓๑) นางสาวอริกา รังสวัสดิ์
- ๓๒) นางสาวนภสรวรรณ คงคำ
- ๓๓) นายสุทธินันท์ อรุณจันทร์
- ๓๔) นางสาวทิพย์ อ่อนคำ
- ๓๕) นางสาวพร้อมพรรณ สมบูรณ์ธรรม

- ทะเบียนเลขที่ ๖-๑๕๕-๙-๐๐๐๑
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(นางจันทรา เดชะศิริรักษ์)
ผู้อำนวยการกองประเมินและขึ้นทะเบียนโรงงาน
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๑๖) นายบุญมี...

สิ่งที่ส่งมาด้วย ๒

เอกสารแนบท้ายหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
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ข. เจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๑๐๖ ราย

- ๑) นายสุกัญญา คุณอนากุล
- ๒) นางสาวศิริภาพร เหมอินทร์
- ๓) นางสาวนิตยา จำนิต
- ๔) นางสาวพรวิภา อึ้งจินดา
- ๕) นายณพนธ์ พันธุ์ชาติกุล
- ๖) นางสาวประภรณ์ ทองแก้ว
- ๗) นางสาวกัญญา สมบูรณ์
- ๘) นายอรรถพร เทพทนต์
- ๙) นางสาวณรรธิน พุทธิรักษ์
- ๑๐) นางสาววรรณิสา บุญเรือน
- ๑๑) นายภูษณ์ พานิชสิทธิ์ชัย
- ๑๒) นางสาวอรุณ อ่อนคง
- ๑๓) นายกิตติศักดิ์ ทรงจำรัส
- ๑๔) นางสาวอริกา รังสวัสดิ์
- ๑๕) นางสาวพรพิมล นวนทอง
- ๑๖) นายวิชัย สุวรรณวรา
- ๑๗) นายอภิวิชญ์ ทวี
- ๑๘) นายณณิตย์ ปานโชติ
- ๑๙) นายทศพร ณะพิรุฬห์
- ๒๐) นางสาวกัญญาณี โยธา
- ๒๑) นางสาวมาลี สุทธิ
- ๒๒) นางสาวชนัญญา อภิพัชร์ภา
- ๒๓) นายศิริพร จงคุณเกียรติ
- ๒๔) นางสาวสุภาวดี อินทาคี
- ๒๕) นายพงศ์เทพ เหล่าจร
- ๒๖) นายชัชชัย พันทุภะ
- ๒๗) นางสาวพัชรา ศิริพิศาล
- ๒๘) นางสาวเมธิกา เลิศคำจันทร์
- ๒๙) นายกานต์พงศ์ บุญพวง
- ๓๐) นางสาวสุธิดา เจริญชัยสมบัติ
- ๓๑) นายพนิตน์ จะโต
- ๓๒) นายพิเชษฐ์ ภูมิวิเศษ
- ๓๓) นายพิลา ใจบุญสุกุล
- ๓๔) นายชัชวาลย์ เลื่อนทอง
- ๓๕) นายปิยะนุช ศรีภูธร

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(นางจันทรา เดชะศิริรักษ์)
ผู้อำนวยการกองประเมินและขึ้นทะเบียนโรงงาน
ปฏิบัติการทางเคมีและชีวเคมีกรมโรงงานอุตสาหกรรม

๑๖) นายณณิต...

๓๖) นายณัฐกร ฤทธิธรรมรัตน์
๓๗) นายอภิรักษ์ ธีระโส
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๔๓) นายพรชุก ใจวสุกุล
๔๔) นายชิตะ แสงจันทร์
๔๕) นายณัฐพงศ์ เมืองชัย
๔๖) นายธนัท เลิศประเสริฐ
๔๗) นางสาวนิภาพร จันทเขตต์
๔๘) นายยุทธพงษ์ อิศระสุข
๔๙) นายธนากร กุศลกุลพัฒนา
๕๐) นางสาวศิริวรรณ ขอนพา
๕๑) นายณพพงศ์ สกุลไทย
๕๒) นายสุวิธิน นิธิเชิดชูวงศ์
๕๓) นายธีรภาณุ ยนศิริ
๕๔) นายเอกภูมิ แสนอ้อย
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๕๖) นายธนเดช ทวรรณานะ
๕๗) นายพิพัฒน์ ตันอบกุล
๕๘) นายอภิสิทธิ์ ศรีคงแก้ว
๕๙) นายภูวดล มงคลสูง
๖๐) นายอุทัย แก้วราษฎร์
๖๑) นางสาวนารีนาถ สานนท์
๖๒) นายศุภกร ธีรวงศ์
๖๓) นายศักดิ์สิทธิ์ เกียรติ
๖๔) นางสาวศิริพร อภิภาวรัตน์
๖๕) นางสาวจินตสุภา เปลี่ยนศรี
๖๖) นางสาวนันทนาภ งามบุญ
๖๗) นางสาวอารียา ธรรมย์
๖๘) นายจิรวัฒน์ สุขเกษม
๖๙) นายกิตติพงษ์ สอนชัยภูมิ
๗๐) นายจุณพล สอนเพชร
๗๑) นางสาวพัชราภรณ์ แสงฟ้า
๗๒) นายรัตนชัย เหลือง

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๗๓) นายอิทธิพงษ์ ศรีเดช
๗๔) นางสาวกรรณิการ์ สำเภา
๗๕) นายสุภากรณัฏฐ์ คุ้มศรี
๗๖) นายพรชัย คุ้มวัง
๗๗) นางสาวทัศนีย์ ไชยหาร
๗๘) นายธีรพงษ์ ศรีคำแหง
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๘๐) นางสาวลัดดาวัลย์ โพธิ์พันธ์
๘๑) นางสาวกมลวรรณ เข็มจันทร์
๘๒) นายณวัฒน์ จันทร์คุณ
๘๓) นายปิยวัฒน์ โขงู
๘๔) นางสาวพรนิชา กสิณกุล
๘๕) นายณสิทธิ์ ศรีพิมพ์
๘๖) นางสาวลลิตา จันทสุข
๘๗) นายสงกรานต์ มาลัยทอง
๘๘) นางสาวสัณฐิยา แซ่เขียว
๘๙) นายศักดิ์สอน นุ่ม
๙๐) นายรพีพร นนทจันทร์
๙๑) นางสาวนภา มาะมาตร์
๙๒) นางสาวธนพร คุณานุพันธ์ชัย
๙๓) นายวีระยุทธ สารวงศ์
๙๔) นางสาวธิดา วัชรพันธุ์วัฒน์
๙๕) นายสุพล พงศ์คำพร
๙๖) นายณัฐชัย พรหมอารักษ์
๙๗) นายชินนท์ ทานแก้ว
๙๘) นายปรีชาพล โสภ
๙๙) นายวัชรินทร์ แสนงาม
๑๐๐) นางสาวอนันต์ ทรัพย์
๑๐๑) นายอาทิตย์ อุดมผล
๑๐๒) นายปวีร์ ภูมิ
๑๐๓) นายอิทธิเดช ใจบุญ
๑๐๔) นายณวัฒน์ พงษ์อรรักษ์
๑๐๕) นางสาวสุภาวรัตน์ จันทร์ประทีป
๑๐๖) นายเสกสรรค์ เอกกลิ่นบัว

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(นางจินดา เลขาภิบาล)
ผู้อำนวยการกองบริหารงาน
ปฏิบัติการและแผนกบริหารงาน

๗๓) นายอิทธิพงษ์...

(นางจินดา เลขาภิบาล)
ผู้อำนวยการกองบริหารงาน
ปฏิบัติการและแผนกบริหารงาน

เอกสารแนบท้ายหนังสือรับข้ออาชญาขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกสาร
บริษัท ยูนิค แอนนาลิสต์ แอนด์ เอ็นจิเนียริง คอนซัลแตนท์ จำกัด เลขทะเบียน ๖-๑๕๕
ที่ อก ๐๓๑๐(๑)/ ๑๕๖๗ ๕ ลงวันที่ ๐๙ กุมภาพันธ์ ๒๕๖๕

สิ่งที่ส่งมาด้วย ๓

ขอขยายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๑๕๗ รายการ

น้ำเสีย จำนวน ๔๖ รายการ

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
1	Aldrin	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
2	Arsenic	1) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾
3	Barium	Digestion, Inductively Coupled Plasma Method ⁽⁴⁾
4	α-BHC	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
5	β-BHC	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
6	δ-BHC	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
7	γ-BHC	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
8	Biochemical Oxygen Demand	1) 5-Day BOD Test, Azide Modification Method ⁽⁴⁾ 2) 5-Day BOD Test, Membrane Electrode Method ⁽⁴⁾
9	Cadmium	1) Digestion, Direct Air-Acetylene Flame Method ⁽⁴⁾ 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ⁽⁴⁾
10	Chemical Oxygen Demand	3) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 1) Closed Reflux, Titrimetric Method ⁽⁴⁾ 2) Closed Reflux, Colorimetric Method ⁽⁴⁾ 3) Open Reflux, Titrimetric Method ⁽⁴⁾
11	Chlordane	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
12	Chromium	1) Digestion, Direct Air-Acetylene Flame Method ⁽⁴⁾ 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ⁽⁴⁾ 3) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾
13	Color	ADMI Weighted-Ordinate Spectrophotometric Method ⁽⁴⁾
14	Copper	1) Digestion, Direct Air-Acetylene Flame Method ⁽⁴⁾ 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ⁽⁴⁾ 3) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾
15	Cyanide	1) Distillation, Colorimetric Method ⁽⁴⁾ 2) Flow Injection Analysis Method ⁽⁴⁾

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
16	o,p'-DDT	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
17	4,4'-DDD	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
18	4,4'-DDE	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
19	4,4'-DDT	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
20	Dieldrin	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
21	Endosulfan I	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
22	Endosulfan II	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
23	Endosulfan sulfate	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
24	Endrin	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
25	Endrin aldehyde	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
26	Formaldehyde	Distillation, Colorimetric Method ⁽⁴⁾
27	Free Chlorine	1) Iodometric Method ⁽⁴⁾ 2) DPD Ferrous Titrimetric Method ⁽⁴⁾
28	Heptachlor	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
29	Heptachlor Epoxide	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
30	Hexavalent Chromium	1) Colorimetric Method ⁽⁴⁾ 2) Extraction, Direct Air-Acetylene Flame Method ⁽⁴⁾
31	Lead	1) Digestion, Direct Air-Acetylene Flame Method ⁽⁴⁾ 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ⁽⁴⁾ 3) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾
32	Manganese	1) Digestion, Direct Air-Acetylene Flame Method ⁽⁴⁾ 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ⁽⁴⁾ 3) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾
33	Mercury	Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ⁽⁴⁾
34	Methoxychlor	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
35	Nickel	1) Digestion, Direct Air-Acetylene Flame Method ⁽⁴⁾ 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ⁽⁴⁾ 3) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
36	Oil & Grease	1) Liquid-Liquid, Partition-Gravimetric Method ⁽⁴⁾ 2) Soxhlet Extraction Method ⁽⁴⁾
37	pH	Electrometric Method ⁽⁴⁾
38	Phenols	1) Distillation, Chloroform Extraction Method ⁽⁴⁾ 2) Distillation, Direct Photometric Method ⁽⁴⁾
39	Selenium	1) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾
40	Sulfide	1) Iodometric Method ⁽⁴⁾ 2) Methylene Blue Method ⁽⁴⁾
41	Temperature	Laboratory and Field Methods ⁽⁴⁾
42	Total Dissolved Solids	Dried at 180 °C ⁽⁴⁾
43	Total Kjeldahl Nitrogen	Semi-Micro-Kjeldahl Method ⁽⁴⁾
44	Total Suspended Solids	Dried at 103-105 °C ⁽⁴⁾
45	Trivalent Chromium	1) Digestion, Direct Air-Acetylene Flame Method; Colorimetric Method; Calculation ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma Method; Colorimetric Method; Calculation ⁽⁴⁾
46	Zinc	1) Digestion, Direct Air-Acetylene Flame Method ⁽⁴⁾ 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ⁽⁴⁾ 3) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾

น้ำใต้ดิน จำนวน 126 รายการ

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
1	Acenaphthene	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
2	Acetone	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
3	Aldrin	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾ 2.1.1

4 Anthracene...

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
4	Anthracene	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
5	Antimony	Digestion, Inductively Coupled Plasma Method ⁽⁴⁾
6	Arsenic	1) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾
7	Atrazine	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
8	Barium	1) Digestion, Electrothermal Atomic Absorption Spectrometric Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾
9	Benz(a)anthracene	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
10	Benzene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
11	Benzo(b)fluoranthene	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
12	Benzo(k)fluoranthene	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
13	Benzoic acid	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
14	Benzo(a)pyrene	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾ 2.1.1

15 Benzo(g,h,i)perylene...

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
15	Benzo(g,h,i)perylene	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
16	Beryllium	Digestion, Inductively Coupled Plasma Method ⁽⁴⁾
17	Bis(2-chloroethyl)ether	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
18	Bis(2-ethylhexyl)phthalate	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
19	Bromodichloromethane	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
20	Bromoform	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
21	Butanol	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
22	Butyl benzyl phthalate	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
23	Cadmium	1) Digestion, Direct Air-Acetylene Flame Method ⁽⁴⁾ 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ⁽⁴⁾ 3) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾
24	Carbazole	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
25	Carbon disulfide	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
26	Carbon tetrachloride	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
27	Chlordane	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
28	p-Chloroaniline	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
29	Chlorobenzene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾ 2.1.1

30 Chlorodibromomethane...

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
30	Chlorodibromomethane	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
31	Chloroform	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
32	2-Chlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
33	Chromium	1) Digestion, Direct Air-Acetylene Flame Method ⁽⁴⁾ 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ⁽⁴⁾ 3) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾
34	Chromium (III)	1) Digestion, Direct Air-Acetylene Flame Method; Colorimetric Method; Calculation ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma Method; Colorimetric Method; Calculation ⁽⁴⁾
35	Chromium (VI)	1) Colorimetric Method ⁽⁴⁾ 2) Extraction, Air-Acetylene Flame Method ⁽⁴⁾
36	Chrysene	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
37	Cyanide	Distillation, Colorimetric Method ⁽⁴⁾
38	2,4-D	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
39	DDD	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
40	DDE	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
41	DDT	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾ 2.1.1

42 Dibenz(a,h)anthracene...

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
42	Dibenz[a,h]anthracene	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
43	Di-n-butyl phthalate	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
44	1,2-Dichlorobenzene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
45	1,3-Dichlorobenzene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
46	1,4-Dichlorobenzene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
47	3,3'-Dichlorobenzidine	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
48	1,1-Dichloroethane	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
49	1,2-Dichloroethane	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
50	1,1-Dichloroethylene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
51	cis-1,2-Dichloroethylene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
52	trans-1,2-Dichloroethylene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
53	2,4-Dichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
54	1,2-Dichloropropane	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
55	1,3-Dichloropropane	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
56	1,3-Dichloropropene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
57	Dieldrin	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾

58 Diethyl phthalate...

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
58	Diethyl phthalate	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
59	2,4-Dimethylphenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
60	2,4-Dinitrophenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
61	2,4-Dinitrotoluene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
62	2,6-Dinitrotoluene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
63	Di-n-Octyl phthalate	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
64	Endosulfan	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
65	Endrin	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
66	Ethylbenzene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
67	Fluoranthene	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
68	Fluorene	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
69	Heptachlor	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾

70 Heptachlor epoxide...

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
70	Heptachlor epoxide	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
71	Hexachlorobenzene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
72	Hexachloro-1,3-butadiene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
73	n-Hexane	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
74	α-HCH	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
75	β-HCH	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
76	γ-HCH	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
77	Hexachlorocyclopentadiene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
78	Hexachloroethane	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
79	Indeno(1,2,3-cd)pyrene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
80	Isophorone	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
81	Lead	1) Digestion, Direct Air-Acetylene Flame Method ⁽⁴⁾ 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ⁽⁴⁾ 3) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾

82 Manganese...

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
82	Manganese	1) Digestion, Direct Air-Acetylene Flame Method ⁽⁴⁾ 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ⁽⁴⁾ 3) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾
83	Mercury	Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ⁽⁴⁾
84	Methanol	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
85	Methoxychlor	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
86	Methyl bromide	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
87	Methylene chloride	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
88	2-Methylphenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
89	2-Methylnaphthalene	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
90	Methyl tert-butyl ether	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
91	Naphthalene	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
92	Nickel	1) Digestion, Direct Air-Acetylene Flame Method ⁽⁴⁾ 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ⁽⁴⁾ 3) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾
93	Nitrobenzene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
94	N-Nitrosodiphenylamine	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
95	N-Nitrosodi-n-propylamine	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾

96 Polychlorinated Biphenyls...

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
96	Polychlorinated Biphenyls - PCB 1016 - PCB 1221 - PCB 1232 - PCB-1242 - PCB-1248 - PCB-1254 - PCB-1260	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
97	Pentachlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
98	pH	Electrometric Method ⁽⁴⁾
99	Phenanthrene	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
100	Phenol	1) Distillation, Chloroform Extraction Method ⁽⁴⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
101	Pyrene	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
102	Selenium	1) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾
103	Silver	Digestion, Inductively Coupled Plasma Method ⁽⁴⁾
104	Styrene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
105	1,1,2,2-Tetrachloroethane	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
106	Tetrachloroethylene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
107	Toluene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾

108 Toxaphene...

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
108	Toxaphene	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
109	TPH (C ₃ - C ₉)	1) Purge and Trap, Gas Chromatographic Method ^(11,21) 2) Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(11,21)
110	TPH (C ₁₀ - C ₁₄)	Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^(9,21)
111	TPH (C ₁₅ - C ₃₃)	Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^(9,21)
112	1,2,4-Trichlorobenzene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
113	1,1,1-Trichloroethane	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
114	1,1,2-Trichloroethane	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
115	Trichloroethylene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
116	2,4,5-Trichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
117	2,4,6-Trichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
118	1,3,5-Trimethylbenzene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
119	Vanadium	Digestion, Inductively Coupled Plasma Method ⁽⁴⁾
120	Vinyl acetate	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
121	Vinyl chloride	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
122	m-Xylene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
123	o-Xylene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾

124 p-Xylene...

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
124	p-Xylene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
125	Xylene (Total)	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
126	Zinc	1) Digestion, Direct Air-Acetylene Flame Method ⁽⁴⁾ 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ⁽⁴⁾ 3) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾

อากาศเสีย (ปล่องระบาย) จำนวน 25 รายการ

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
1	Antimony	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁽³⁾
2	Arsenic	1) Isokinetic Sampling, Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ⁽³⁾ 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁽³⁾
3	Cadmium	1) Isokinetic Sampling, Digestion, Direct Air-Acetylene Flame Method ⁽³⁾ 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁽³⁾
4	Carbon Monoxide	Instrumental Analyzer Method ⁽³⁾
5	Chlorine	Isokinetic Sampling, Ion Chromatographic Method ⁽³⁾
6	Chromium	1) Isokinetic Sampling, Digestion, Direct Air-Acetylene Flame Method ⁽³⁾ 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁽³⁾
7	Cobalt	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁽³⁾
8	Copper	1) Isokinetic Sampling, Digestion, Direct Air-Acetylene Flame Method ⁽³⁾ 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁽³⁾
9	Cresol	Absorption Sampling, Gas Chromatographic Method ⁽³⁾

10 Dioxins/Furans...

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
10	Dioxins/Furans	Isokinetic Sampling ⁽³⁾
11	Hydrogen Chloride	Isokinetic Sampling, Ion Chromatographic Method ⁽³⁾
12	Hydrogen Fluoride	Isokinetic Sampling, Ion Chromatographic Method ⁽³⁾
13	Hydrogen Sulfide	Absorption Sampling, Iodometric Method ⁽³⁾
14	Lead	1) Isokinetic Sampling, Digestion, Direct Air-Acetylene Flame Method ⁽³⁾ 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁽³⁾
15	Manganese	1) Isokinetic Sampling, Digestion, Direct Air-Acetylene Flame Method ⁽³⁾ 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁽³⁾
16	Mercury	Isokinetic Sampling, Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ⁽³⁾
17	Nickel	1) Isokinetic Sampling, Digestion, Direct Air-Acetylene Flame Method ⁽³⁾ 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁽³⁾
18	Opacity	Ringelmann's Method ⁽¹⁾
19	Oxides of Nitrogen	1) Absorption Sampling, Phenoldisulfonic acid Method ⁽³⁾ 2) Instrumental Analyzer Method ⁽³⁾
20	Selenium	1) Isokinetic Sampling, Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ⁽³⁾ 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁽³⁾
21	Sulfur Dioxide	1) Absorption Sampling, Barium-Thorin Titrimetric Method ⁽³⁾ 2) Instrumental Analyzer Method ⁽³⁾
22	Sulfuric Acid	Isokinetic Sampling, Barium-Thorin Titrimetric Method ⁽³⁾
23	Total Suspended Particulate	Isokinetic Sampling, Gravimetric Method ⁽³⁾
24	Vanadium	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁽³⁾
25	Xylene	1) Bag Sampling, Gas Chromatographic Method ⁽³⁾ 2) Adsorption Sampling, Gas Chromatographic Method ⁽³⁾

สิ่งบ่งชี้...

สิ่งปฏิกูลหรือวัสดุที่ไม่ใช้แล้ว จำนวน 35 รายการ

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
1	Aldrin	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^(2,9,22) 2) Ultrasonic Extraction, Gas Chromatographic Method ^(10,22)
2	Antimony	Digestion, Inductively Coupled Plasma Method ^(7,13)
3	Arsenic	1) Waste Extraction, Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^(2,6,15) 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(2,6,13) 3) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^(7,13) 4) Digestion, Inductively Coupled Plasma Method ^(7,13)
4	Barium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(2,6,13) 2) Digestion, Inductively Coupled Plasma Method ^(7,13)
5	Beryllium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(2,6,13) 2) Digestion, Inductively Coupled Plasma Method ^(7,13)
6	Cadmium	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^(2,6,14) 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(2,6,13) 3) Digestion, Flame Atomic Absorption Spectrometric Method ^(7,14) 4) Digestion, Inductively Coupled Plasma Method ^(7,13)
7	Chlordane	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^(2,9,22) 2) Ultrasonic Extraction, Gas Chromatographic Method ^(10,22)
8	Chromium	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^(2,6,14) 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(2,6,13)

3) Digestion,...

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
9	Chromium (III)	3) Digestion, Flame Atomic Absorption Spectrometric Method ^(1,14) 4) Digestion, Inductively Coupled Plasma Method ^(7,13) 1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method; Waste Extraction, Colorimetric Method; Calculation ^(2,6,13,16) 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method; Waste Extraction, Colorimetric Method; Calculation ^(2,6,13,16) 3) Digestion, Flame Atomic Absorption Spectrometric Method; Alkaline Digestion, Colorimetric Method; Calculation ^(7,8,13,16) 4) Digestion, Inductively Coupled Plasma Method; Alkaline Digestion, Colorimetric Method; Calculation ^(7,8,13,16)
10	Chromium (VI)	1) Waste Extraction, Colorimetric Method ^(2,16) 2) Alkaline Digestion, Colorimetric Method ^(8,16)
11	Cobalt	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(2,6,13) 2) Digestion, Inductively Coupled Plasma Method ^(7,13)
12	Copper	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^(2,6,14) 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(2,6,13) 3) Digestion, Flame Atomic Absorption Spectrometric Method ^(7,14) 4) Digestion, Inductively Coupled Plasma Method ^(7,13)
13	2,4-D	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^(2,9,22) 2) Ultrasonic Extraction, Gas Chromatographic Method ^(10,22)
14	DDD	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^(2,9,22) 2) Ultrasonic Extraction, Gas Chromatographic Method ^(10,22)

15 DDE...

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
15	DDE	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^(2,9,22) 2) Ultrasonic Extraction, Gas Chromatographic Method ^(10,22)
16	DDT	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^(2,9,22) 2) Ultrasonic Extraction, Gas Chromatographic Method ^(10,22)
17	Dieldrin	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^(2,9,22) 2) Ultrasonic Extraction, Gas Chromatographic Method ^(10,22)
18	Endrin	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^(2,9,22) 2) Ultrasonic Extraction, Gas Chromatographic Method ^(10,22)
19	Heptachlor	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^(2,9,22) 2) Ultrasonic Extraction, Gas Chromatographic Method ^(10,22)
20	Lead	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^(2,6,14) 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(2,6,13) 3) Digestion, Flame Atomic Absorption Spectrometric Method ^(7,14) 4) Digestion, Inductively Coupled Plasma Method ^(7,13)
21	Lindane	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^(2,9,22) 2) Ultrasonic Extraction, Gas Chromatographic Method ^(10,22)
22	Mercury	1) Waste Extraction, Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ^(2,17) 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(2,6,13)

3) Digestion,...

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
23	Methoxychlor	3) Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ⁽¹⁸⁾ 4) Digestion, Inductively Coupled Plasma Method ^(7,13) 5) Thermal Decomposition Amalgamation and Atomic Absorption Spectrometric Method ^(3,9) 1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^(2,9,22) 2) Ultrasonic Extraction, Gas Chromatographic Method ^(10,22)
24	Molybdenum	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(2,6,13) 2) Digestion, Inductively Coupled Plasma Method ^(7,13)
25	Nickel	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^(2,6,14) 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(2,6,13) 3) Digestion, Flame Atomic Absorption Spectrometric Method ^(7,14) 4) Digestion, Inductively Coupled Plasma Method ^(7,13)
26	Polychlorinated Biphenyls - Aroclor 1016 - Aroclor 1221 - Aroclor 1232 - Aroclor 1242 - Aroclor 1248 - Aroclor 1254 - Aroclor 1260 - 2-Chlorobiphenyl - 2,3-Dichlorobiphenyl - 2,2',5'-Trichlorobiphenyl - 2,4',5'-Trichlorobiphenyl - 2,2',3,5'-Tetrachlorobiphenyl - 2,2',5,5'-Tetrachlorobiphenyl - 2,3',4,4'-Tetrachlorobiphenyl - 2,2',3,4,5'-Pentachlorobiphenyl	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^(2,9,22) 2) Ultrasonic Extraction, Gas Chromatographic Method ^(10,22)

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

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
27	- 2,2',4,5,5'-Pentachlorobiphenyl - 2,3,3',4',6-Pentachlorobiphenyl - 2,2',3,4,4',5'-Hexachlorobiphenyl - 2,2',3,4,5,5'-Hexachlorobiphenyl - 2,2',3,5,5',6'-Hexachlorobiphenyl - 2,2',4,4',5,5'-Hexachlorobiphenyl - 2,2',3,3',4,4',5-Heptachlorobiphenyl - 2,2',3,4,4',5,5'-Heptachlorobiphenyl - 2,2',3,4,4',5,6'-Heptachlorobiphenyl - 2,2',3,4',5,5',6-Heptachlorobiphenyl - 2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl Pentachlorophenol	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(2,9,28) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26) Electrometric Method ^(31,32)
28	pH	
29	Selenium	1) Waste Extraction, Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^(2,8,29) 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(2,6,13) 3) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^(7,20) 4) Digestion, Inductively Coupled Plasma Method ^(7,13)

30 Silver...

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
30	Silver	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(2,6,13)
31	Thallium	2) Digestion, Inductively Coupled Plasma Method ^(7,13) 1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(2,6,13)
32	Toxaphene	2) Digestion, Inductively Coupled Plasma Method ^(7,13) 1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^(2,9,22) 2) Ultrasonic Extraction, Gas Chromatographic Method ^(10,22)
33	Trichloroethylene	1) Waste Extraction, Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(2,12,25) 2) Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
34	Vanadium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(2,6,13) 2) Digestion, Inductively Coupled Plasma Method ^(7,13)
35	Zinc	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^(2,6,14) 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(2,6,13) 3) Digestion, Flame Atomic Absorption Spectrometric Method ^(7,14) 4) Digestion, Inductively Coupled Plasma Method ^(7,13)

ดิน จำนวน 125 รายการ

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
1	Acenaphthene	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,24) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
2	Acetone	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)

3 Aldrin...

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
3	Aldrin	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,22) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
4	Anthracene	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,26) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
5	Antimony	Digestion, Inductively Coupled Plasma Method ^(7,13)
6	Arsenic	1) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^(7,13) 2) Digestion, Inductively Coupled Plasma Method ^(7,13)
7	Atrazine	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
8	Barium	Digestion, Inductively Coupled Plasma Method ^(7,13)
9	Benz(a)anthracene	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,24) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
10	Benzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
11	Benzo(b)fluoranthene	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,24) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
12	Benzo(k)fluoranthene	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,24) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
13	Benzoic acid	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
14	Benzo(a)pyrene	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,24) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)

15 Benzo(g,h,i)perylene...

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
15	Benzo(g,h,i)perylene	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,22) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
16	Beryllium	Digestion, Inductively Coupled Plasma Method ^(7,13)
17	Bis(2-chloroethyl)ether	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
18	Bis(2-ethoxyethyl)phthalate	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
19	Bromodichloromethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
20	Bromoform	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
21	Butanol	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
22	Butyl benzyl phthalate	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
23	Cadmium	1) Digestion, Flame Atomic Absorption Spectrometric Method ^(7,14) 2) Digestion, Inductively Coupled Plasma Method ^(7,13)
24	Carbazole	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
25	Carbon disulfide	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
26	Carbon tetrachloride	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
27	Chlordane	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,24) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
28	p-Chloroaniline	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
29	Chlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
30	Chlorodibromomethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)

31 Chloroform...

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
31	Chloroform	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(10,25)
32	2-Chlorophenol	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
33	Chromium	1) Digestion, Flame Atomic Absorption Spectrometric Method ^(7,14) 2) Digestion, Inductively Coupled Plasma Method ^(7,13)
34	Chromium (III)	1) Digestion, Flame Atomic Absorption Spectrometric Method; Alkaline Digestion, Colorimetric Method; Calculation ^(7,8,14,16) 2) Digestion, Inductively Coupled Plasma Method; Alkaline Digestion, Colorimetric Method; Calculation ^(7,8,13,14)
35	Chromium (VI)	Alkaline Digestion, Colorimetric Method ^(8,16)
36	Chrysene	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,24) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,24)
37	Cyanide	Extraction, Distillation, Colorimetric Method ^(28,29,30)
38	2,4-D	Ultrasonic Extraction, Gas Chromatographic Method ⁽²⁷⁾
39	DDD	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,22) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
40	DDE	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,22) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
41	DDT	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,22) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
42	Dibenz(a,h)anthracene	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,24) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)

43 Di-n-butyl phthalate...

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
43	Di-n-butyl phthalate	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
44	1,2-Dichlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(10,25)
45	1,3-Dichlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(10,25)
46	1,4-Dichlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(10,25)
47	3,3'-Dichlorobenzidine	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
48	1,1-Dichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(10,25)
49	1,2-Dichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(10,25)
50	1,1-Dichloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(10,25)
51	cis-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(10,25)
52	trans-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(10,25)
53	2,4-Dichlorophenol	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,24)
54	1,2-Dichloropropane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(10,25)
55	1,3-Dichloropropane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(10,25)
56	1,3-Dichloropropene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(10,25)
57	Dieldrin	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,22) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
58	Diethyl phthalate	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
59	2,4-Dimethylphenol	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,24)

60 2,4-Dinitrophenol...

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
60	2,4-Dinitrophenol	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
61	2,4-Dinitrotoluene	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,24)
62	2,6-Dinitrotoluene	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,24)
63	Di-n-Octyl phthalate	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
64	Endosulfan	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,22) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
65	Endrin	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,22) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
66	Ethylbenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(10,25)
67	Fluoranthene	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,24) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
68	Fluorene	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,24) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
69	Heptachlor	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,22) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
70	Heptachlor epoxide	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,22) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)

71 Hexachlorobenzene...

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
71	Hexachlorobenzene	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,22) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
72	Hexachloro-1,3-butadiene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(10,25)
73	n-Hexane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(10,25)
74	α -HCH	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,22) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
75	β -HCH	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,22) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
76	γ -HCH	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,22) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
77	Hexachlorocyclopentadiene	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
78	Hexachloroethane	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
79	Indeno(1,2,3-cd)pyrene	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,24) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
80	Isophorone	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
81	Lead	1) Digestion, Flame Atomic Absorption Spectrometric Method ^(7,14) 2) Digestion, Inductively Coupled Plasma Method ^(7,13)
82	Manganese	1) Digestion, Flame Atomic Absorption Spectrometric Method ^(7,14) 2) Digestion, Inductively Coupled Plasma Method ^(7,13)

83 Mercury...

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
83	Mercury	1) Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ⁽¹⁸⁾ 2) Digestion, Inductively Coupled Plasma Method ^(7,13) 3) Thermal Decomposition Amalgamation and Atomic Absorption Spectrometric Method ⁽¹⁹⁾
84	Methanol	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
85	Methoxychlor	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,22) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
86	Methyl bromide	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
87	Methylene chloride	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
88	2-Methylphenol	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
89	2-Methylnaphthalene	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
90	Methyl tert-butyl ether	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
91	Naphthalene	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,26) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
92	Nickel	1) Digestion, Flame Atomic Absorption Spectrometric Method ^(7,14) 2) Digestion, Inductively Coupled Plasma Method ^(7,13)
93	Nitrobenzene	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
94	N-Nitrosodiphenylamine	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
95	N-Nitrosodi-n-propylamine	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)

96 Polychlorinated Biphenyls...

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
96	Polychlorinated Biphenyls - Aroclor 1016 - Aroclor 1221 - Aroclor 1232 - Aroclor 1242 - Aroclor 1248 - Aroclor 1254 - Aroclor 1260 Polychlorinated Biphenyls - 2-Chlorobiphenyl - 2,3-Dichlorobiphenyl - 2,2',5-Trichlorobiphenyl - 2,4',5-Trichlorobiphenyl - 2,2',3,5'-Tetrachlorobiphenyl - 2,2',5,5'-Tetrachlorobiphenyl - 2,3',4,4'-Tetrachlorobiphenyl - 2,2',3,4,5'-Pentachlorobiphenyl - 2,2',4,5,5'-Pentachlorobiphenyl - 2,2',3,4',6-Pentachlorobiphenyl - 2,2',3,4,4',5'-Hexachlorobiphenyl - 2,2',3,4,5,5'-Hexachlorobiphenyl - 2,2',3,5,5',6-Hexachlorobiphenyl - 2,2',3,4',5'-Heptachlorobiphenyl - 2,2',3,4,4',5,5'-Heptachlorobiphenyl - 2,2',3,4,4',5,6-Heptachlorobiphenyl	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,23) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26) Ultrasonic Extraction, Gas Chromatographic Method ^(10,23)

- 2,2',3,4',5,5',6...

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
97	- 2,2',3,4',5,5',6-Heptachlorobiphenyl - 2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl Pentachlorophenol	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
98	Phenanthrene	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,24) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
99	Phenol	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
100	Pyrene	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,24) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
101	Selenium	1) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^(7,22) 2) Digestion, Inductively Coupled Plasma Method ^(7,13)
102	Silver	Digestion, Inductively Coupled Plasma Method ^(7,13)
103	Styrene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
104	1,1,2,2-Tetrachloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
105	Tetrachloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
106	Toluene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
107	Toxaphene	Ultrasonic Extraction, Gas Chromatographic Method ^(10,22)
108	TPH (C ₈ -C ₆)	1) Purge and Trap, Gas Chromatographic Method ^(12,21) 2) Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
109	TPH (C ₁₀ -C ₁₄)	Ultrasonic Extraction, Gas Chromatographic Method ^(10,21)
110	TPH (C ₁₄ -C ₂₈)	Ultrasonic Extraction, Gas Chromatographic Method ^(10,21)
111	1,2,4-Trichlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)

112 1,1,1-Trichloroethane...

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
112	1,1,1-Trichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
113	1,1,2-Trichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
114	Trichloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
115	2,4,5-Trichlorophenol	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
116	2,4,6-Trichlorophenol	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
117	1,3,5-Trimethylbenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
118	Vanadium	Digestion, Inductively Coupled Plasma Method ^(7,13)
119	Vinyl acetate	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
120	Vinyl chloride	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
121	m-Xylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
122	o-Xylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
123	p-Xylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
124	Xylene (Total)	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
125	Zinc	1) Digestion, Flame Atomic Absorption Spectrometric Method ^(7,14) 2) Digestion, Inductively Coupled Plasma Method ^(7,13)

เอกสารอ้างอิง

- กระทรวงอุตสาหกรรม. ประกาศกระทรวงอุตสาหกรรม, พ.ศ. 2549. เรื่อง กำหนดค่าปริมาณค่าควมที่เจือปนในอากาศที่ระบายออกจากปล่องของหม้อน้ำโรงสีข้าวที่เชื่อมลงเป็นเชื้อเพลิง. ราชกิจจานุเบกษา. 4 ธันวาคม 2549. เล่มที่ 123 ตอนพิเศษ 125 ง.
- กระทรวงอุตสาหกรรม. ประกาศกระทรวงอุตสาหกรรม, พ.ศ. 2548. เรื่อง การกำจัดสิ่งปฏิกูลหรือวัสดุที่ไม่ใช้แล้ว. ราชกิจจานุเบกษา. 25 มกราคม 2549. เล่มที่ 123 ตอนพิเศษ 114 ง.

16. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. **Chromium, Hexavalent (Colorimetric)**. SW-846 Method 7196A, 1992.
17. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. **Mercury in Liquid Waste (Manual Cold Vapor Technique)**. SW-846 Method 7470A, 1994.
18. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. **Mercury in Solid or Semisolid Waste (Manual Cold-Vapor Technique)**. SW-846 Method 7471B, 1998.
19. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. **Mercury in Solids and Solutions by Thermal Decomposition, Amalgamation, and Atomic Absorption Spectrophotometry**. SW-846 Method 7473, 2007.
20. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. **Selenium (Atomic Absorption, Borohydride Reduction)**. SW-846 Method 7742, 1994.
21. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. **Nonhalogenated Organics Using GC/FID**. SW-846 Method 8015D, 2003.
22. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. **Organochlorine Pesticides by Gas Chromatography**. SW-846 Method 8081B, 2007.
23. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. **Polychlorinated Biphenyls (PCBs) by Gas Chromatography**. SW-846 Method 8082A, 2007.
24. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. **Polynuclear Aromatic Hydrocarbons**. SW-846 Method 8100, 1980.
25. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. **Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry**. SW-846 Method 8260D, 2018.
26. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. **Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry**. SW-846 Method 8270E, 2018.
27. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. **Chlorinated Herbicides by GC Using Methylation or Pentafluorobenzoylation Derivatization**. SW-846 Method 8151A, 1996.

28. United States..

28. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. **Total and Amenable Cyanide : Distillation**. SW-846 Method 9010C, 2004.
29. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. **Cyanide Extraction Procedure for Solids and Oils**. SW-846 Method 9013A, 2014.
30. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. **Cyanide in Waters and Extracts using Titrimetric and Manual Spectrophotometric Procedures**. SW-846 Method 9014, 2014.
31. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. **pH Electrometric Measurement**. SW-846 Method 9040C, 2004.
32. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. **Soil and Waste pH**. SW-846 Method 9045D, 2004.

ภาคผนวก ช

เอกสารสอบเทียบเครื่องมือ

List of Instrument/Equipment Certification for Quality Analysis.

No.	Instrument/Equipment	Parameter	Manufacturer	Model / Serial No.	Calibrator	Certification No.	Date of Calibration	Due date of Calibration*	Remark
Laboratory Instrument/Equipments Water Quality Analysis.									
1	pH Meter	pH Temperature	Hanna Instrument	HI2211 / 8165345	National Food Institute, Ministry of Industry, Thailand	2102015-001-01	17 Mar 21	16 Mar 22	-
2	pH Meter		Mettler-Toledo	Seven Easy S20 / 123052512	National Food Institute, Ministry of Industry, Thailand	2101930-001-01	17 Mar 21	16 Mar 22	-
3	pH Meter		Mettler-Toledo	1231155210	National Food Institute, Ministry of Industry, Thailand	2103272-001-02	1 Mar 22	28 Feb 23	-
4	Analytical Balance (Readability 0.01 mg)	Suspended Solids Total Dissolved Solids	Mettler-Toledo	XSR205DU / C09071872	Calibration Laboratory Mettler-Toledo (Thailand) Limited	2102573-001-01	26 Apr 21	25 Apr 22	-
5	Analytical Balance (Readability 0.01 mg)		Mettler-Toledo	AX105DR / 1122100406	National Food Institute, Ministry of Industry, Thailand	2200708-001-01	24 Nov 21	23 Nov 22	-
6	Hot Air Oven		Memmert	UF55 / B212.0411	Technology Promotion Association (Thailand-Japan)	21TM813	21 Apr 21	20 Apr 22	-
7	Hot Air Oven	Total Coliform Bacteria Fecal Coliform Bacteria	Memmert	UF55 / B216.1666	Technology Promotion Association (Thailand-Japan)	21TM1876	29 Oct 21	28 Oct 22	-
8	Incubator		Memmert	IPP 260 / V616.0066	Technology Promotion Association (Thailand-Japan)	21TM1874	28 Oct 21	27 Oct 22	-
9	Incubator		Memmert	IPP 260 / V615.0187	Technology Promotion Association (Thailand-Japan)	21TM706	21 Apr 21	20 Apr 22	-
10	Water Bath	Water Bath	Memmert	WNE 14 / L416.0606	Technology Promotion Association (Thailand-Japan)	21TM422	22 Feb 21	21 Feb 22	-
11	Water Bath		Memmert	WNE 14 / L416.0612	Technology Promotion Association (Thailand-Japan)	21TM423	23 Feb 21	22 Feb 22	-
12	Water Bath		Memmert	WB 14 / 1401.0569	Technology Promotion Association (Thailand-Japan)	21TM1355/1	14 Jul 21	13 Jul 22	-

List of Instrument/Equipment Certification for Quality Analysis.

No.	Instrument/Equipment	Parameter	Manufacturer	Model / Serial No.	Calibrator	Certification No.	Date of Calibration	Due date of Calibration*	Remark
13	Water Bath	Total Coliform Bacteria	Memmert	WNB 14 / L407.0756	Technology Promotion Association (Thailand-Japan)	21TM1356	14 Jul 21	13 Jul 22	-
14	Analytical Balance	Fecal Coliform Bacteria	Mettler-Toledo	MS603S / B0070110311	National Food Institute, Ministry of Industry, Thailand	2200705-001-01	24 Nov 21	23 Nov 22	-
15	Analytical Balance		Mettler-Toledo	MS603S / B0070110311	National Food Institute, Ministry of Industry, Thailand	2200705-001-01	24 Nov 21	23 Nov 22	-
16	Auto Clave		ALP	CL-40L / 802664	Technology Promotion Association (Thailand-Japan)	21TM425	23 Feb 21	22 Feb 22	-
17	Auto Clave		ALP	CL-40L / 807298	Technology Promotion Association (Thailand-Japan)	21TM831	7 May 21	6 May 22	-
18	Analytical Balance (Repeatability 0.1 mg)	Fat Oil & Grease	Mettler-Toledo	AB-204S/FACT / 1129361010	National Food Institute, Ministry of Industry, Thailand	2103270-001-01	11 Jun 21	10 Jun 22	-
19	Analytical Balance (Repeatability 0.1 mg)		Mettler-Toledo	AB-204-S 1128312528	Mettler-Toledo	TH2038-097-040722-	7 Apr 22	6 Apr 23	-
20	BOD Incubator	BOD	Arco	UR-1320 / (UAE.LAB.018/2551)	Technology Promotion Association (Thailand-Japan)	21TM811	21 Apr 21	20 Apr 22	-
21	BOD Incubator		Arco	UR-1320 / (UAE.LAB.006/2553)	Technology Promotion Association (Thailand-Japan)	21TM812	21 Apr 21	20 Apr 22	-
22	BOD Incubator		Arco	UC4-1320 / (UAE.LAB002/2550)	Technology Promotion Association (Thailand-Japan)	21TM1405	17 Aug 21	16 Aug 22	-
23	BOD Incubator		Arco	UC4-1320 / (UAE.LAB018/2559)	Technology Promotion Association (Thailand-Japan)	21TM1406	17 Aug 21	16 Aug 22	-

List of Instrument/Equipment Certification for Quality Analysis.

No.	Instrument/Equipment	Parameter	Manufacturer	Model / Serial No.	Calibrator	Certification No.	Date of Calibration	Due date of Calibration*	Remark
24	Digestor Unit	TKN	FOSS TECATOR	2520auto / 91794469	Thailand Institute Of Science And Technological Research (TISTR)	PSL-T 614/64	12 Mar 21	11 Mar 22	-
25	Digestor Unit		Velp	DKL20 / 213517	National Food Institute, Ministry of Industry, Thailand	2103014-001-02	7 Jun 21	6 Jun 22	-
26	Distillation Unit (Kjeldahl Method)		FOSS TECATOR	KT200 / 91790524	Sithiporn Associates Co.,Ltd.	MS63FOT0084B	25 Feb 21	24 Feb 22	-
27	UV-VIS Spectrophotometer	Nitrate-Nitrogen	Agilent Technologies	Cary60 G6860A / MY15410009	DOE Services Co.,Ltd.	SP22-016	26 May 22	25 May 23	-
28	UV-VIS Spectrophotometer		Hitachi	U-1900 / 2021-064	DOE Services Co.,Ltd.	SP22-007	24 Jan 22	23 Jan 23	-

Due Date of Calibration* : Based on the annual calibration plan. At least 1 time per year.

Calibration Certificate

Certificate No.: 2102015-001-01
Client name: UNITED ANALYST AND ENGINEERING CONSULTANT CO.,LTD.
Address: 3 Soi Udomsuk 41, Sukhumvit Road,
Bangchack, Prakhong, Bangkok 10260

Page 1 of 5

Equipment: pH Meter
Manufacturer: HANNA INSTRUMENTS
Model: HI 2211
Serial No.: 08165345
ID No.: UAE.WAT.004/2556

Order No.: 2102015
Operation No.: 2102015-001
Date of Receipt: 16 March 2021
Date of Calibration: 17 March 2021

Calibrated by: Mr. Manas Somsak Expert
Approved by: 
Manager, Division of Calibration Laboratory
Date of Issue: 19 March 2021 Responsible for the Technical Management Team

The uncertainties are for a confidence probability of approximately 95%.

This Certificate is issued in accordance with the conditions of accreditation granted by the Thai Laboratory Accreditation Scheme which has assessed the measurement capability of the laboratory and its traceability to recognized national standards and to the units of measurement realized at the corresponding national standards laboratory. This certificate may not be reproduced other than in full except with the prior written approval of the National Food Institute.

F-CS-009 Revision: 00 Date: 14-12-61

เอกสารไม่ควบคุม

Calibration Report

Certificate No.: 2102015-001-01
Equipment: pH Meter
Resolution: 0.01 pH ; 0.1 mV
Manufacturer: HANNA INSTRUMENTS
Model: HI 2211
Serial No.: 08165345
Type: Bench top
ID No.: UAE.WAT.004/2556

Date of Calibration: 17 March 2021 Page 2 of 5

Location: Chemical Calibration Laboratory, National Food Institute
Environment Condition: Ambient Temperature: (23.3 ± 1.5) °C Relative Humidity: (53.5 ± 5) %
Condition of Equipment: Good Condition

Condition of this Results of Calibration

1. Calibration Method In house method : W-CC-002 based on direct measurement by using standard voltage calibrator and certified reference material (CRM)

2. Reference Standards / Certified Reference Material

Instruments	Serial / ID No.	Manufacturer	Certificate No.	Due Date
2.1 DC Voltage Calibrator	2708007	Fluke	SCI-20F-0682	17 June 2021
2.2 Digital Thermometer	2708007	Fluke	CC 630609-01	30 October 2021
2.3 Thermo-Hygro Meter	NPLBT-H00317	PONPE	QR20-1578	21 September 2021

Certified Reference Material	Lot No.	Manufacturer	Ref N	Expire Date
2.4 pH buffer 4.008 (Primary pH buffer Solution)	710848	CPAchem	PH216.L5	2 October 2022
2.5 pH buffer 6.865 (Primary pH buffer Solution)	710949	CPAchem	PH217.L5	2 October 2022
2.6 pH buffer 10.01 (Primary pH buffer Solution)	710950	CPAchem	PH220.L5	2 October 2021
2.7 pH buffer 7.00 (Standard pH buffer Solution)	710051	CPAchem	PH187.L5	2 October 2021

3. This certification is traceable to The International System of Unit (SI Unit)

- Instruments No.2.1 through NSC-TISI-TIS 17025 Laboratory Accreditation of Calibration No.0075
- Instruments No.2.2 through NSC-TISI-TIS 17025 Laboratory Accreditation of Calibration No.0061
- Instruments No.2.3 through NSC-TISI-TIS 17025 Laboratory Accreditation of Calibration No.0282
- Certified Reference Material No. 2.4 to 2.8 traceable to Primary measurement method- Harned cell using calibrated thermometer, barometer, and nanovoltmeter. The Standard Solution preparation and certified by CPAchem Ltd is accredited to ISO 17034 and ISO/IEC 17025
- Certified Reference Material No. 2.7 traceable to BSM Ref N HI-7 Lot# 30.04.2020; BSM Ref N HI-9 Lot# 28.05.2020; BSM Ref N HI-10 Lot# 28.05.2020. The Standard Solution preparation and certified by CPAchem Ltd is accredited to ISO 17034 and ISO/IEC 17025

4. This certificate was certified only for the instrument we calibrated.

5. This result of calibration was found accurate as shown on date and place of calibration only.

F-CS-012 Revision: 00 Date: 14-12-61

เอกสารไม่ควบคุม

Calibration Report

Certificate No.: 2102015-001-01
Equipment: pH Meter
Resolution: 0.01 pH ; 0.1 mV
Manufacturer: HANNA INSTRUMENTS
Model: HI 2211
Serial No.: 08165345
Type: Bench top
ID No.: UAE.WAT.004/2556

Date of Calibration: 17 March 2021 Page 3 of 5

Calibration Results:

1. Calibration of pH Meter (Manual Temperature Compensation at 25 °C)

Nominal pH	DC Voltage Standard (mV)	Average Indicator Reading		Uncertainty (±mV)	Coverage Factor (#)
		mV	pH		
0.00	414.118	414	0.00	0.58	2.00
2.00	295.811	295.7	2.00	0.063	2.00
4.00	177.461	177.5	4.00	0.063	2.00
6.00	59.160	59.2	6.00	0.063	2.00
7.00	0.000	0.1	7.00	0.063	2.00
8.00	-59.158	-59.1	8.00	0.063	2.00
10.00	-177.461	-177.3	10.00	0.063	2.00
12.00	-295.812	-295.6	12.00	0.063	2.00
14.00	-414.118	-414	14.00	0.58	2.00

2. Calibration of pH Meter with Electrode (Manual Temperature Compensation at 25 °C)

Equipment: pH Electrode Type: Combined Electrode
Manufacturer: HANNA INSTRUMENTS Model: HI 1531
Serial No.: 05612F2N ID No. N/A

Performance of Electrode system (Three-Point Calibration at pH4, pH7 and pH10)

Certified Value @25 °C (pH)	Average Indicator Reading		Relative Slope (%)	Uncertainty (± pH)	Coverage Factor (#)
	pH	mV			
4.008	4.01	165.0	95.8	0.0071	2.00
6.868	6.87	2.9		0.0075	2.00
6.868	6.87	2.9	94.5	0.0075	2.00
10.008	10.01	-172.7		0.0093	2.00
6.868	6.89	-4.0		0.0093	2.00

F-CS-012 Revision: 00 Date: 14-12-61

เอกสารไม่ควบคุม

Calibration Report

Certificate No.: 2102015-001-01
Equipment: Digital Thermometer with RTD (pH Meter)
Resolution: 0.1 °C
Model: HI 2211
Serial No.: 08165345
ID No.: UAE.WAT.004/2556
Manufacturer: HANNA INSTRUMENTS

Date of Calibration: 17 March 2021 Page 4 of 5

Location: Chemical Calibration Laboratory, National Food Institute

Environment Condition: Ambient Temperature 23 °C ± 1 °C
Relative Humidity 54 % ± 2 %

Condition of this results of Calibration:

- Calibration Method : - In house method: W-TE-025 by comparison with standard thermometer.
- The Calibration is determined by comparing with a known temperature from a standard resistance thermometer.
- The temperature scale in use at this laboratory is the International Temperature scale of 1990 (ITS-90).

2. Reference Standard Instrument :

Instrument	Model	Serial No.	Certificate No.	Due Date	Through
HANDHELD THERMOMETER	1523	2118154	PSL-T 767/63	04-Jun-21	TISTR
Platinum Resistance Thermometer (PRT)	5627A	877332			

Support Equipment : - Low Temperature Bath (SDCAL-6) Model: Europa-6 Plus Basic, S/N: 3415822

3. This certificate is traceable to International System of Units (SI Units).

4. This certificate was certified only for the instrument we calibrated.

5. This result of calibration was found accurate as shown on date and place of calibration only.

6. Condition of Calibrated Item : Good

7. Result of Calibration : ☒ Without adjustment ☐ After adjustment

F-CS-012 Revision: 00 Date: 14-12-61

เอกสารไม่ควบคุม

Calibration Report

Certificate No.: 2102015-001-01
Equipment: Digital Thermometer with RTD (pH Meter)
Resolution: 0.1 °C Model: H9 2211
Serial No.: 06185345 ID No.: UAE.WAT.0042556
Manufacturer: HANNA INSTRUMENTS
Date of Calibration: 17 March 2021 Page 5 of 5

Calibration point: 15.0, 25.0 and 35.0 °C

Calibration result:

- The probe was immersed in liquid bath or dry bath to a minimum depth of 100 mm.

- Description of probe, model : S/N :
Dimension of probe : Diameter 3.5 mm, Length 100 mm,
Sheath material : Stainless Steel

UUC* Reading (°C)	Standard Temperature (°C)	Correction Value (°C)	Uncertainty ± (°C)
14.9	15.003	0.1	0.099
25.0	25.003	0.0	0.099
35.0	35.007	0.0	0.099

Note

- UUC* : Unit Under Calibration

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

----- End -----

F-CS-012 Revision: 00 Date: 14-12-61

เอกสารไม่ควบคุม

Calibration Certificate

Certificate No.: 2201793-001-01
Client name: UNITED ANALYST AND ENGINEERING CONSULTANT CO.,LTD.
Address: 3 Soi Udomsuk 41, Sukhumvit Road,
Bangchack, Prakhonong, Bangkok 10260

Page 1 of 5

Equipment: pH Meter
Manufacturer: METTLER TOLEDO
Model: SevenEasy pH
Serial No.: 1231155210
ID No.: UAE.WAT.0102553
Order No.: 2201793
Operation No.: 2201793-001
Date of Receipt: 21 February 2022
Date of Calibration: 1 March 2022

Calibrated by Mr.Pheraphat Tuanjit Scientist
Approved by [Redacted]
Specialist, Division of Calibration Laboratory
Responsible for the Technical Management Team
Date of Issue: 1 March 2022

The uncertainties are for a confidence probability of approximately 95%.

This Certificate is issued in accordance with the conditions of accreditation granted by the Thai Laboratory Accreditation Scheme which has assessed the measurement capability of the laboratory and its traceability to recognized national standards and to the units of measurement realized at the corresponding national standards laboratory. This certificate may not be reproduced other than in full, except with the prior written approval of the National Food Institute.

F-CS-009 Revision: 00 Date: 14-12-61

เอกสารไม่ควบคุม

Calibration Report

Certificate No.: 2201793-001-01
Equipment: pH Meter
Resolution: 0.01 pH : 1 mV
Manufacturer: METTLER TOLEDO Model: SevenEasy pH
Serial No.: 1231155210 Type: Bench top
ID No.: UAE.WAT.0102553
Date of Calibration: 1 March 2022 Page 2 of 5

Location: Chemical Calibration Laboratory, NATIONAL FOOD INSTITUTE
Ambient Temperature: (23.5 ± 1.5) °C Relative Humidity: (53 ± 5) %
Condition of Equipment: Good Condition
Condition of this Results of Calibration

1. Calibration Method In house method : W-CO-002 based on direct measurement by using standard voltage calibrator and certified reference material (CRM)

2. Reference Standards / Certified Reference Material

Instruments	Serial / ID No.	Manufacturer	Certificate No.	Due Date
2.1 DC Voltage Calibrator	2709007	Fuke	SCL-21F-0887	24 June 2022
2.2 Digital Thermometer	2709007	Fuke	CC-640599-01	30 October 2022
2.3 Thermo-Hygro Meter	NPLBTH004/18	PONPE	QR22-0195	27 January 2023

Certified Reference Material	Lot No.	Manufacturer	Ref N	Expire Date
2.4 pH buffer 4.008 (Primary pH buffer Solution)	741339	CPAchem	PH216.L5	19 April 2023
2.5 pH buffer 6.865 (Primary pH buffer Solution)	741340	CPAchem	PH217.L5	19 April 2023
2.6 pH buffer 10.01 (Primary pH buffer Solution)	741342	CPAchem	PH220.L5	19 April 2022
2.7 pH buffer 7.00 (Standard pH buffer Solution)	735536	CPAchem	PH107.L5	18 March 2022

3. This certification is traceable to The International System of Unit (SI Unit)
3.1 Instruments No.2.1 through NSC-TIS1-TIS 17025 Laboratory Accreditation of Calibration No.0375
3.2 Instruments No.2.2 through NSC-TIS1-TIS 17025 Laboratory Accreditation of Calibration No.0961
3.3 Instruments No.2.3 through NSC-TIS1-TIS 17025 Laboratory Accreditation of Calibration No.0292
3.4 Certified Reference Material No. 2.4 to 2.6 traceable to Primary measurement method- Harned cell using calibrated thermometer, barometer, and nanovoltmeter. The Standard Solution preparation and certified by CPAchem Ltd is accredited to ISO 17034 and ISO/IEC 17025
3.5 Certified Reference Material No. 2.7 traceable to BIM RefN HI-7 LoTN 30.04.2020; BIM RefN HI-9 LoTN 28.05.2020; BIM RefN HI-8 LoTN 30.04.2020; BIM RefN HI-10 LoTN 28.05.2020. The Standard Solution preparation and certified by CPAchem Ltd is accredited to ISO 17034 and ISO/IEC 17025

4. This certificate was certified only for the instrument we calibrated.

5. This result of calibration was found accurate as shown on date and place of calibration only.

F-CS-012 Revision: 00 Date: 14-12-61

เอกสารไม่ควบคุม

Calibration Report

Certificate No.: 2201793-001-01
Equipment: pH Meter
Resolution: 0.01 pH : 1 mV
Manufacturer: METTLER TOLEDO Model: SevenEasy pH
Serial No.: 1231155210 Type: Bench top
ID No.: UAE.WAT.0102553
Date of Calibration: 1 March 2022 Page 3 of 5

Calibration Results:

1. Calibration of pH Meter (Manual Temperature Compensation at 25 °C)

Nominal pH	DC Voltage Standard (mV)	Average Indicator Reading		Uncertainty (±mV)	Coverage Factor (k)
		mV	pH		
0.00	414.117	414	0.00	0.58	2.00
2.00	295.811	296	2.00	0.58	2.00
4.00	177.462	178	4.00	0.58	2.00
6.00	59.159	59	6.00	0.58	2.00
7.00	-0.001	0	7.00	0.58	2.00
8.00	-59.159	-59	8.00	0.58	2.00
10.00	-177.463	-177	10.00	0.58	2.00
12.00	-295.812	-296	12.00	0.58	2.00
14.00	-414.119	-414	14.00	0.58	2.00

2. Calibration of pH Meter with Electrode (Manual Temperature Compensation at 25 °C)

Equipment: pH Electrode Type: Combined Electrode
Manufacturer: METTLER TOLEDO Model: InLabSolids
Serial No.: 1156882 ID.No. N/A

Performance of Electrode system (Three-Point Calibration at pH4, pH7 and pH10)

Certified Value @25 °C (pH)	Average Indicator Reading		Relative Slope (%)	Uncertainty (± pH)	Coverage Factor (k)
	pH	mV			
4.008	4.00	180	96.25	0.0076	2.00
6.866	6.88	18	-	0.0079	2.00
10.012	10.01	-162	96.13	0.0094	2.00
6.985	7.00	9	-	0.0097	2.00

F-CS-012 Revision: 00 Date: 14-12-61

เอกสารไม่ควบคุม

Calibration Report

Certificate No.: 2201793-001-01
Equipment: Digital Thermometer with RTD (pH Meter)
Resolution: 0.1 °C Model: SevenEasy pH
Serial No.: 1231155210 ID No.: UAE.WAT.010/2553
Manufacturer: METTLER TOLEDO
Date of Calibration: 1 March 2022 Page 4 of 5

Location: Chemical Calibration Laboratory, NATIONAL FOOD INSTITUTE
Environment Condition: Ambient Temperature 24 °C ± 1 °C
Relative Humidity 53 % ± 2 %

Condition of this results of Calibration:

- Calibration Method :
 - In house method: W-TE-025 by comparison with standard thermometer.
 - The Calibration is determined by comparing with a known temperature from a standard resistance thermometer.
 - The temperature scale in use at this laboratory is the International Temperature scale of 1990 (ITS-90).

2. Reference Standard Instrument:

Instrument	Model	Serial No.	Certificate No.	Due Date	Through
HANDHELD THERMOMETER	1523	2116154	PSL-T 0851/64	03-Jun-22	TISTR
Platinum Resistance Thermometer (PRT)	5627A	877332			

Support Equipment: Low Temperature Bath (ISOCAL-6), Model: Europa-6 Plus Basic, S/N: 341592/2

- This certificate is traceable to International System of Units (SI Units).
- This certificate was certified only for the instrument we calibrated.
- This result of calibration was found accurate as shown on date and place of calibration only.
- Condition of Calibrated item : ☒ Good ☐ Without adjustment ☐ After adjustment
- Result of Calibration : ☒ X

F-CS-012 Revision: 00 Date: 14-12-61

เอกสารไม่ควบคุม

Calibration Report

Certificate No.: 2201793-001-01
Equipment: Digital Thermometer with RTD (pH Meter)
Resolution: 0.1 °C Model: SevenEasy pH
Serial No.: 1231155210 ID No.: UAE.WAT.010/2553
Manufacturer: METTLER TOLEDO
Date of Calibration: 1 March 2022 Page 5 of 5

Calibration point: 15.0, 25.0 and 35.0 °C
Calibration result:

- The probe was immersed in liquid bath or dry bath to a minimum depth of 100 mm.
- Description of probe, model : N/A S/N : N/A
- Dimension of probe : Diameter 4 mm., Length 100 mm.,
- Sheath material : Stainless Steel

UUC* Reading (°C)	Standard Temperature (°C)	Correction Value (°C)	Uncertainty ± (°C)
15.1	15.006	-0.1	0.099
25.1	25.004	-0.1	0.099
35.1	35.003	-0.1	0.099

Note

* UUC* : Unit Under Calibration

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

End

F-CS-012 Revision: 00 Date: 14-12-61

เอกสารไม่ควบคุม

Calibration Certificate

Certificate No.: 2101930-001-01
Client name: UNITED ANALYST AND ENGINEERING CONSULTANT CO.,LTD.
Address: 3 Soi Udomsuk 41, Sukhumvit Road, Bangchack, Prakhonong, Bangkok 10260
Page 1 of 5
Equipment: pH Meter
Manufacturer: METTLER TOLEDO
Model: SevenEasy pH
Serial No.: 1230525212
ID No.: UAE.WAS.003/2553
Order No.: 2101930
Operation No.: 2101930-001
Date of Receipt: 10 March 2021
Date of Calibration: 17 March 2021
Calibrated by: Mr.Manas Someak Expert
Approved by: [Signature]
Manager, Division of Calibration Laboratory
Date of Issue: 19 March 2021
Responsible for the Technical Management Team

The uncertainties are for a confidence probability of approximately 95%.

This Certificate is issued in accordance with the conditions of accreditation granted by the Thai Laboratory Accreditation Scheme which has assessed the measurement capability of the laboratory and its traceability to recognized national standards and to the units of measurement realized at the corresponding national standards laboratory. This certificate may not be reproduced other than in full except with the prior written approval of the National Food Institute.

F-CS-009 Revision: 00 Date: 14-12-61

เอกสารไม่ควบคุม

Calibration Report

Certificate No.: 2101930-001-01
Equipment: pH Meter
Resolution: 0.01 pH ; 1 mV
Manufacturer: METTLER TOLEDO
Model: SevenEasy pH
Serial No.: 1230525212
Type: Bench top
ID No.: UAE.WAS.003/2553
Date of Calibration: 17 March 2021 Page 2 of 5
Location: Chemical Calibration Laboratory, National Food Institute
Environment Condition: Ambient Temperature: (23.5 ± 1.5) °C Relative Humidity: (53.5 ± 5) %
Condition of Equipment: Good Condition
Condition of this Results of Calibration
1. Calibration Method : In house method : W-CC-002 based on direct measurement by using standard voltage calibrator and certified reference material (CRM)
2. Reference Standards / Certified Reference Material

Instruments	Serial / ID No.	Manufacturer	Certificate No.	Due Date
2.1 DC Voltage Calibrator	2709007	Fluke	SCL-20P-0682	17 June 2021
2.2 Digital Thermometer	2709007	Fluke	CC 630608-01	30 October 2021
2.3 Thermo-Hygro Meter	NF18TH00317	PONPE	QR20-1578	21 September 2021

Certified Reference Material	Lot No.	Manufacturer	Ref N	Expires Date
2.4 pH buffer 4.008 (Primary pH buffer Solution)	710048	CPAchem	Ph216.L5	2 October 2022
2.5 pH buffer 6.865 (Primary pH buffer Solution)	710049	CPAchem	Ph217.L5	2 October 2022
2.6 pH buffer 10.01 (Primary pH buffer Solution)	710050	CPAchem	Ph220.L5	2 October 2021
2.7 pH buffer 7.00 (Standard pH buffer Solution)	710051	CPAchem	Ph107.L5	2 October 2021

3. This certification is traceable to The International System of Unit (SI Unit)

3.1 Instruments No 2.1	through	NSC-TISI-TIS 17025 Laboratory Accreditation of Calibration No.0078
3.2 Instruments No 2.2	through	NSC-TISI-TIS 17025 Laboratory Accreditation of Calibration No.0061
3.3 Instruments No 2.3	through	NSC-TISI-TIS 17025 Laboratory Accreditation of Calibration No.0292
3.4 Certified Reference Material No. 2.4 to 2.6	traceable to	Primary measurement method: Harned cell using calibrated thermometer, barometer, and nanovoltmeter. The Standard Solution preparation and certified by CPAchem Ltd is accredited to ISO 17034 and ISO/IEC 17025
3.5 Certified Reference Material No. 2.7	traceable to	BM RefN HI-7 LotN 30.04.2020; BM RefN HI-9 LotN 28.05.2020; BM RefN HI-8 LotN 30.04.2020; BM RefN HI-10 LotN 28.05.2020. The Standard Solution preparation and certified by CPAchem Ltd is accredited to ISO 17034 and ISO/IEC 17025

4. This certificate was certified only for the instrument we calibrated.
5. This result of calibration was found accurate as shown on date and place of calibration only.

F-CS-012 Revision: 00 Date: 14-12-61

เอกสารไม่ควบคุม

Calibration Report

Certificate No.: 2101930-001-01
Equipment: pH Meter
Resolution: 0.01 pH ± 1 mV
Manufacturer: METTLER TOLEDO Model: SevenEasy pH
Serial No.: 1230525212 Type: Bench top
ID No.: UAE.WAS.003/2553

Date of Calibration: 17 March 2021 Page 3 of 5

Calibration Results:

1. Calibration of pH Meter (Manual Temperature Compensation at 25 °C)

Nominal pH	DC Voltage Standard (mV)	Average Indicator Reading		Uncertainty (± mV)	Coverage Factor (k)
		mV	pH		
0.00	414.118	414	0.00	0.58	2.00
2.00	295.811	296	2.00	0.58	2.00
4.00	177.461	178	4.00	0.58	2.00
6.00	59.160	59	6.00	0.58	2.00
7.00	0.000	0	7.00	0.58	2.00
8.00	-59.158	-59	8.00	0.58	2.00
10.00	-177.461	-177	10.00	0.58	2.00
12.00	-295.812	-296	12.00	0.58	2.00
14.00	-414.118	-414	14.00	0.58	2.00

2. Calibration of pH Meter with Electrode (Manual Temperature Compensation at 25 °C)

Equipment: pH Electrode Type: Combined Electrode
Manufacturer: METTLER TOLEDO Model: InLab Solids
Serial No.: 9453943 ID No.: N/A

Performance of Electrode system (Three-Point Calibration at pH4, pH7 and pH10)

Certified Value @25 °C (pH)	Average Indicator Reading		Relative Slope (%)	Uncertainty (± pH)	Coverage Factor (k)
	pH	mV			
4.008	4.01	186	97.5	0.0071	2.00
6.866	6.87	21		0.0075	2.00
6.866	6.87	21	98.0	0.0075	2.00
10.008	10.01	-161		0.0093	2.00
6.965	6.99	14		0.0093	2.00

F-CS-012 Revision: 00 Date: 14-12-61

เอกสารไม่ควบคุม

Calibration Report

Certificate No.: 2101930-001-01
Equipment: Digital Thermometer with RTD (pH Meter)
Resolution: 0.1 °C Model: SevenEasy pH
Serial No.: 1230525212 ID No.: UAE.WAS.003/2553
Manufacturer: METTLER TOLEDO

Date of Calibration: 17 March 2021 Page 4 of 5

Location: Chemical Calibration Laboratory, National Food Institute
Environment Condition: Ambient Temperature 23 °C ± 1 °C
Relative Humidity: 54 % ± 2 %

Condition of this results of Calibration:

1. Calibration Method :
 - In house method: W-TE-025 by comparison with standard thermometer.
 - The Calibration is determined by comparing with a known temperature from a standard resistance thermometer.
 - The temperature scale in use at this laboratory is the International Temperature scale of 1990 (ITS-90).
2. Reference Standard Instrument:

Instrument	Model	Serial No.	Certificate No.	Due Date	Through
HANDHELD THERMOMETER	1523	2118154	PSL-T 767/83	04-Jun-21	TISTR
Platinum Resistance Thermometer (PRT)	5627A	877332			

Support Equipment : - Low Temperature Bath (ISOCAL-6), Model: Europa-6 Plus Basic, S/N: 3415922

3. This certificate is traceable to International System of Units (SI Units).
4. This certificate was certified only for the instrument we calibrated.
5. This result of calibration was found accurate as shown on date and place of calibration only.
6. Condition of Calibrated item : Good
7. Result of Calibration : ☒ Without adjustment ☐ After adjustment

F-CS-012 Revision: 00 Date: 14-12-61

เอกสารไม่ควบคุม

Calibration Report

Certificate No.: 2101930-001-01
Equipment: Digital Thermometer with RTD (pH Meter)
Resolution: 0.1 °C Model: SevenEasy pH
Serial No.: 1230525212 ID No.: UAE.WAS.003/2553
Manufacturer: METTLER TOLEDO

Date of Calibration: 17 March 2021 Page 5 of 5

Calibration point: 15.0, 25.0 and 35.0 °C

Calibration result:

- The probe was immersed in liquid bath or dry bath to a minimum depth of 100 mm.
- Description of probe, model : SN :
Dimension of probe : Diameter 3.5 mm, Length 120 mm.
Sheath material : Stainless Steel

UUC* Reading (°C)	Standard Temperature (°C)	Correction Value (°C)	Uncertainty ± (°C)
15.2	15.003	-0.2	0.099
25.2	25.003	-0.2	0.099
35.2	35.007	-0.2	0.099

Note : * UUC* : Unit Under Calibration
The report uncertainty of measurement was based on standard uncertainty multiplied by coverage factor k=2, providing a level of confidence of approximately 95 %.

F-CS-012 Revision: 00 Date: 14-12-61

เอกสารไม่ควบคุม

Calibration Certificate

Certificate No.: 2102573-001-01
Client name: UNITED ANALYST AND ENGINEERING CONSULTANT CO., LTD.
Address: 3 Soi Udomsuk 41, Sukhumvit Road, Bangchack, Prakhonong, Bangkok 10260

Page 1 of 4

Equipment: Electronic Balance

Manufacturer: METTLER TOLEDO

Model: XSR205DU

Serial No.: C009071872

ID No.: UAE.WAO.012/2563

Order No.: 2102573

Operation No.: 2102573 -001

Date of Receipt: 26 April 2021

Date of Calibration: 26 April 2021

Calibrated by Mr.Manas Somsak Expert

Approved by (Mr.Pherapat Ruangjit)
Manager, Division of Calibration Laboratory

Date of Issue: 29 April 2021 Responsible for the Technical Management Team

The uncertainties are for a confidence probability of approximately 95%

This Certificate is issued in accordance with the conditions of accreditation granted by the Thai Laboratory Accreditation Scheme which has assessed the measurement capability of the laboratory and its traceability to recognized national standards and to the units of measurement realized at the corresponding national standards laboratory. This certificate may not be used for other than in full except with the prior written approval of the National Food Institute.

F-CS-309 Revision: 00 Date: 14-12-61

เอกสารไม่ควบคุม

Calibration Report

Certificate No.: 2102573-001-01
Equipment: Electronic Balance
Model: XSR205DU
Serial No.: C009071872
Capacity: 81 g / 220 g
Manufacturer: METTLER TOLEDO
Resolution: 0.0001 g / 0.0001 g
ID No.: UAE.WAO.012/2563

Date of Calibration: 26 April 2021 **Page 2 of 4**

Environment Condition: Ambient Temperature: 23.2 ± 0.1 °C Relative Humidity: 48 ± 2 %

Place of Calibration: Balance Room (208), UNITED ANALYST AND ENGINEERING CONSULTANT CO., LTD.

Condition of Equipment: Good Condition

Condition of This Results of Calibration:

1. Calibration Method: NFI Method W-MA-001 In-House Method Based on UKAS L86:14 Calibration of Weighing Machines : 2006

2. Reference Standards:

Reference Standard **Model** **Serial No.** **Calibrated By** **Certificate No.** **Due Date**

Standard Weight Class E2 1-500mg 8308068554 TCS MQ1010975 12 January 2022

Standard Weight Class E2 1-500g 8308068128 TCS MQ1010985 13 January 2022

Instrument **Model** **Serial No.** **Calibrated By** **Certificate No.** **Due Date**

Thermo-Hygro Meter POME 490 NFI.8TH 604/18 Quality Reborn QR21-0300 15 February 2022

3. This certification is traceable to SI UNIT

4. This certificate was certified only for the instrument we calibrated.

5. This result of calibration was found accurate as shown on date and place of calibration only.

Calibration Results:

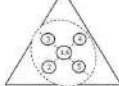
1. Repeatability of Readings:

Nominal Value (g)	Standard Deviation of Reading (g)
40	0.000048
80	0.000032
100	0.000006
200	0.000006

2. Off-Center Error:

A mass of 50 g was placed and moved to various position on pan.

The balance reading obtained is given in the table.



1	2	3	4	5	6	(Maximum Difference)
(g)	(g)	(g)	(g)	(g)	(g)	(g)
50.0000	49.99999	50.00001	50.00001	49.99999	50.00000	0.00001

F-CS-012 Revision: 00 Date: 14-12-61

เอกสารไม่ควบคุม

Calibration Report

Certificate No.: 2102573-001-01
Equipment: Electronic Balance
Model: XSR205DU
Serial No.: C009071872
Capacity: 81 g / 220 g
Manufacturer: METTLER TOLEDO
Resolution: 0.0001 g / 0.0001 g
ID No.: UAE.WAO.012/2563

Date of Calibration: 26 April 2021 **Page 3 of 4**

Calibration Results: (Continued)

Calibration Range: 0 - 200 g

Calibration Adjustment: Internal Calibration

3. Departure from Nominal Value: (Range 0 - 81 g ; Resolution 0.0001 g)

Nominal Value (g)	Standard Value (g)	Average Reading (g)	Correction (g)	Uncertainty (± g)	Coverage Factor k
0.01	0.010002	0.01003	-0.00003	0.0000091	2.00
0.05	0.050004	0.05004	-0.00003	0.0000099	2.00
0.1	0.100009	0.10003	-0.00003	0.000011	2.00
0.2	0.200002	0.20004	-0.00004	0.000011	2.00
0.5	0.499999	0.50003	-0.00003	0.000014	2.00
1	1.000005	1.00001	0.00000	0.000014	2.00
2	2.000006	2.00001	-0.00001	0.000017	2.00
3	3.000011	3.00001	0.00000	0.000020	2.00
4	4.000014	4.00002	-0.00001	0.000023	2.00
5	5.000002	5.00002	-0.00002	0.000026	2.00
10	9.999989	10.00002	-0.00004	0.000029	2.00
20	19.999988	20.00004	-0.00005	0.000037	2.00
50	49.999903	49.99997	-0.00006	0.000083	2.00
70	69.999891	69.99995	-0.00006	0.00011	2.00
80	79.999871	79.99994	-0.00007	0.00015	2.00

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

F-CS-012 Revision: 00 Date: 14-12-61

เอกสารไม่ควบคุม

Calibration Report

Certificate No.: 2102573-001-01
Equipment: Electronic Balance
Model: XSR205DU
Serial No.: C009071872
Capacity: 81 g / 220 g
Manufacturer: METTLER TOLEDO
Resolution: 0.0001 g / 0.0001 g
ID No.: UAE.WAO.012/2563

Date of Calibration: 26 April 2021 **Page 4 of 4**

Calibration Results: (Continued)

Calibration Range: 0 - 200 g

Calibration Adjustment: Internal Calibration

3. Departure from Nominal Value: (Range >81 g to 200 g ; Resolution 0.0001 g)

Nominal Value (g)	Standard Value (g)	Average Reading (g)	Correction (g)	Uncertainty (± g)	Coverage Factor k
82	81.99989	82.0000	-0.0001	0.00012	2.00
85	84.99987	85.0000	-0.0001	0.00013	2.00
90	89.99988	90.0000	-0.0001	0.00013	2.00
95	94.99989	95.0000	-0.0001	0.00014	2.00
100	100.00000	100.0000	0.0000	0.00015	2.00
110	109.99998	110.0000	0.0000	0.00016	2.00
120	119.99999	120.0000	0.0000	0.00017	2.00
150	149.99990	150.0000	-0.0001	0.00020	2.00
170	169.99989	170.0000	-0.0001	0.00023	2.00
200	200.00009	200.0001	0.0000	0.00028	2.00

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

F-CS-012 Revision: 00 Date: 14-12-61

เอกสารไม่ควบคุม

Calibration Certificate

Certificate No.: 2200708-001-01
Client name: UNITED ANALYST AND ENGINEERING CONSULTANT CO., LTD.
Address: 3 Soi Udomsuk 41, Sukhumvit Road, Bangchack, Prakhonong, Bangkok 10260

Date of Calibration: 24 November 2021 **Page 1 of 4**

Equipment: Electronic Balance

Manufacturer: METTLER TOLEDO

Model: AX 105 DR

Serial No.: 1122100406

ID No.: UAE.WAO.004/2546

Order No.: 2200708

Operation No.: 2200708-001

Date of Receipt: 24 November 2021

Date of Calibration: 24 November 2021

Calibrated by Mr. Worapob Sooktong
Scientist

Approved by (Mr. [Signature])
Manager, Division of Calibration Laboratory
Responsible for the Technical Management Team

Date of Issue: 30 November 2021

The uncertainties are for a confidence probability of approximately 95%

This Certificate is issued in accordance with the conditions of accreditation granted by the Thai Laboratory Accreditation Scheme which has assessed the measurement capability of the laboratory and its traceability to recognized national standards and to the units of measurement realized at the corresponding national standards laboratory. This certificate may not be reproduced other than in full except with the prior written approval of the National Food Institute.

F-CS-009 Revision: 00 Date: 14-12-61

เอกสารไม่ควบคุม

Calibration Report

Certificate No.: 2200708-001-01
Equipment: Electronic Balance
Model: AX 105 DR
Serial No.: 1122100406
Capacity: 110 g
Manufacturer: METTLER TOLEDO
Resolution: 0.00001 g/0.0001 g
ID No.: UAE.WAO.004/2546

Date of Calibration: 24 November 2021 **Page 2 of 4**

Environment Condition: Ambient Temperature: 22.0 ± 0.5 °C Relative Humidity: 39 ± 1 %

Place of Calibration: Balance Room, UNITED ANALYST AND ENGINEERING CONSULTANT CO.,LTD.

Condition of Equipment: Good Condition

Condition of This Results of Calibration:

1. Calibration Method: NFI Method W-MA-001 In-House Method based on UKAS Lab 14 : 2019

2. Reference Standards:

Reference Standard	Model	Serial No.	Calibrated By	Certificate No.	Due Date
Standard Weight Class E2	1-500mg	15880	TCS	M20111955	28 November 2021
Standard Weight Class E2	1-500g	15882	TCS	M20111965	28 November 2021

Instrument	Model	Serial No.	Calibrated By	Certificate No.	Due Date
Thermo-Hygro Meter	11A1	ajav.aj. 8TH 003/55	Quality Reborn	QR21-0297	15 February 2022

3. This certification is traceable to SI UNIT

4. This certificate was certified only for the instrument we calibrated.

5. This result of calibration was found accurate as shown on date and place of calibration only.

Calibration Results:

1. Repeatability of Reading:

Nominal Value (g)	Standard Deviation of Reading (g)
15	0.000057
30	0.000084
50	0.000053
100	0.000048

2. Off-Center Error:

A mass of 50 g was placed and moved to various position on pan.

The balance reading obtained is given in the table.

1	2	3	4	5	6	(Maximum Difference)
(g)	(g)	(g)	(g)	(g)	(g)	(g)
50.0000	50.0000	49.9999	50.0000	49.9999	49.9999	0.0001

F-CS-012 Revision: 00 Date: 14-12-61

เอกสารไม่ควบคุม

Calibration Report

Certificate No.: 2200708-001-01
Equipment: Electronic Balance
Model: AX 105 DR
Serial No.: 1122100406
Capacity: 110 g
Manufacturer: METTLER TOLEDO
Resolution: 0.00001 g/0.0001 g
ID No.: UAE.WAO.004/2546

Date of Calibration: 24 November 2021 **Page 3 of 4**

Calibration Results: (Continued)

Calibration Range: 0-100 g

Calibration Adjustment: Internal Calibration

3. Departure from Nominal Value: (Range: 0 - 30 g ; Resolution: 0.00001 g)

Nominal Value (g)	Standard Value (g)	Average Reading (g)	Correction (g)	Uncertainty (± g)	Coverage Factor k
Unload	0.00000	0.00000	0.00000	0.0000089	2.00
0.01	0.009998	0.01000	0.00000	0.000011	2.00
0.02	0.019997	0.02000	0.00000	0.000012	2.00
0.05	0.050001	0.05000	0.00000	0.000011	2.00
0.1	0.100002	0.10000	0.00000	0.000012	2.00
0.2	0.200004	0.20000	0.00000	0.000013	2.00
0.5	0.499994	0.50000	-0.00001	0.000014	2.00
1	0.999985	1.00000	-0.00001	0.000026	2.00
2	1.999989	1.99998	0.00001	0.000019	2.00
5	4.999979	4.99998	0.00000	0.000022	2.00
10	10.000026	9.99994	0.00009	0.000074	2.00
20	20.000037	19.99991	0.00013	0.000099	2.00
30	30.000063	30.00000	0.00006	0.00013	2.00

F-CS-012 Revision: 00 Date: 14-12-61

เอกสารไม่ควบคุม

Calibration Report

Certificate No.: 2200708-001-01
Equipment: Electronic Balance
Model: AX 105 DR
Serial No.: 1122100406
Capacity: 110 g
Manufacturer: METTLER TOLEDO
Resolution: 0.00001 g/0.0001 g
ID No.: UAE.WAO.004/2546

Date of Calibration: 24 November 2021 **Page 4 of 4**

Calibration Results: (Continued)

Calibration Range: 0-100 g

Calibration Adjustment: Internal Calibration

3. Departure from Nominal Value: (Range: 31 - 100 g ; Resolution: 0.0001 g)

Nominal Value (g)	Standard Value (g)	Average Reading (g)	Correction (g)	Uncertainty (± g)	Coverage Factor k
40	40.00000	39.9999	0.0001	0.00014	2.00
45	44.99998	44.9999	0.0001	0.00015	2.00
50	49.99999	49.9999	0.0001	0.00016	2.00
55	54.99997	54.9998	0.0002	0.00016	2.00
60	60.00002	59.9999	0.0001	0.00018	2.00
65	65.00000	64.9999	0.0001	0.00018	2.00
70	70.00003	69.9999	0.0001	0.00019	2.00
75	75.00001	74.9999	0.0001	0.00020	2.00
80	80.00005	79.9998	0.0003	0.00021	2.00
85	85.00003	84.9998	0.0002	0.00022	2.00
90	89.99999	89.9998	0.0002	0.00021	2.00
100	99.99997	99.9998	0.0002	0.00026	2.00

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

F-CS-012 Revision: 00 Date: 14-12-61

----- End -----

เอกสารไม่ควบคุม



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES & EQUIPMENT CALIBRATION AND TESTING SERVICES
3144 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250
TEL. 0-2717-3000-27 FAX. 0-2719-9484



Cert. No.: 21TM813
Page: 1 of 3

Certificate of Calibration

Equipment: Hot Air Oven
Manufacturer: Memmert
Model: UF 55
Serial No.: B212.0411
ID No.: UAE.WAO.005/2556
Submitted by: United Analyst and Engineering Consultant Co.,Ltd.
3 Soi Udomsuk 41, Sukhumvit Road,
Bangchak, Phrakhanong,
Bangkok 10260
Location: Lab Floor 2
Received Order: 21 April 2021
Calibration Date: 21 April 2021
Ambient Temperature: (26 ± 10) °C
Relative Humidity: (50 ± 30) %
Calibrated by: Khit Ruttanaprapachai
Approved by: [Signature]
() Ponthippa Tameyakul
() Malee Butkruea
() Suwit Imjai
Issue Date: 5 May 2021

The Uncertainties are for a confidence probability of approximately 95 %

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

เอกสารไม่ควบคุม



Equipment : Hot Air Oven
 Condition As-Received : Used Item
 Reference : 2104-0024OC-2
 Result of Calibration :- (*) Without Adjustment
 Function of UUC* : Temperature Source

Cert. No.: 21TM813
 Page.: 3 of 3

Calibration Point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Temperature stability (± °C)	Temperature uniformity (°C)	Overall Variation (°C)	Uncertainty (± °C)	Coverage Factor k
104.0	104.0	104.0	0.13	0.67	0.70	0.68	2
120.0	120.0	120.0	0.10	0.95	1.5	1.1	2
180.0	180.0	180.0	0.15	1.5	2.7	1.1	2

Calibration Point (°C)	Measured Temperature (°C)								
	1	2	3	4	5	6	7	8	9 (ref.)
104.0	103.712	103.853	104.189	104.213	103.803	103.832	104.026	103.775	103.703
120.0	119.714	119.841	120.552	120.326	119.231	119.293	120.117	119.826	119.721
180.0	179.624	179.511	180.806	180.572	178.397	178.663	180.344	179.807	179.691

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

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

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

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

UUC* : Unit Under Calibration

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

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

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เอกสารไม่ควบคุม

a 1052722



Equipment : Hot Air Oven
 Condition As-Received : Used Item
 Reference : 2104-0024OC-2
 Procedure Used :-

Cert. No.: 21TM813
 Page.: 2 of 3

Calibration were conducted using calibration procedure CP-OT02 according to direct measurement method with Data Acquisition which connected with Thermocouple Type T.

The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standard instrument:-

Instrument	Serial No.	Cert. No.	Traceable	Due Date
1) Data Acquisition	MY57013711	20LM7	NIST, NIMT	18 May 2021

2. This certification is traceable to the SI unit.

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

Remark : NIST : National Institute of Standards and Technology, The United State of America.

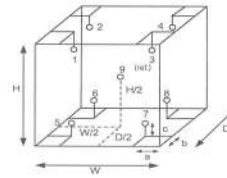
NIMT : National Institute of Metrology Thailand.

Result of Calibration :- (*) Without Adjustment

Function of UUC* : Temperature Source

Fresh air setting : Close

Environment during calibration		
	Beginning	Finished
Temp. (°C)	28	29
REL.Humid. (%)	50	54
AC Supply (Volt)	221	222



Probe Installation Details :

a =	5.0	cm
b =	5.0	cm
c =	5.0	cm

Dimension of Chamber :

D =	0.50	m
W =	0.80	m
H =	0.75	m
Capacity =	0.30	m ³

Position	Ref. Std./ID No.:
1	18-18TC-01
2	18-18TC-02
3	18-18TC-03
4	18-18TC-04
5	18-18TC-05
6	18-18TC-06
7	18-18TC-07
8	18-18TC-08
9 (ref.)	18-18TC-09

เอกสารไม่ควบคุม

a 1052723



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
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 534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250
 TEL. 0-2717-3000-27 FAX. 0-2719-9484



Cert. No.: 21TM1876
 Page.: 1 of 3

Certificate of Calibration

Equipment : Hot Air Oven
 Manufacturer : Memmert
 Model : UF 55
 Serial No. : B216.1666
 ID No. : UAE.WAO.027/2559
 Submitted by : United Analyst and Engineering Consultant Co.,Ltd.
 3 Soi Udornsuk 41, Sukhumvit Road,
 Bangchak, Phrakhanong,
 Bangkok 10260
 Location : Lab Floor 2
 Received Order : 29 October 2021
 Calibration Date : 29 October 2021
 Ambient Temperature : (26 ± 10) °C
 Relative Humidity : (50 ± 30) %
 Calibrated by : Kunchit Promprat
 Approved by :
 Approved Signatory
 () Pornthippa Tameyakul
 () Malee Butkruea
 () Suwit Imjai

Issue Date : 4 November 2021

The Uncertainties are for a confidence probability of approximately 95%

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

เอกสารไม่ควบคุม



Equipment : Hot Air Oven
 Condition As-Received : Used Item
 Reference : 2110-0701OC-1
 Procedure Used :-

Cert. No.: 21TM1876
 Page.: 2 of 3

Calibration were conducted using calibration procedure CP-OT02 according to direct measurement method with Data Acquisition which connected with Resistance Temperature Detector (RTD) and Thermocouple Type T.

The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standard instrument:-

Instrument	Model	Serial No.	Cert. No.	Due Date
1) Data Acquisition	34970A	MY44067817	21LM10	20 Jul 2022

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

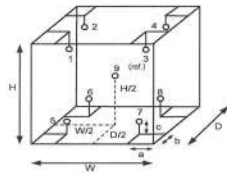
3. This certificate is traceable to the International System of Unit.

Result of Calibration :- (*) Without Adjustment

Function of UUC* : Temperature Source

Fresh air setting : Close

Environment during calibration		
	Beginning	Finished
Temp. (°C)	28	28
REL.Humid. (%)	56	55
AC Supply (Volt)	230	230



Probe Installation Details :

a =	5.0	cm
b =	5.0	cm
c =	5.0	cm

Dimension of Chamber :

D =	0.33	m
W =	0.40	m
H =	0.40	m
Capacity =	0.053	m ³

Ref. Std. ID No.: @ Calibration Point		
Position	(140, 180) °C	(104) °C
1	21-15TC-01	15RTD2/11
2	21-15TC-02	15RTD2/12
3	21-15TC-03	15RTD2/13
4	21-15TC-04	15RTD2/14
5	21-15TC-05	15RTD2/15
6	21-15TC-06	15RTD2/20
7	21-15TC-07	15RTD2/17
8	21-15TC-08	15RTD2/18
9 (ref.)	21-15TC-09	15RTD2/19

เอกสารไม่ควบคุม



Equipment : Hot Air Oven
Condition As-Received : Used Item
Reference : 2110-0701OC-1
Result of Calibration :- (*) Without Adjustment
Function of UUC* : Temperature Source
Fresh air setting : Close

Cert. No.: 21TM1876
Page.: 3 of 3

Calibration Point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Temperature stability (± °C)	Temperature uniformity (°C)	Overall Variation (°C)	Uncertainty (± °C)	Coverage Factor k
104.0	104.0	104.0	0.11	0.52	0.72	0.42	2
140.0	140.0	140.0	0.25	1.1	1.4	1.1	2
180.0	180.0	180.0	0.18	0.87	1.2	1.1	2

Calibration Point (°C)	Measured Temperature (°C)								
	Position								
	1	2	3	4	5	6	7	8	9 (ref.)
104.0	103.852	103.978	104.382	104.323	103.776	104.015	104.312	104.196	103.907
140.0	140.309	140.730	140.426	140.270	139.531	139.666	140.067	139.895	139.750
180.0	180.598	180.339	180.755	180.619	179.716	179.829	180.204	180.365	179.975

Average*: The average of 30 values in each position.
Temperature stability: One-half of the greatest maximum difference of measured temperature at any one sensor.
Temperature uniformity: The maximum difference of measured temperatures at any sensors and the measured temperature at the reference location which are observed at the same time or at as close an observation time as possible to determine the temperature pattern or homogeneity within the chamber under steady-state conditions.
Overall Variation: The Difference of the maximum and minimum measured temperatures throughout observation.
UUC*: Unit Under Calibration
Note: The reported uncertainty of measurement was included stability and excluded uniformity.

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

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เอกสารไม่ควบคุม



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
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TEL: 0-2717-3090-27 FAX: 0-2719-9484



Cert. No.: 21TM1874
Page.: 1 of 3

Certificate of Calibration

Equipment : Incubator
Manufacturer : Memmert
Model : IPP 260
Serial No. : V616.0066
ID No. : UAE.MIC.032/2559
Submitted by : United Analyst and Engineering Consultant Co.,Ltd.
3 Soi Udomsuk 41, Sukhumvit Road,
Bangchak, Phrakhanong,
Bangkok 10260
Location : Microbiology Laboratory (302)
Received Order : 28 October 2021
Calibration Date : 28 - 29 October 2021
Ambient Temperature : (26 ± 10) °C
Relative Humidity : (50 ± 30) %

Calibrated by : Kunchit Promprat

Approved by : 
Approved Signatory

() Pornthippa Tameyakul
() Malee Butkruea
() Suwit Imjai

Issue Date : 4 November 2021

The Uncertainties are for a confidence probability of approximately 95%

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เอกสารไม่ควบคุม



Equipment : Incubator
Condition As-Received : Used Item
Reference : 2110-0698OC-1
Procedure Used :-

Calibration were conducted using calibration procedure CP-OT02 according to direct measurement method with Data Acquisition which connected with Resistance Temperature Detector (RTD).

The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standard instrument:-

Instrument	Model	Serial No.	Cert. No.	Due Date
1) Data Acquisition	34970A	MY44067817	21LM10	20 Jul 2022

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

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

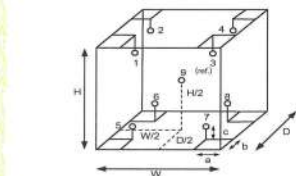
Result of Calibration :- (*) Without Adjustment

Function of UUC* : Temperature Source

Fresh air setting : Not Available

Environment during calibration		
	Beginning	Finished
Temp. (°C)	22	22
REL.Humid. (%)	59	60
AC Supply (Volt)	226	226

Position :	Ref. Std. ID No.:
1	15RTD2/11
2	15RTD2/12
3	15RTD2/13
4	15RTD2/14
5	15RTD2/15
6	15RTD2/20
7	15RTD2/17
8	15RTD2/18
9 (ref.)	15RTD2/19



Probe Installation Details : Dimension of Chamber :
a = 5.0 cm D = 0.50 m
b = 5.0 cm W = 0.64 m
c = 5.0 cm H = 0.80 m
Capacity = 0.26 m³



Equipment : Incubator
Condition As-Received : Used Item
Reference : 2110-0698OC-1
Result of Calibration :- (*) Without Adjustment
Function of UUC* : Temperature Source
Fresh air setting : Not Available

Cert. No.: 21TM1874
Page.: 3 of 3

Calibration Point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Temperature stability (± °C)	Temperature uniformity (°C)	Overall Variation (°C)	Uncertainty (± °C)	Coverage Factor k
25.0	25.0	24.5	0.053	0.25	0.42	0.30	2
35.0	35.0	35.0	0.029	0.43	0.75	0.30	2

Calibration Point (°C)	Measured Temperature (°C)								
	Position								
	1	2	3	4	5	6	7	8	9 (ref.)
25.0	25.007	24.986	24.943	24.894	24.653	24.806	24.672	24.694	24.786
35.0	35.340	35.384	35.336	35.307	34.680	35.120	34.813	34.996	35.088

Average*: The average of 30 values in each position.
Temperature stability: One-half of the greatest maximum difference of measured temperature at any one sensor.
Temperature uniformity: The maximum difference of measured temperatures at any sensors and the measured temperature at the reference location which are observed at the same time or at as close an observation time as possible to determine the temperature pattern or homogeneity within the chamber under steady-state conditions.
Overall Variation: The Difference of the maximum and minimum measured temperatures throughout observation.
UUC*: Unit Under Calibration
Note: The reported uncertainty of measurement was included stability and excluded uniformity.

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

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เอกสารไม่ควบคุม

เอกสารไม่ควบคุม



Cert. No.: 21TM706
Page: 1 of 3

Certificate of Calibration

Equipment : Incubator
Manufacturer : Memmert
Model : IPP260
Serial No. : V615.0187
ID No. : UAE.MIC.003/2559
Submitted by : United Analyst and Engineering Consultant Co.,Ltd.
3 Soi Udomsuk 41, Sukhumvit Road,
Bangchak, Phrakhanong,
Bangkok 10260
Location : Microbiology Laboratory
Received Order : 21 April 2021
Calibration Date : 21 April 2021
Ambient Temperature : (26 ± 10) °C
Relative Humidity : (50 ± 30) %
Calibrated by : Kritsada Chaitrong
Approved by :
() Pornthippa Tameyakul
(✓) Malee Butkruea
() Suwit Imjai

Issue Date : 5 May 2021

The Uncertainties are for a confidence probability of approximately 95 %

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เอกสารไม่ควบคุม

A 0027609



Equipment : Incubator
Condition As-Received : Used Item
Reference : 2104-0019OC-1
Procedure Used :-

Cert. No.: 21TM706
Page: 2 of 3

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

Condition of this result of calibration

1. Reference standard instrument:-

Instrument	Serial No.	Cert. No.	Traceable	Due Date
1) Data Acquisition	MY44060450	21LM4	NIMT	06 Mar 2022

2. This certification is traceable to the SI unit.

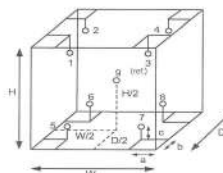
3. This certificate is valid only to the item calibrated on date and place of calibration.

Remark : NIMT : National Institute of Metrology Thailand.

Result of Calibration :- (*) Without Adjustment

Function of UUC* : Temperature Source

Fresh air setting : Close



Probe Installation Details :

Dimension	Value
a = 10 cm	D = 0.50 m
b = 10 cm	W = 0.64 m
c = 10 cm	H = 0.80 m
	Capacity = 0.26 m³

Environment during calibration		
	Beginning	Finished
Temp. (°C)	24	23
REL Humid. (%)	80	63
AC Supply (Volt)	223	224

Position :	Ref. Std. ID No.:
1	19-14RTD-01
2	19-14RTD-02
3	19-14RTD-03
4	19-14RTD-04
5	19-14RTD-05
6	19-14RTD-06
7	21-14RTD-07
8	19-14RTD-08
9 (ref.)	19-14RTD-09

เอกสารไม่ควบคุม

a 1052708



Equipment : Incubator
Condition As-Received : Used Item
Reference : 2104-0019OC-1
Result of Calibration :- (*) Without Adjustment
Function of UUC* : Temperature Source

Cert. No.: 21TM706
Page: 3 of 3

Calibration Point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Temperature stability (± °C)	Temperature uniformity (°C)	Overall Variation (°C)	Uncertainty (± °C)	Coverage Factor k
35.0	35.0	35.0	0.11	0.36	0.55	0.30	2

Calibration Point (°C)	Measured Temperature (°C)								
	Position								
	1	2	3	4	5	6	7	8	9 (ref.)
35.0	34.946	35.035	35.120	35.087	34.989	35.121	34.745	35.004	34.994

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

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

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

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

UUC* : Unit Under Calibration

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

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

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เอกสารไม่ควบคุม

a 1052707



Cert. No.: 22TM563
Page: 1 of 3

Certificate of Calibration

Equipment : Incubator
Manufacturer : Memmert
Model : IPP 260
Serial No. : V615.0187
ID No. : UAE.MIC.003/2559
Submitted by : United Analyst and Engineering Consultant Co.,Ltd.
3 Soi Udomsuk 41, Sukhumvit Road,
Bangchak, Phrakhanong,
Bangkok 10260
Location : Microbiology Laboratory
Received Order : 7 April 2022
Calibration Date : 7 April 2022
Ambient Temperature : (26 ± 10) °C
Relative Humidity : (50 ± 30) %
Calibrated by : Prawit Sodavitchit
Approved by :
() Pornthippa Tameyakul
(✓) Malee Butkruea
() Suwit Imjai
Issue Date : 18 April 2022

The Uncertainties are for a confidence probability of approximately 95 %

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

เอกสารไม่ควบคุม

A 0040248



Equipment : Water Bath
Condition As-Received : Used Item
Reference : 2107-0318OC-5

Cert. No.: 21TM1355/1
Page.: 2 of 3

Procedure Used :-

Calibration were conducted using in-house calibration procedure CP-OT04 according to direct measurement method with Data Acquisition which connected with Industrial Platinum Resistance Thermometer (IPRT).

The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standard instrument:-

Instrument	Model	Serial No.	Cert. No.	Due Date
1) Data Acquisition	34972A	MY57013823	21LM3	26 Feb 2022

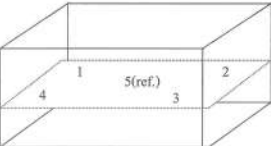
2. This certificate is valid only to the item calibrated on date and place of calibration.

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

Result of Calibration :- (*) Without Adjustment

Function of UUC* : Temperature Source

	Environmental		AC Voltage Supply
	(°C)	(%R.H.)	(Volt)
Beginning of Calibration	25	54	220
Finished of Calibration	25	57	222



Front

Position :	Ref. Std. S/N.:
1	4804539-006
2	4804539-007
3	4804539-008
4	4804539-009
5(ref.)	4804539-010

เอกสารไม่ควบคุม
a 1065656



Equipment : Water Bath
Condition As-Received : Used Item
Reference : 2107-0318OC-5

Cert. No.: 21TM1355/1
Page.: 3 of 3

Result of Calibration :- (*) Without Adjustment
Function of UUC* : Temperature Source

Calibration point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Average* Standard Reading (°C)				
			1	2	3	4	5 (ref.)
41.5	41.2	41.2	41.418	41.379	41.374	41.447	41.420

Calibration point (°C)	Uniformity (°C)	Stability (± °C)	Uncertainty (± °C)	Coverage Factor k
41.5	0.084	0.043	0.16	2

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

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

Stability : One-half of the greatest maximum difference of measured temperature at any one probe.

UUC* : Unit Under Calibration

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

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

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เอกสารไม่ควบคุม
a 1065655



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



Cert. No.: 21TM422
Page.: 1 of 3

Certificate of Calibration

Equipment : Water Bath
Manufacturer : Memmert
Model : WNE 14
Serial No. : L416.0606
ID No. : UAE.MIC.002/2560
Submitted by : United Analyst and Engineering Consultant Co.,Ltd.
3 Soi Udumak 41, Sukhumvit Road,
Bangchak, Phrakhanong,
Bangkok 10260
Location : Microbiology Laboratory
Received Order : 22 February 2021
Calibration Date : 22 February 2021
Ambient Temperature : (26 ± 10) °C
Relative Humidity : (50 ± 30) %
Calibrated by : Man Pattanapongpaiboon
Approved by : [Signature]
() Pornthippa Tameyakul
(/) Malee Butkruea
() Suwit Imjai
Issue Date : 3 March 2021

The Uncertainties are for a confidence probability of approximately 95%

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เอกสารไม่ควบคุม



Equipment : Water Bath
Condition As-Received : Used Item
Reference : 2102-0751OC-3

Cert. No.: 21TM422
Page.: 2 of 3

Procedure Used :-

Calibration were conducted using in-house calibration procedure CP-OT04 according to direct measurement method with Data Acquisition which connected with Industrial Platinum Resistance Thermometer (IPRT).

The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standard instrument:-

Instrument	Serial No.	Cert. No.	Traceable	Due Date
1) Data Acquisition	MY44036292	20LM5	NIST, NIMT	10 Apr 2021

2. This certification is traceable to the SI unit.

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

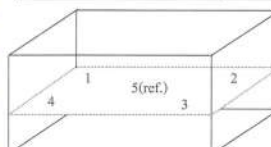
Remark : NIST : National Institute of Standards and Technology, The United State of America.

NIMT : National Institute of Metrology Thailand.

Result of Calibration :- (*) Without Adjustment

Function of UUC* : Temperature Source

	Environmental		AC Voltage Supply
	(°C)	(%R.H.)	(Volt)
Beginning of Calibration	24	54	219
Finished of Calibration	24	58	221



Front

Position :	Ref. Std. ID No.
1	70RC148
2	70RC149
3	70RC150
4	70RC151
5(ref.)	70RC152

เอกสารไม่ควบคุม



Equipment : Water Bath
 Condition As-Received : Used Item
 Reference : 2102-0751OC-3
 Result of Calibration :- (*) Without Adjustment
 Function of UUC* : Temperature Source

Cert. No.: 21TM422
 Page.: 3 of 3

Calibration point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Average* Standard Reading (°C)				
			Position				
			1	2	3	4	5 (ref.)
44.5	44.5	44.5	44.462	44.465	44.510	44.496	44.460

Calibration point (°C)	Uniformity (°C)	Stability (± °C)	Uncertainty (± °C)	Coverage Factor k
44.5	0.097	0.046	0.15	2

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

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

Stability : One-half of the greatest maximum difference of measured temperature at any one probe.

UUC* : Unit Under Calibration

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

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

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เอกสารไม่ควบคุม

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TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
 CORPORATE SERVICES & EQUIPMENT CALIBRATION AND TESTING SERVICES
 5544 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250
 TEL. 0-2717-3080-21 FAX. 0-2719-9484



Cert. No.: 21TM1356
 Page.: 1 of 3

Certificate of Calibration

Equipment : Water Bath
 Manufacturer : Memmert
 Model : WNB 14
 Serial No. : L407.0756
 ID No. : UAE.MIC.024/2550
 Submitted by : United Analyst and Engineering Consultant Co.,Ltd.
 3 Soi Udomsuk 41, Sukhumvit Road,
 Bangkok, Phrakhanong,
 Bangkok 10260
 Location : Microbiology Laboratory
 Received Order : 14 July 2021
 Calibration Date : 14 July 2021
 Ambient Temperature : (26 ± 10) °C
 Relative Humidity : (50 ± 30) %
 Calibrated by : Preecha Hiahib

Approved by :
 Approved Signatory

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

Issue Date : 20 July 2021

The Uncertainties are for a confidence probability of approximately 95%

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

เอกสารไม่ควบคุม



Equipment : Water Bath
 Condition As-Received : Used Item
 Reference : 2107-0318OC-6
 Result of Calibration :- (*) Without Adjustment
 Function of UUC* : Temperature Source

Cert. No.: 21TM1356
 Page.: 3 of 3

Calibration point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Average* Standard Reading (°C)				
			Position				
			1	2	3	4	5 (ref.)
44.5	45.0	45.0	44.480	44.502	44.490	44.486	44.483

Calibration point (°C)	Uniformity (°C)	Stability (± °C)	Uncertainty (± °C)	Coverage Factor k
44.5	0.072	0.053	0.15	2

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

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

Stability : One-half of the greatest maximum difference of measured temperature at any one probe.

UUC* : Unit Under Calibration

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

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

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เอกสารไม่ควบคุม



Equipment : Water Bath
 Condition As-Received : Used Item
 Reference : 2107-0318OC-6
 Procedure Used :-

Cert. No.: 21TM1356
 Page.: 2 of 3

Calibration were conducted using in-house calibration procedure CP-OT04 according to direct measurement method with Data Acquisition which connected with Industrial Platinum Resistance Thermometer (IPRT).

The temperature scale used was based on ITS-90.

Condition of this result of calibration

- Reference standard instrument:-

Instrument	Model	Serial No.	Cert. No.	Due Date
1) Data Acquisition	34972A	MY57013823	21LM3	26 Feb 2022

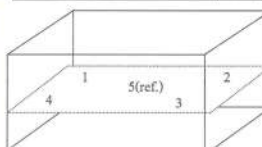
2. This certificate is valid only to the item calibrated on date and place of calibration.

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

Result of Calibration :- (*) Without Adjustment

Function of UUC* : Temperature Source

	Environmental		AC Voltage Supply
	(°C)	(%R.H.)	(Volt)
Beginning of Calibration	25	54	220
Finished of Calibration	25	57	222



Front

Position :	Ref. Std. S/N.:
1	4804539-006
2	4804539-007
3	4804539-008
4	4804539-009
5(ref.)	4804539-010

เอกสารไม่ควบคุม



Cert. No.: 21TM423
Page: 1 of 3

Certificate of Calibration

Equipment : Water Bath
Manufacturer : Memmert
Model : WNE 14
Serial No. : L416.0612
ID No. : UAE.MIC.003/2560
Submitted by : United Analyst and Engineering Consultant Co., Ltd.
3 Soi Udomsuk 41, Sukhumvit Road,
Bangchak, Phrakhanong,
Bangkok 10260
Location : Microbiology Laboratory
Received Order : 22 February 2021
Calibration Date : 23 February 2021
Ambient Temperature : $(26 \pm 10) ^\circ\text{C}$
Relative Humidity : $(50 \pm 30) \%$
Calibrated by : Man Pattanapongpaiboon

Approved by :

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

Issue Date : 3 March 2021

The Uncertainties are for a confidence probability of approximately 95%

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

เอกสารไม่ควบคุม
a 0025138



Equipment : Water Bath
Condition As-Received : Used Item
Reference : 2102-0751OC-4
Procedure Used :-

Cert. No.: 21TM423
Page: 2 of 3

Calibration were conducted using in-house calibration procedure CP-OT04 according to direct measurement method with Data Acquisition which connected with Industrial Platinum Resistance Thermometer (IPRT).

The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standard instrument:-

Instrument	Serial No.	Cert. No.	Traceable	Due Date
1) Data Acquisition	MY44036292	20LM5	NIST, NIMT	10 Apr 2021

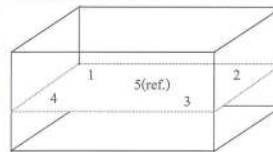
2. This certification is traceable to the SI unit.

3. This certificate is valid only to the item calibrated on date and place of calibration.
Remark : NIST : National Institute of Standards and Technology, The United State of America.
NIMT : National Institute of Metrology Thailand.

Result of Calibration :- (*) Without Adjustment

Function of UUC* : Temperature Source

	Environmental		AC Voltage Supply
	(°C)	(%R.H.)	(Volt)
Beginning of Calibration	24	56	220
Finished of Calibration	24	59	221



Front

Position :	Ref. Std. ID No.
1	70RC148
2	70RC149
3	70RC150
4	70RC151
5(ref.)	70RC152

เอกสารไม่ควบคุม
a 1043929



Equipment : Water Bath
Condition As-Received : Used Item
Reference : 2102-0751OC-4
Result of Calibration :- (*) Without Adjustment
Function of UUC* : Temperature Source

Cert. No.: 21TM423
Page: 3 of 3

Calibration point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Average* Standard Reading (°C)				
			1	2	3	4	5 (ref.)
44.5	44.5	44.5	44.531	44.474	44.492	44.514	44.537

Calibration point (°C)	Uniformity (°C)	Stability (± °C)	Uncertainty (± °C)	Coverage Factor k
44.5	0.12	0.044	0.15	2

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

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

Stability : One-half of the greatest maximum difference of measured temperature at any one probe.

UUC* : Unit Under Calibration

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

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

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เอกสารไม่ควบคุม
a 1043928



National Food Institute, Ministry of Industry, Thailand

2009 Soi 36, Anuramin Road, Bang Yi Khan Subdistrict, Bang Phlat District, Bangkok 10700, Thailand.
Tel : +66 (0) 2422 8586 Fax : +66 (0) 2422 8558 Website : www.nfi.or.th E-mail : cal@nfi.or.th



Calibration Certificate

Certificate No.: 2200705-001-01
Client name: UNITED ANALYST AND ENGINEERING CONSULTANT CO., LTD.
Address: 3 Soi Udomsuk 41, Sukhumvit Road,
Bangchak, Phrakhanong, Bangkok 10260

Page 1 of 3

Equipment: Electronic Balance
Manufacturer: METTLER TOLEDO
Model: MS603S/01
Serial No.: B007010311
ID No.: UAE.MIC.008/2553
Order No.: 2200705
Operation No.: 2200705-001
Date of Receipt: 24 November 2021
Date of Calibration: 24 November 2021

Calibrated by Mr. Jumpon Pimsri
Scientist
Approved by
(Mr. Pimpraphat Pongtong)
Manager, Division of Calibration Laboratory
Responsible for the Technical Management Team
Date of Issue: 30 November 2021

The uncertainties are for a confidence probability of approximately 95%

This Certificate is issued in accordance with the conditions of accreditation granted by the Thai Laboratory Accreditation Scheme, which has assessed the measurement capability of the laboratory and its traceability to recognized national standards and to the units of measurement realized at the corresponding national standards laboratory. This certificate may not be reproduced other than in full except with the prior written approval of the National Food Institute.

F-CS-009 Revision: 00 Date: 14-12-61

เอกสารไม่ควบคุม

Calibration Report

Certificate No.: 2200705-001-01
Equipment: Electronic Balance
Manufacturer: METTLER TOLEDO
Model: MS6035/01
Serial No.: B007010311
Capacity: 620 g
Resolution: 0.001 g
ID No.: UAE.MIC.008/2553

Date of Calibration: 24 November 2021 Page 2 of 3

Environment Condition: Ambient Temperature: 24.1 ± 0.6 °C Relative Humidity: 48 ± 2.5 %
Place of Calibration: 305 Balance Room, UNITED ANALYST AND ENGINEERING CONSULTANT CO.,LTD.

Condition of Equipment: Good Condition

Condition of This Results of Calibration:

1. Calibration Method: NFI Method W-MA-001 In-House Method based on UKAS Lab 14 : 2019

2. Reference Standards:

Reference Standard	Model	Serial No.	Calibrated By	Certificate No.	Due Date
Standard Weight Class E2	1-500g	8338068554	TCS	M21010975	12 January 2022
Standard Weight Class E2	1-500g	8338068128	TCS	M21010985	13 January 2022
Instrument	Model	Serial No.	Calibrated By	Certificate No.	Due Date
Thermo-Hygro Meter	PONPE 490	NFI.BTH 001/17	Quality Reborn	QR21-0299	15 February 2022

3. This certification is traceable to SI UNIT

4. This certificate was certified only for the instrument we calibrated.

5. This result of calibration was found accurate as shown on date and place of calibration only.

Calibration Results:




1. Repeatability of Reading:

Nominal Value (g)	Standard Deviation of Reading (g)
300	0.00052
600	0.00083

2. Off-Center Error:

A mass of 200 g was placed and moved to various position on pan.

The balance reading obtained is given in the table.

		
1	2	3
(g)	(g)	(g)
200.001	200.009	200.002
4	5	6
(g)	(g)	(g)
200.001	200.000	200.002
(Maximum Difference)		
0.002		

FCS-012 Revision: 00 Date: 14-12-61

Calibration Report

Certificate No.: 2200705-001-01
Equipment: Electronic Balance
Manufacturer: METTLER TOLEDO
Model: MS6035/01
Serial No.: B007010311
Capacity: 620 g
Resolution: 0.001 g
ID No.: UAE.MIC.008/2553

Date of Calibration: 24 November 2021 Page 3 of 3

Calibration Results: (Continued)

Calibration Range: 0-600 g

Calibration Adjustment: Internal Calibration

3. Departure from Nominal Value:

Nominal Value (g)	Standard Value (g)	Average Reading (g)	Correction (g)	Uncertainty (± g)	Coverage Factor k
Unloaded	0.0000	0.000	0.000	0.00088	2.00
0.1	0.1000	0.099	0.001	0.00088	2.00
0.5	0.5000	0.500	0.000	0.00088	2.00
1	1.0000	1.000	0.000	0.00088	2.00
5	5.0000	5.000	0.000	0.00088	2.00
10	10.0000	10.000	0.000	0.00088	2.00
20	20.0000	20.000	0.000	0.00089	2.00
50	49.9999	50.001	-0.001	0.00089	2.00
70	69.9999	70.000	0.000	0.00089	2.00
100	100.0000	100.000	0.000	0.00090	2.00
150	149.9999	150.000	0.000	0.00091	2.00
200	200.0001	199.999	0.001	0.00093	2.00
300	300.0001	300.000	0.000	0.00097	2.00
400	400.0000	400.001	-0.001	0.0011	2.00
500	499.9999	500.001	-0.001	0.0012	2.00
600	599.9999	600.000	0.000	0.0013	2.00

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

FCS-012 Revision: 00 Date: 14-12-61



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES & EQUIPMENT CALIBRATION AND TESTING SERVICES
534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250
TEL. 0-2717-3000-27 FAX. 0-2719-9484



Cert. No.: 21TM831
Page: 1 of 3

Certificate of Calibration

Equipment: Autoclave
Manufacturer: ALP
Model: CL-40L
Serial No.: 807298
ID No.: UAE.MIC.019/2560
Submitted by: United Analyst and Engineering Consultant Co.,Ltd.
3 Soi Udomsuk 41, Sukhumvit Road,
Bangchak, Phrakhanong,
Bangkok 10260
Location: 301 Room
Received Order: 7 May 2021
Calibration Date: 7 May 2021
Ambient Temperature: (26 ± 10) °C
Relative Humidity: (50 ± 30) %
Calibrated by: Khitt Ruttanaprapachai
Approved by: 
() Pomthippa Tameyakul
(✓) Malee Butkrusa
() Suwit Imjai
Issue Date: 18 May 2021

The Uncertainties are for a confidence probability of approximately 95%

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

เอกสารไม่ควบคุม



Equipment: Autoclave
Condition As-Received: Used Item
Reference: 2105-0012OC-1
Result of Calibration: () Without Adjustment
Cert. No.: 21TM831
Page: 3 of 3

Operating parameter Set: Temperature = 116 °C
Sterilization period = 15 minute

UUC* Setting (°C)	UUC* Reading (°C)	Position	Average* Standard Reading (°C)	Stability (± °C)	Pressure Reading (MPa)	Uncertainty (± °C)	Coverage Factor k
116	116	1	116.744	0.12	0.08	0.90	2
		2	116.549				
		3	116.515				

Operating parameter Set: Temperature = 122 °C
Sterilization period = 30 minute

UUC* Setting (°C)	UUC* Reading (°C)	Position	Average* Standard Reading (°C)	Stability (± °C)	Pressure Reading (MPa)	Uncertainty (± °C)	Coverage Factor k
122	122	1	122.672	0.076	0.12	1.1	2
		2	122.469				
		3	122.414				

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

Stability: One-half of the greatest maximum difference of measured temperature at any one probe.

UUC*: Unit Under Calibration

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

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

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เอกสารไม่ควบคุม



Equipment : Autoclave
Condition As-Received : Used Item
Reference : 2105-0012OC-1

Cert. No.: 21TM831
Page: 2 of 3

Procedure Used :-

Calibration were conducted using in-house calibration procedure CP-OT03 according to direct measurement method with Data Acquisition which connected with Thermocouple Type T

The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standard instrument:-

Instrument	Model	Serial No.	Cert. No.	Due Date
1) Data Acquisition	34972A	MY57013711	20LM7	18 May 2021

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

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

4. This result of calibration covers laboratory autoclaves for the sterilization of goods and material which

could be infected with organisms categorized as Hazard Group 1, 2 and 3**

(** = Categorization of pathogens according to hazard and categories of containment, second edition, 1990)

It does not cover autoclaves for use with material infect with organisms in Hazard Group 4, for which

complete containment and sterilization of infected condensate is considered to be essential.

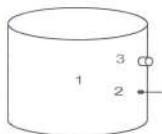
This result of calibration does not apply to sterilizers or disinfectors used for medical, dental, pharmaceutical

or veterinary purposes which are directly concerned with patient care, or those used for fabrics subjected to

sterilization which are required to be dry at the end of cycle.

Result of Calibration :- (*) Without Adjustment

Function of UUC* : Temperature Source



	Environmental		
	(°C)	(%R.H.)	(Volt)
Beginning of Calibration	24	62	222
Finished of Calibration	25	63	221

Position	Description	Ref. Std. ID No.:
1 =	Center of chamber	18-18TC-04
2 =	Temperature sensor	18-18TC-05
3 =	Exhaust port	18-18TC-06

เอกสารไม่ควบคุม



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250
TEL: 0-2717-3090-57 FAX: 0-2719-9484



Cert. No.: 22TM89
Page: 1 of 3

Certificate of Calibration

Equipment : Autoclave
Manufacturer : ALP
Model : CL-40L
Serial No. : 802664
ID No. : UAE.MIC.014/2550
Submitted by : United Analyst and Engineering Consultant Co.,Ltd.
3 Soi Udomsuk 41, Sukhumvit Road,
Bangchak, Phrakhanong,
Bangkok 10260
Location : Air Analysis Unit
Received Order : 17 February 2022
Calibration Date : 17 February 2022
Ambient Temperature : (26 ± 10) °C
Relative Humidity : (50 ± 30) %
Calibrated by : Kunchit Promrat
Approved by :
() Ponthippa Tameyakul
(✓) Malee Butkruea
() Suwit Imjai
Issue Date : 22 February 2022

The Uncertainties are for a confidence probability of approximately 95%

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

เอกสารไม่ควบคุม



Equipment : Autoclave
Condition As-Received : Used Item
Reference : 2202-0444OC-1

Cert. No.: 22TM89
Page: 2 of 3

Procedure Used :-

Calibration were conducted using in-house calibration procedure CP-OT03 according to direct measurement method with Data Acquisition which connected with Thermocouple Type T

The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standard instrument:-

Instrument	Model	Serial No.	Cert. No.	Due Date
1) Data Acquisition	34970A	MY44035217	21LM30	23 Dec 2022

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

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

4. This result of calibration covers laboratory autoclaves for the sterilization of goods and material which

could be infected with organisms categorized as Hazard Group 1, 2 and 3**

(** = Categorization of pathogens according to hazard and categories of containment, second edition, 1990)

It does not cover autoclaves for use with material infect with organisms in Hazard Group 4, for which

complete containment and sterilization of infected condensate is considered to be essential.

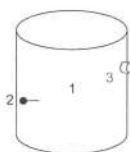
This result of calibration does not apply to sterilizers or disinfectors used for medical, dental, pharmaceutical

or veterinary purposes which are directly concerned with patient care, or those used for fabrics subjected to

sterilization which are required to be dry at the end of cycle.

Result of Calibration :- (*) Without Adjustment

Function of UUC* : Temperature Source



	Environmental		
	(°C)	(%R.H.)	(Volt)
Beginning of Calibration	27	68	226
Finished of Calibration	27	65	226

Position	Description	Ref. Std. ID No.:
1 =	Center of chamber	22-10TC-01
2 =	Temperature sensor	22-10TC-02
3 =	Exhaust port	22-10TC-03

เอกสารไม่ควบคุม



Equipment : Autoclave
Condition As-Received : Used Item
Reference : 2202-0444OC-1

Cert. No.: 22TM89
Page: 3 of 3

Result of Calibration :- (*) Without Adjustment

Operating parameter Set : Temperature = 122 °C

Sterilization period = 30 minute

UUC* Setting (°C)	UUC* Reading (°C)	Position	Average* Standard Reading (°C)	Stability (± °C)	Pressure Reading (MPa)	Uncertainty (± °C)	Coverage Factor k
122	122	1	122.373	0.32	0.12	1.2	2
		2	122.421				
		3	122.292				

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

Stability : One-half of the greatest maximum difference of measured temperature at any one probe.

UUC* : Unit Under Calibration

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

The reported uncertainty of measurement was based on a standard uncertainty multiplied by a

coverage factor k, providing a level of confidence of approximately 95 %.

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เอกสารไม่ควบคุม



Cert. No.: 21TM425
Page.: 1 of 3

Certificate of Calibration

Equipment : Autoclave
Manufacturer : ALP
Model : CL-40L
Serial No. : 802664
ID No. : UAE.MIC.014/2550
Submitted by : United Analyst and Engineering Consultant Co.,Ltd.
3 Soi Udomsuk 41, Sukhumvit Road,
Bangchak, Phrakhanong,
Bangkok 10260
Location : Air Analysis Unit
Received Order : 22 February 2021
Calibration Date : 23 February 2021
Ambient Temperature : (26 ± 10) °C
Relative Humidity : (50 ± 30) %
Calibrated by : Man Pattanapongpaiboon
Approved by :
() Pornthippa Tameyakul
() Malee Bulkruea
() Suwit Imjai

Issue Date : 3 March 2021

The Uncertainties are for a confidence probability of approximately 95%

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

เอกสารไม่ควบคุม

A 0025135



Equipment : Autoclave
Condition As-Received : Used Item
Reference : 2102-0751OC-1

Cert. No.: 21TM425
Page.: 2 of 3

Procedure Used :-

Calibration were conducted using in-house calibration procedure CP-OT03 according to direct measurement method with Data Acquisition which connected with Thermocouple Type T

The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standard instrument:-

Instrument	Serial No.	Cert. No.	Traceable	Due Date
1) Data Acquisition	MY49023932	20LM6	NIST, NIMT	20 Apr 2021

2. This certification is traceable to the SI unit.

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

4. This result of calibration covers laboratory autoclaves for the sterilization of goods and material which could be infected with organisms categorized as Hazard Group 1, 2 and 3**

(** = Categorization of pathogens according to hazard and categories of containment, second edition, 1990)
It does not cover autoclaves for use with material infect with organisms in Hazard Group 4, for which complete containment and sterilization of infected condensate is considered to be essential.

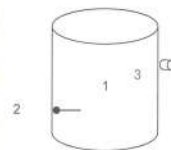
This result of calibration does not apply to sterilizers or disinfectors used for medical, dental, pharmaceutical or veterinary purposes which are directly concerned with patient care, or those used for fabrics subjected to sterilization which are required to be dry at the end of cycle.

Remark : NIST : National Institute of Standards and Technology, The United State of America.

NIMT : National Institute of Metrology Thailand.

Result of Calibration :- (*) Without Adjustment

Function of UUC* : Temperature Source



	Environmental		
	(°C)	(%R.H.)	(Volt)
Beginning of Calibration	26	61	222
Finished of Calibration	26	63	223

Position	Description	Ref. Std. Thermocouple
1 =	Center of chamber	19-16TC-08
2 =	Temperature sensor	19-16TC-09
3 =	Exhaust port	19-16TC-10

เอกสารไม่ควบคุม

a 1043935



Equipment : Autoclave
Condition As-Received : Used Item
Reference : 2102-0751OC-1
Result of Calibration :- (*) Without Adjustment

Cert. No.: 21TM425
Page.: 3 of 3

Operating parameter Set : Temperature = 116 °C
Sterilization period = 15 minute

UUC* Setting (°C)	UUC* Reading (°C)	Position	Average* Standard Reading (°C)	Stability (± °C)	Pressure Reading (MPa)	Uncertainty (± °C)	Coverage Factor k
116	116	1	117.021	0.23	0.08	0.92	2
		2	117.111				
		3	117.212				

Operating parameter Set : Temperature = 122 °C
Sterilization period = 15 minute

UUC* Setting (°C)	UUC* Reading (°C)	Position	Average* Standard Reading (°C)	Stability (± °C)	Pressure Reading (MPa)	Uncertainty (± °C)	Coverage Factor k
122	122	1	122.817	0.15	0.12	1.10	2
		2	122.914				
		3	122.978				

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

Stability : One-half of the greatest maximum difference of measured temperature at any one probe.

UUC* : Unit Under Calibration

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

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

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เอกสารไม่ควบคุม

a 1043934



National Food Institute, Ministry of Industry, Thailand

2008 Soi 26, Anul Amarin Road, Bang Yi Khan Subdistrict, Bang Phai District, Bangkok 10700, Thailand
Tel : +66 (0) 2422 8558 Fax : +66 (0) 2422 8545 Website : www.nfi.or.th E-mail : cal@nfi.or.th



Calibration Certificate

Certificate No.: 2103270-001-01
Client name: UNITED ANALYST AND ENGINEERING CONSULTANT CO.,LTD.
Address: 3 Soi Udomsuk 41, Sukhumvit Road,
Bangchak, Phrakhanong, Bangkok 10260

Page 1 of 3

Equipment: Electronic Balance

Manufacturer: Mettler Toledo

Model: AB204-S/FACT

Serial No.: 1129361010

ID No.: UAE.WAS.002/2552

Order No.: 2103270

Operation No.: 2103270-001

Date of Receipt: 11 June 2021

Date of Calibration: 11 June 2021

Calibrated by Mr.Yothin Charoensuk
Scientist

Approved by

(Mr.Yothin Charoensuk)
Manager, Division of Calibration Laboratory
Responsible for the Technical Management Team

Date of Issue: 15 June 2021

The uncertainties are for a confidence probability of approximately 95%

This Certificate is issued in accordance with the conditions of accreditation granted by the Thai Laboratory Accreditation Scheme which has assessed the measurement capability of the laboratory and its traceability to recognized national standards and to the units of measurement realized at the corresponding national standards laboratory. This certificate may not be reproduced other than in full except with the prior written approval of the National Food Institute.

F-CS-009 Revision: 00 Date: 14-12-61

เอกสารไม่ควบคุม

Calibration Report

Certificate No.: 2103270-001-01
Equipment: Electronic Balance
Model: AB204-S/FACT
Serial No.: 1129361010
Capacity: 220 g
Manufacturer: Mettler Toledo
Resolution: 0.0001 g
ID No.: UAE.WAS.002/2552

Date of Calibration: 11 June 2021 Page 2 of 3

Environment Condition: Ambient Temperature: 21.1 ± 0.4 °C Relative Humidity: 48 ± 4 %

Place of Calibration: Laboratory, united analyst and engineering consultant co.,ltd.

Condition of Equipment: Good Condition

Condition of This Results of Calibration:

1. Calibration Method: NFI Method W-MA-001 In-House Method Based on UKAS LAB 14 Calibration of Weighing Machines : 2006

2. Reference Standards:

Reference Standard Model Serial No. Calibrated By Certificate No. Due Date

Standard Weight Class E2 1mg to 200g 8505567572 TCS M20040405 20 April 2022

Instrument Model Serial No. Calibrated By Certificate No. Due Date

Thermo-Hygro Meter PCNPE 490 NFI.BTH.004/18 Quality Reborn QR21-0300 15 February 2022

3. This certification is traceable to SI UNIT

4. This certificate was certified only for the instrument we calibrated.

5. This result of calibration was found accurate as shown on date and place of calibration only.

Calibration Results:

1. Repeatability of Readings:

Nominal Value (g)	Standard Deviation of Reading (g)
100	0.000067
200	0.000057

2. Off-Center Error:

A mass of 50 g was placed and moved to various position on pan.

The balance reading obtained is given in the table.

<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
1 (g) 50.0000	2 (g) 49.9999	3 (g) 49.9999
4 (g) 50.0000	5 (g) 50.0000	6 (g) 50.0000
(Maximum Difference) (g) 0.0001		

F-CS-012 Revision: 00 Date: 14-12-61

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Calibration Report

Certificate No.: 2103270-001-01
Equipment: Electronic Balance
Model: AB204-S/FACT
Serial No.: 1129361010
Capacity: 220 g
Manufacturer: Mettler Toledo
Resolution: 0.0001 g
ID No.: UAE.WAS.002/2552

Date of Calibration: 11 June 2021 Page 3 of 3

Calibration Results: (Continued)

Calibration Range: 0-200 g

Calibration Adjustment: Internal Calibration

3. Departure from Nominal Value:

Nominal Value (g)	Standard Value (g)	Average Reading (g)	Correction (g)	Uncertainty (± g)	Coverage Factor
Unloaded	0.00000	0.0000	0.0000	0.000092	2.00
0.01	0.01000	0.0100	0.0000	0.000092	2.00
0.05	0.05000	0.0500	0.0000	0.000092	2.00
0.1	0.10001	0.1000	0.0000	0.000093	2.00
0.2	0.20001	0.2001	-0.0001	0.000093	2.00
0.5	0.50001	0.5000	0.0000	0.000093	2.00
1	1.00001	1.0000	0.0000	0.000093	2.00
2	2.00002	2.0001	-0.0001	0.000093	2.00
5	5.00002	4.9999	0.0001	0.000094	2.00
10	10.00001	9.9999	0.0001	0.000096	2.00
20	20.00003	20.0000	0.0000	0.00010	2.00
50	50.00004	50.0000	0.0000	0.00012	2.00
70	70.00007	70.0000	0.0001	0.00014	2.00
100	100.00009	100.0000	0.0001	0.00016	2.00
150	150.00013	150.0000	0.0001	0.00021	2.00
200	200.00016	200.0001	0.0001	0.00028	2.00

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

----- End -----

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F-CS-012 Revision: 00 Date: 14-12-61

Calibration Certificate ID
TH2058-097-040722-ACC-TH

Mettler-Toledo (Thailand) Ltd.
 848/4 - 848/5 Lasalle Rd., Bangna Tai Sub-District
 Bangna District, Bangkok 10260
 +66 2723 0382
 MT-TH.ServiceSupport@mt.com

METTLER TOLEDO



Accuracy Calibration Certificate

Customer

Company: United Analyst and Engineering Consultant Co., Ltd.
Address: 3 Soi Udom Suk 41, Sukhumvit Rd., Bang Chak
City: Phra Khanong **Contact:** Suwit Chotnork
Zip / Postal: 10260
State / Province: Bangkok
Order Number:

Weighing Device

Manufacturer: Mettler Toledo **Instrument Type:** Weighing Instrument
Model: AB204-S **Asset Number:** UAE.AIR.019/2550
Serial No.: 1128312528 **Terminal Model:** N/A
Building: N/A **Terminal Serial No.:** N/A
Floor: 2 **Terminal Asset No.:** N/A
Room: Balance Room 2 (206)

Range	Max. Capacity	Readability (g)
1	220 g	0.0001 g

Procedure

Calibration Guideline: EURAMET cg-18 v. 4.0 (11/2015)
METTLER TOLEDO Work Instruction: CPW002/20

This calibration certificate contains measurements for As Found calibration. No As Left calibration was performed because the device was not modified after As Found calibration. Therefore, results for As Left correspond to As Found.

The sensitivity/span of the weighing instrument was adjusted before calibration with a built-in weight.

In accordance with EURAMET cg-18 (11/2015), the test loads were selected to reflect the specific use of the weighing device or to accommodate specific calibration conditions.

As Found	Temperature	Humidity
Start: 22.5 °C	End: 21.4 °C	Start: 56.1 %
		End: 63.2 %

As Found Calibration Date: 07-Apr-2022 **Calibrator:**
As Left Calibration Date: N/A
Issue Date: 08-Apr-2022
Approved Signatory:

☒ Kalasorn Jirayom
☐ Sans Jirayom
☐ Sutachet Sukkate

เอกสารไม่ควบคุม

Calibration Certificate ID
TH2058-097-040722-ACC-TH

METTLER TOLEDO Service

Measurement Results

Repeatability

Test Load: 100 g

	As Found	As Left
1	99.9999 g	N/A
2	100.0000 g	N/A
3	99.9998 g	N/A
4	100.0000 g	N/A
5	99.9999 g	N/A
6	100.0000 g	N/A
7	99.9999 g	N/A
8	100.0001 g	N/A
9	99.9999 g	N/A
10	100.0000 g	N/A
Standard Deviation	0.00008 g	N/A



The "d" in the graph represents the readability of the range/interval in which the test was performed.
 The results of this graph are based upon the absolute values of the differences from the mean value.

Eccentricity

Test Load: 100 g

Position	As Found	As Left
1	100.0000 g	N/A
2	99.9998 g	N/A
3	99.9998 g	N/A
4	100.0001 g	N/A
5	100.0001 g	N/A
Maximum Deviation	0.0002 g	N/A



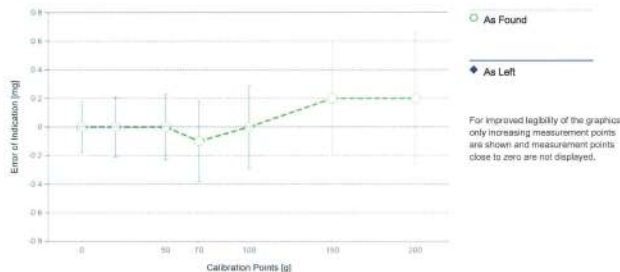
The "d" in the graph represents the readability of the range/interval in which the test was performed.

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Error of Indication

As Found

	Reference Value	Indication	Error of Indication	Expanded Uncertainty	k
1	0.0000 g	0.0000 g	0.0000 g	0.18 mg	2
2	0.1000 g	0.1000 g	0.0000 g	0.18 mg	2
3	1.0000 g	0.9999 g	-0.0001 g	0.19 mg	2
4	5.0000 g	5.0000 g	0.0000 g	0.19 mg	2
5	10.0000 g	9.9999 g	-0.0001 g	0.20 mg	2
6	20.0000 g	20.0000 g	0.0000 g	0.21 mg	2
7	50.0000 g	50.0000 g	0.0000 g	0.23 mg	2
8	70.0001 g	70.0000 g	-0.0001 g	0.28 mg	2
9	100.0000 g	100.0000 g	0.0000 g	0.29 mg	2
10	150.0000 g	150.0002 g	0.0002 g	0.40 mg	2
11	200.0001 g	200.0003 g	0.0002 g	0.46 mg	2



The uncertainty stated is the expanded uncertainty at calibration obtained by multiplying the standard combined uncertainty by the coverage factor $k=2$ which can be larger than 2 according to EURAMET cg-15. The value of the measurand lies within the assigned range of values with a probability of approximately 95%.

The user is responsible for maintaining environmental conditions and the settings of the weighing instrument when it was calibrated.

Test Equipment

All weights used for metrological testing are traceable to national or international standards. The weights were calibrated and certified by an accredited calibration laboratory.

Weight Set 1: OIML E2

Weight Set No.: WS80 Date of Issue: 23-Feb-2022
Certificate Number: C208581631 Calibration Due Date: 14-Aug-2023

Thermo Hygrometer

Equipment No.: IN161 Date of Issue: 14-Jun-2021
Certificate Number: 21H1220 Calibration Due Date: 01-Jun-2022

Remarks

Equipment condition: Good
Next calibration according to customer's procedure
Calibration data not decide by calibration laboratory
Test weight by Filter pan : 1 g = 0.9999 g, 3 g = 3.0000 g, 5 g = 5.0000 g

End of Accredited Section

The information below and any attachments to this calibration certificate are not part of the accredited calibration.

Measurement Uncertainty of the Weighing Instrument in Use

Stated is the expanded uncertainty with $k=2$ in use. The formula shall be used for the estimation of the uncertainty under consideration of the errors of indication. The value R represents the net load indication in the unit of measure of the device.

Temperature coefficient for the evaluation of the measurement uncertainty in use: $3.8 \cdot 10^{-6} / K$
Temperature range on site for the evaluation of the measurement uncertainty in use: $3 K$

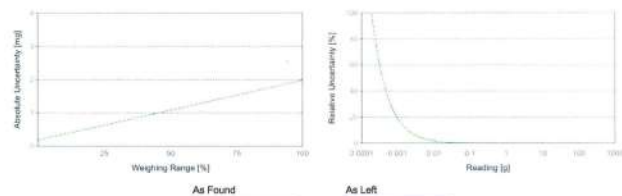
Linearization of Uncertainty Equation

Range	As Found	As Left
d Max		
1 0.0001 g 220 g	$U_1 = 0.19 \text{ mg} + 0.00817 \text{ mg/g} \cdot R$	N/A

To optimize the stability of the linearization, besides of the zero load only increasing measurement points with a test load of 5% of the measurement range or larger are taken for the calculation of the linear equation.

Absolute and Relative Measurement Uncertainty in Use for Various Net Indications (Examples)

Net Indication	As Found	As Left
0.0220 g	0.19 mg 0.86%	N/A
0.2200 g	0.19 mg 0.087%	N/A
2.2000 g	0.21 mg 0.0095%	N/A
22.0000 g	0.37 mg 0.0017%	N/A
220.0000 g	2.0 mg 0.00090%	N/A



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES & EQUIPMENT CALIBRATION AND TESTING SERVICES
334H PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250
TEL: 0-2717-3000-27 FAX: 0-2719-9484



Cert. No.: 21TM811
Page.: 1 of 3

Certificate of Calibration

Equipment : BOD Incubator
Manufacturer : ARCO
Model : UR-1320
Serial No. : -
ID No. : UAE.WAO.018/2551
Submitted by : United Analyst and Engineering Consultant Co.,Ltd.
3 Soi Udomsuk 41, Sukhumvit Road,
Bangchak, Phrakhanong,
Bangkok 10260
Location : Lab Floor 2
Received Order : 21 April 2021
Calibration Date : 21 April 2021
Ambient Temperature : $(26 \pm 10) ^\circ C$
Relative Humidity : $(50 \pm 30) \%$
Calibrated by : Khit Rutanaprapachai
Approved by :
() Pornthippa Tameyakul
() Malee Butkrua
() Suwit Injai

Issue Date : 5 May 2021

The Uncertainties are for a confidence probability of approximately 95%

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Equipment : BOD Incubator
 Condition As-Received : Used Item
 Reference : 2104-0024OC-3
 Procedure Used :-

Cert. No.: 21TM811
 Page.: 2 of 3

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

Condition of this result of calibration

1. Reference standard instrument:-

Instrument Serial No. Cert. No. Traceable Due Date
 1) Data Acquisition MY57013711 20LM7 NIST, NIMT 18 May 2021

2. This certification is traceable to the SI unit.
 3. This certification is valid only to the item calibrated on date and place of calibration.

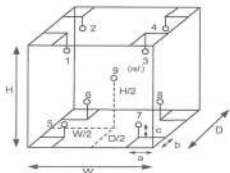
Remark : NIST : National Institute of Standards and Technology, The United State of America.

NIMT : National Institute of Metrology Thailand.

Result of Calibration :- (*) Without Adjustment

Function of UUC* : Temperature Source

Fresh air setting : Not Available



Probe Installation Details :

Dimension of Chamber :

a = 10 cm D = 0.62 m
 b = 10 cm W = 1.2 m
 c = 10 cm H = 1.2 m
 Capacity = 0.89 m³

Environment during calibration		
	Beginning	Finished
Temp. (°C)	27	28
REL.Humid. (%)	47	51
AC Supply (Volt)	221	222

Position :	Ref. Std./ID No.:
1	18RTD-2/1
2	18RTD-2/2
3	18RTD-2/3
4	18RTD-2/4
5	18RTD-2/5
6	18RTD-2/6
7	18RTD-2/7
8	18RTD-2/8
9 (ref.)	18RTD-2/9

เอกสารไม่ควบคุม

a 1052721



Equipment : BOD Incubator
 Condition As-Received : Used Item
 Reference : 2104-0024OC-3
 Result of Calibration :- (*) Without Adjustment
 Function of UUC* : Temperature Source

Cert. No.: 21TM811
 Page.: 3 of 3

Calibration Point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Temperature stability (± °C)	Temperature uniformity (°C)	Overall Variation (°C)	Uncertainty (± °C)	Coverage Factor k
20.0	20.0	20.0	0.15	0.47	0.86	0.31	2

Calibration Point (°C)	Measured Temperature (°C)								
	Position								
20.0	1	2	3	4	5	6	7	8	9 (ref.)
	20.368	20.509	20.115	20.023	19.826	19.955	20.135	20.269	20.101

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

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

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

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

UUC* : Unit Under Calibration

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

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

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เอกสารไม่ควบคุม

a 1052720



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
 CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
 534/8 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10256
 TEL. 0-2717-3000-27 FAX. 0-2719-9484



Cert. No.: 21TM1405
 Page.: 1 of 3

Certificate of Calibration

Equipment : BOD Incubator
 Manufacturer : Arco
 Model : UC4-1320
 Serial No. : -
 ID No. : UAE.WAO.002/2550
 Submitted by : United Analyst and Engineering Consultant Co.,Ltd.
 3 Soi Udomsuk 41, Sukhumvit Road,
 Bangchak, Phrakhanong,
 Bangkok 10260
 Location : Lab Floor 2
 Received Order : 17 August 2021
 Calibration Date : 17 August 2021
 Ambient Temperature : (26 ± 10) °C
 Relative Humidity : (50 ± 30) %
 Calibrated by : Khit Ruttanaprapachai
 Approved by :
 () Pornhippa Tameyakul
 () Malee Butkruea
 () Suwit Imjai
 Issue Date : 1 September 2021

The Uncertainties are for a confidence probability of approximately 95 %

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เอกสารไม่ควบคุม

A 0031567



Equipment : BOD Incubator
 Condition As-Received : Used Item
 Reference : 2108-0364OC-1
 Procedure Used :-

Cert. No.: 21TM1405
 Page.: 2 of 3

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

Condition of this result of calibration

1. Reference standard instrument:-

Instrument Model Serial No. Cert. No. Due Date
 1) Data Acquisition 34970A MY41021843 21LM2 16 Feb 2022

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

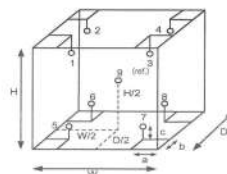
3. This certification is traceable to the International System of Unit.

Result of Calibration :- (*) Without Adjustment

Function of UUC* : Temperature Source

Fresh air setting : Not Available

Environment during calibration		
	Beginning	Finished
Temp. (°C)	28	29
REL.Humid. (%)	52	55
AC Supply (Volt)	220	221



Probe Installation Details :

Dimension of Chamber :

a = 10 cm D = 0.53 m
 b = 10 cm W = 1.2 m
 c = 10 cm H = 1.2 m
 Capacity = 0.76 m³

Position :	Ref. Std. ID No.:
1	18-04RTD-01
2	18-04RTD-02
3	18-04RTD-03
4	18-04RTD-04
5	18-04RTD-05
6	18-04RTD-06
7	18-04RTD-07
8	18-04RTD-08
9 (ref.)	18-04RTD-09

เอกสารไม่ควบคุม

a 1069646



Equipment : BOD Incubator
 Condition As-Received : Used Item
 Reference : 2108-0364OC-1
 Result of Calibration :- (*) Without Adjustment
 Function of UUC* : Temperature Source
 Fresh air setting : Not Available

Cert. No.: 21TM1405
 Page.: 3 of 3

Calibration Point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Temperature stability (± °C)	Temperature uniformity (°C)	Overall Variation (°C)	Uncertainty (± °C)	Coverage Factor k
20.0	19.5	19.3	0.46	0.45	1.0	0.78	2

Calibration Point (°C)	Measured Temperature (°C)								
	Position								
	1	2	3	4	5	6	7	8	9 (ref.)
20.0	20.018	20.137	20.086	19.942	20.157	20.093	19.968	19.860	20.048

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

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

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

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

UUC* : Unit Under Calibration

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

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

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เอกสารไม่ควบคุม

A 1069645



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
 CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
 534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250
 TEL. 0-2717-3000-27 FAX. 0-2716-9484



Certificate of Calibration

Cert. No.: 21TM1406
 Page.: 1 of 3

Equipment : BOD Incubator

Manufacturer : Arco

Model : UC4-1320

Serial No. : -

ID No. : UAE.WAO.018/2559

Submitted by : United Analyst and Engineering Consultant Co.,Ltd.
 3 Soi Udomsuk 41, Sukhumvit Road,
 Bangchak, Phrakhanong,
 Bangkok 10260

Location : Lab Floor 2

Received Order : 17 August 2021

Calibration Date : 17 August 2021

Ambient Temperature : (25 ± 10) °C

Relative Humidity : (50 ± 30) %

Calibrated by : Khit Rutanaprapachai

Approved by :
 Approved Signatory

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

Issue Date : 1 September 2021

The Uncertainties are for a confidence probability of approximately 95%

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

เอกสารไม่ควบคุม

A 0031568



Equipment : BOD Incubator
 Condition As-Received : Used Item
 Reference : 2108-0364OC-2

Cert. No.: 21TM1406
 Page.: 2 of 3

Procedure Used :-

Calibration were conducted using calibration procedure CP-OT02 according to direct measurement method with Data Acquisition which connected with Resistance Temperature Detector (RTD).

The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standard instrument:-

Instrument	Model	Serial No.	Cert. No.	Due Date
1) Data Acquisition	34970A	MY41021843	21LM2	18 Feb 2022

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

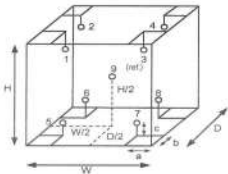
3. This certification is traceable to the International System of Unit.

Result of Calibration :- (*) Without Adjustment

Function of UUC* : Temperature Source

Fresh air setting : Not Available

Environment during calibration		
	Beginning	Finished
Temp. (°C)	28	29
REL.Humid. (%)	52	55
AC Supply (Volt)	220	221



Probe Installation Details : Dimension of Chamber :
 a = 10 cm D = 0.53 m
 b = 10 cm W = 1.2 m
 c = 10 cm H = 1.2 m
 Capacity = 0.76 m³

Position :	Ref. Std. ID No.:
1	21-04RTD-11
2	21-04RTD-12
3	21-04RTD-13
4	21-04RTD-14
5	21-04RTD-15
6	21-04RTD-16
7	21-04RTD-17
8	21-04RTD-18
9 (ref.)	21-04RTD-19

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เอกสารไม่ควบคุม

A 1069644



Equipment : BOD Incubator
 Condition As-Received : Used Item
 Reference : 2108-0364OC-2
 Result of Calibration :- (*) Without Adjustment
 Function of UUC* : Temperature Source
 Fresh air setting : Not Available

Cert. No.: 21TM1406
 Page.: 3 of 3

Calibration Point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Temperature stability (± °C)	Temperature uniformity (°C)	Overall Variation (°C)	Uncertainty (± °C)	Coverage Factor k
20.0	19.8	19.7	0.37	0.50	1.1	0.62	2

Calibration Point (°C)	Measured Temperature (°C)								
	Position								
	1	2	3	4	5	6	7	8	9 (ref.)
20.0	20.040	19.742	20.203	19.762	19.784	19.819	19.764	19.797	19.787

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

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

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

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

UUC* : Unit Under Calibration

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

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

เอกสารไม่ควบคุม

A 1069643

Verification Report

Certificate No.: 2103014-001-02
Equipment: HEATING BLOCK DIGESTION
Model: DKL20 Serial No.: 213517
Resolution: 1 °C ID No.: UAE.WAS.005/2555
Manufacturer: VELD SCIENTIFICA

Date of Calibration: 2,7 June 2021 Page 2 of 4

Location: Calibration Laboratory, NATIONAL FOOD INSTITUTE
Environment Condition: Ambient Temperature (25 ± 3) °C
Relative Humidity (55 ± 15) %
Line Voltage (220 ± 10) Volt

Condition of this results of Calibrations:

- This instrument was calibrated by insert standard thermocouples type R into its heating block digestion and compared to temperature obtained from reference standards thermometer at calibrated point.
- The temperature scale used was based on ITS - 90 .
- All data show below were final values and the initial data may be obtained upon request.

2. Reference Standard Instrument :

Instrument	Model	Serial No.	Certificate No.	Due Date	Through
Digital Thermometer with Thermocouple	34970A/34901A Type R	MY44045576/MY41194453	TC21/0041	24-Apr-2022	N.M. Technical Center Laboratory

- This certificate is traceable to international system of units (SI Units).
- This certificate was certified only for the instrument we calibrated.
- This result of calibration was found accurate as shown on date and place of calibration only.
- Condition of Calibrated item : Good

UUC* Description

Time of Record - Hour 30 Minute At 380 °C

7. Result of Calibration : ☒ Without adjustment ☐ After adjustment

F-CS-012 Revision: 00 Date: 14-12-61

เอกสารไม่ควบคุม

Verification Report

Certificate No.: 2103014-001-02
Equipment: HEATING BLOCK DIGESTION
Model: DKL20 Serial No.: 213517
Resolution: 1 °C ID No.: UAE.WAS.005/2555
Manufacturer: VELD SCIENTIFICA

Date of Calibration: 2,7 June 2021 Page 3 of 4

Calibration point: 380 °C

Calibration result:

Reporting of Temperature

Block No.	UUC* Setting (°C)	UUC* Reading (°C)	Stability (±°C)	Standard Thermometer (°C)	Uncertainty (±°C)
1	380	379 - 380	0.53	383.17	1.8
2	380	379 - 380	0.32	383.16	1.8
3	380	379 - 380	0.39	382.96	1.8
4	380	379 - 380	0.18	381.23	1.8
5	380	379 - 380	0.49	382.97	1.8
6	380	379 - 380	0.49	382.85	1.8
7	380	379 - 380	0.54	382.97	1.8
8	380	379 - 380	0.24	382.95	1.8
9	380	379 - 380	0.61	383.17	1.8
10	380	379 - 380	0.73	381.14	1.9
11	380	379 - 380	0.73	382.53	1.9
12	380	379 - 380	0.76	381.56	1.9
13	380	379 - 380	0.38	382.25	1.7
14	380	379 - 380	0.43	383.00	1.7
15	380	379 - 380	0.31	383.08	1.7
16	380	379 - 380	0.22	381.78	1.7
17	380	379 - 380	0.31	382.99	1.7
18	380	379 - 380	0.37	383.24	1.7
19	380	379 - 380	0.32	380.98	1.7
20	380	379 - 380	0.31	382.63	1.7

Note:

- UUC* = Unit Under Calibration
- Immersion depth of standard thermometer in tube level high of sand is equal heater plate of UUC.
- Stability = One-half of the greatest maximum difference of measured temperatures at one sensors, for at least half an hour after reaching steady state.

F-CS-012 Revision: 00 Date: 14-12-61

เอกสารไม่ควบคุม

Verification Report

Certificate No.: 2103014-001-02
Equipment: HEATING BLOCK DIGESTION
Model: DKL20 Serial No.: 213517
Resolution: 1 °C ID No.: UAE.WAS.005/2555
Manufacturer: VELD SCIENTIFICA

Date of Calibration: 2,7 June 2021 Page 4 of 4

Calibration point: 380 °C

Calibration result: Continued

Figure 1. Location of Reference Standard and Block Diagram of Digestion Unit



Sensor Installation Location

Remark: Edited ID.No. from UAE.WAS.005/2555 to UAE.WAS.005/2555.

Note:

- UUC* = Unit Under Calibration
- Immersion depth of standard thermometer in tube level high of sand is equal heater plate of UUC.
- Stability = One-half of the greatest maximum difference of measured temperatures at one sensors, for at least half an hour after reaching steady state.

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

----- End -----

F-CS-012 Revision: 00 Date: 14-12-61

เอกสารไม่ควบคุม

Verification Certificate

Certificate No.: 2202361-001-01
Client name: UNITED ANALYST AND ENGINEERING CONSULTANT CO., LTD.
Address: 3 Soi Udomsuk 41, Sukhumvit Road, Bangchack, Prakhonong, Bangkok 10260

Date of Calibration: 4-6 April 2022 Page 1 of 4

Equipment: HEATING BLOCK DIGESTION

Manufacturer: FOSS

Model: 2520

Serial No.: 91794469

ID No.: UAE.WAS.011/2560

Order No.: 2202361

Operation No.: 2202361-001

Date of Receipt: 4 April 2022

Date of Calibration: 4-6 April 2022

Calibrated by Mr.Nuttapol Niyomchat Specialist

Approved by (Mr.)
Manager, Division of Calibration Laboratory
Responsible for the Technical Management Team

Date of Issue: 11 April 2022

The uncertainties are for a confidence probability of approximately 95 %.

This Certificate is issued in accordance with the conditions of accreditation granted by the Thai Laboratory Accreditation scheme which has assessed the measurement capability of the laboratory and its traceability to recognized national standards and to the units of measurement realized at the corresponding national standards laboratory. This certificate may not be reproduced other than in full except with the prior written approval of the National Food Institute.

F-CS-009 Revision: 00 Date: 14-12-61

เอกสารไม่ควบคุม

Verification Report

Certificate No.: 2202361-001-01
Equipment: HEATING BLOCK DIGESTION
Model: 2520 Serial No.: 91794469
Resolution: 1 °C ID No.: UAE.WAS.011/2560
Manufacturer: FOSS

Date of Calibration: 4-6 April 2022

Page 2 of 4

Location: Laboratory Room, NATIONAL FOOD INSTITUTE
Environment Condition: Ambient Temperature (25 ± 3) °C
Relative Humidity (55 ± 15) %
Line Voltage (220 ± 10) Volt

Condition of this results of Calibration:

- This instrument was calibrated by insert standard thermocouples type R into its heating block digestion and compared to temperature obtained from reference standards thermometer at calibrated point.
- The temperature scale used was based on ITS - 90 .
- All data show below were final values and the initial data may be obtained upon request.

2. Reference Standard Instrument :

Instrument	Model	Serial No.	Certificate No.	Due Date	Through
Digital Thermometer with Thermocouple	34970A/34901A	MY44063576/MY41394853	TC21/0041	24-Apr-2022	N.M. Technical Center Laboratory
	Type R	TCF101-103 / CHP101-103			

- This certificate is traceable to international system of units (SI Units).

- This certificate was certified only for the instrument we calibrated.

- This result of calibration was found accurate as shown on date and place of calibration only.

- Condition of Calibrated item : Good

UUC* Description

Time of Record - Hour 30 Minute At 380 °C

- Result of Calibration : ☒ Without adjustment ☐ After adjustment

FCS-012 Revision: 00 Date: 14-12-61

เอกสารไม่ควบคุม

Verification Report

Certificate No.: 2202361-001-01
Equipment: HEATING BLOCK DIGESTION
Model: 2520 Serial No.: 91794469
Resolution: 1 °C ID No.: UAE.WAS.011/2560
Manufacturer: FOSS

Date of Calibration: 4-6 April 2022

Page 3 of 4

Calibration point: 380 °C

Calibration result:

Reporting of Temperature

Block No.	UUC* Setting (°C)	UUC* Reading (°C)	Stability (±°C)	Standard Thermometer (°C)	Uncertainty (±°C)
1	380	380	0.13	376.48	1.5
2	380	380	0.12	376.58	1.5
3	380	380	0.12	376.51	1.5
4	380	380	0.14	376.70	1.6
5	380	380	0.18	376.81	1.6
6	380	380	0.12	377.23	1.6
7	380	380	0.12	377.37	1.5
8	380	380	0.13	376.68	1.5
9	380	380	0.14	376.72	1.5
10	380	380	0.18	378.97	1.6
11	380	380	0.25	378.79	1.6
12	380	380	0.11	377.14	1.6
13	380	380	0.19	379.65	1.6
14	380	380	0.16	379.61	1.6
15	380	380	0.16	378.66	1.6
16	380	380	0.15	379.18	1.6
17	380	380	0.23	377.39	1.6
18	380	380	0.11	377.71	1.6
19	380	380	0.22	376.64	1.6
20	380	380	0.16	376.56	1.6

Note:

- UUC* = Unit Under Calibration

- Immersion depth of standard thermometer in tube level high of sand is equal heater plate of UUC.

- Stability = One-half of the greatest maximum difference of measured temperatures at one sensors, for at least half an hour after reaching steady state.

FCS-012 Revision: 00 Date: 14-12-61

เอกสารไม่ควบคุม

Verification Report

Certificate No.: 2202361-001-01
Equipment: HEATING BLOCK DIGESTION
Model: 2520 Serial No.: 91794469
Resolution: 1 °C ID No.: UAE.WAS.011/2560
Manufacturer: FOSS

Date of Calibration: 4-6 April 2022

Page 4 of 4

Calibration point: 380 °C
Calibration result: Continued

Figure 1. Location of Reference Standard and Block Diagram of Digestion Unit



Sensor Installation Location

Note:

- UUC* = Unit Under Calibration

- Immersion depth of standard thermometer in tube level high of sand is equal heater plate of UUC.

- Stability = One-half of the greatest maximum difference of measured temperatures at one sensors, for at least half an hour after reaching steady state.

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

***** End *****

FCS-012 Revision: 00 Date: 14-12-61

เอกสารไม่ควบคุม



Request No.: 22-64/0445

MTC No.: PSL-T 614/64

TEST REPORT

Nomenclature : HEATING BLOCK DIGESTION

Serial No.: 91794469

Maker : FOSS

Model : 2520

ID.No.: UAE.LAB.011/2560

Customer : UNITED ANALYST AND ENGINEERING CONSULTANT CO.,LTD.

Address : 3 Soi Udomsuk 41, Sukhumvit Rd., Bangchak, Phrakhanong, Bangkok 10260.

Date of request : 12 March 2021

Date of test : 12 March 2021

Place of test : Photometry and Temperature Standards Laboratory, MTC, Bangpoo.

Point of test : Calibrated at 380 °C.

Conditions of test : - Ambient temperature: (25 ± 5) °C, Relative humidity : (50 ± 20) %
- AC Power supply : (220 ± 5) % VAC.

Reference Standard : Data Acquisition / Switch Unit Equipped, Model : 34972A, S/N : MY49004645,

Maker : Agilent with Sensor TC-S, S/N : TC-S 01 - 02, through Calibration

certificate No.: 22-63/0516, PSL-T 678/63, Date of Calibrated 20 April 2020

Traceability : This certificate is traceable to SI unit through Photometry and Temperature Standards Laboratory, Industrial Metrology and Testing Service Centre, Thailand Institute of Scientific and Technological Research (TISTR), NSC-ONSC accredited no, Calibration 0015.

Test Procedure : Indicate temperature of Unit Under Test (UUT) was compared to temperature Obtained from reference standards at calibration point.

The temperature scale in use of this laboratory is the International Temperature Scale of 1990 (ITS-90).

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

page 1 of 4

The results relate only to the items tested or calibrated.

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

FM.BL.MTC.002 Rev.3

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E-mail : numpai@tistr.or.th Website:www.tistr.or.th

Office/Laboratory

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Amphoe Bang Chalong, Samutprakan 10280, Thailand

Tel. (66) 0 2323 1672-80 ext. 115, 116

Fax. (66) 0 2323 9165

E-mail : mtc@tistr.or.th

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Thailand

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E-mail : sumee@tistr.or.th

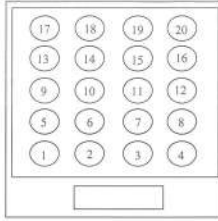
เอกสารไม่ควบคุม 5225, 5217



Request No.: 22-64/0445

Serial No.: 91794469

Results :



Top View

Tested at 380 °C	Temperature of UUT at each position (°C)				
UUC Setting 380 °C	1	2	3	4	5
Maximum	378.5	377.7	378.5	377.8	379.2
Minimum	378.2	377.4	378.2	377.5	378.9
Mid-Range	378.3	377.6	378.3	377.6	379.0
Difference	0.3	0.3	0.3	0.3	0.3
Uncertainty of measurement (± °C)	1.5	1.5	1.5	1.5	1.5

Note : - Reference Standards are measurement in tube sand at 240 value record after temperature stability.
- Level high of sand is equal heater plate of UUT.

page 2 of 4

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FMBL/MTC.002 Rev.3

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เอกสารไม่ควบคุม



Request No.: 22-64/0445

Serial No.: 91794469

Results :

Tested at 380 °C	Temperature of UUT at each position (°C)				
UUC Setting 380 °C	16	17	18	19	20
Maximum	376.9	379.4	378.7	379.7	378.3
Minimum	376.6	379.1	378.4	379.5	378.1
Mid-Range	376.7	379.2	378.5	379.6	378.2
Difference	0.3	0.3	0.3	0.2	0.2
Uncertainty of measurement (± °C)	1.5	1.5	1.5	1.5	1.5

Note : - Reference Standards are measurement in tube sand at 240 value record after temperature stability.
- Level high of sand is equal heater plate of UUT.

Tested by

Director

Photometry and Temperature Standards Laboratory

Ref. : 2012264031201170001

Issued date : 16 March 2021

page 4 of 4

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Request No.: 22-64/0445

Serial No.: 91794469

Results :

Tested at 380 °C	Temperature of UUT at each position (°C)				
UUC Setting 380 °C	6	7	8	9	10
Maximum	377.6	379.8	378.1	379.5	377.7
Minimum	377.4	379.4	377.9	379.3	377.6
Mid-Range	377.5	379.6	378.0	379.4	377.6
Difference	0.2	0.5	0.2	0.2	0.2
Uncertainty of measurement (± °C)	1.5	1.5	1.5	1.5	1.5

Tested at 380 °C	Temperature of UUT at each position (°C)				
UUC Setting 380 °C	11	12	13	14	15
Maximum	379.1	377.5	378.0	377.9	377.7
Minimum	378.8	377.2	377.6	377.7	377.4
Mid-Range	379.0	377.4	377.8	377.8	377.5
Difference	0.2	0.4	0.3	0.2	0.3
Uncertainty of measurement (± °C)	1.5	1.5	1.5	1.5	1.5

Note : - Reference Standards are measurement in tube sand at 240 value record after temperature stability.
- Level high of sand is equal heater plate of UUT.

page 3 of 4

The results relate only to the items tested or calibrated.

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

FMBL/MTC.002 Rev.3

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Thailand
Tel. (66) 0 2577 9000
Fax. (66) 0 2577 9009
E-mail : rumpai@tistr.or.th

เอกสารไม่ควบคุม

FOSS

Customer Service Report

FOSS South East Asia
3388 Sirinrat Building, 25th - 26th Floor, Unit No. 3388/90,
Rama IV Road, Klongton - Klongtoey, Bangkok, Thailand 10110

Report No.: 5874

Date: 30/11/21
Customer: UAB
Instrument: KT 200

Address: 91 ถนนพหลโยธิน แขวงจตุจักร เขตจตุจักร กรุงเทพมหานคร 10210
Serial: 91790529

Hours: Travel To Customer
Start: 8.00
Finish: 9.00

Labour: 9.00
Travel From Customer: 15.00

Application	Special	Standard
Normal	Courtesy Visit	Installation
Distributor	PMA Onboarding	Quote
Internal	Warranty	Repair
Digital Service	Sales Support	Remote
		Training In House
		PM
		Other

PO/Quote Number: If applicable

PMA Type: Foss Cart Pro Contract No. If applicable

Details of Work / Test	Condition / Status
- Check Instrument	OK
- 1/2" PM Kit for KT 200	Pass
- 1/2" Safety Valve	Pass
- 1/2" Rubber Grommet	Pass
- 1/2" Heating Element	Pass
- 1/2" New Panel PCB	Pass
- 1/2" Safety door pass complete	Pass
- Clean & Lubricant	Pass
- Check Leaky Happed	Pass
- Check Valve 100ml set 30ml 2x 20ml	Pass
Instrument Ready for Use	OK Not OK

Part No.	Batch	Description	Qty
11009945	11235 983	Foss PM Kit KT 200	1
15750026	29.08.21	Safety Valve	1
15750026	09.11.21	Rubber Grommet for Heating	2
11009945	02.08.21	Heating Element	1
10009945	16.11.20	Safety	1
10009945	16.08.20	KT 200 new panel PCB	1
10009945	22.04.21	Safety door complete	1

I confirm this report is accurate and complete

Signed FOSS
Name

Would you be willing to participate in a brief survey in order to tell us how we performed?

เอกสารไม่ควบคุม

FossCare™

FOSS Preventive Maintenance Protocol

Customer : UAE

Instrument	Kjeltec™ 2100 - <i>Kjeltec 200</i>	
Recommended PM interval (whichever occurs first between interval and no. of samples analysed)	12 months	No. of samples analysed (if applicable):
Preventive maintenance kit (P/N)	10009965	<i>S/N 91790524</i>

Introduction

A maintenance protocol provides systematic and functional means of maintaining a specific instrument type. The recommended PM interval depends on the operational conditions and is based on our extensive experience and knowledge of manufacturing and maintaining analytical instruments.

Apart from sample throughput, the environmental conditions also need to be considered. A demanding environment, such as high ambient temperature, humidity, dirtiness etc can measurably shorten component lifetime and also the maintenance and component replacement intervals.

NOTE!

The content of this protocol is subject to change over time. In order to safeguard that you obtain the correct parts, please make sure to indicate serial no and date of installation when contacting your FOSS representative.

Dedicated Analytical Solutions

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Web www.foss.se

Customer Support, 1001 4572 / Rev. 3

1(2)

เอกสารไม่ควบคุม

Maintenance Procedure

Exchange of Parts and Cleaning

Step	Action	Part	P/N	OK
1	Replace	Adapter for dig. tube 250 ml	1000 0056	<input type="checkbox"/>
2	Replace	Non return valve	1000 3538	<input type="checkbox"/>
3	Replace valves in alkali pump	Valve kit reagent/water pump	1575 0093	<input type="checkbox"/>
4	Replace steam tubing	Silicone tubing 8/12 mm	1582 0006	<input type="checkbox"/>
5	Replace alkali tubing	Tubing reinforced for alkali	1582 0011	<input type="checkbox"/>
6	Replace water tubing	Tubing PVC 8/11 mm	1582 0004	<input type="checkbox"/>
7	Cleaning	Steam generator		<input type="checkbox"/>
8	Cleaning	Splash head		<input type="checkbox"/>

Check and Adjustments

Step	Action	Module	Measured	Limits	OK
1	Check alkali volume, 10 ml/stroke	Alkali pump	<i>98</i>	At 50 ml -0/+3 ml	<input checked="" type="checkbox"/>
2	Check distillation volume		<i>120 ml</i>	100 - 150 ml/4 min	<input checked="" type="checkbox"/>
3	Check front panel switches				<input checked="" type="checkbox"/>
4	Check cables and electrical connections				<input checked="" type="checkbox"/>
5	Check level pins in steam generator				<input checked="" type="checkbox"/>
6	Check safety door switch				<input checked="" type="checkbox"/>

Customer Support, 1001 4572 / Rev. 3

2(2)

เอกสารไม่ควบคุม

SITHIPHORN
associates

1

Preventive Maintenance Protocol

Instrument: Kjeltec™ 2100	Model <i>KJ200</i>	S/N: <i>91790524</i>
Customer <i>บริษัท อุตสาหกรรมอาหาร เอนก จำกัด</i>	Job No. <i>MSK3POT0084B</i>	
Certified performed PM interval (whichever occurs first between interval and no. of samples analysed)	12 Months	No. of samples analysed (if applicable):

Introduction

A maintenance protocol provides a systematic and functional means of maintaining a specific instrument type. The certified performed PM interval depends on the operational conditions, and is based on our extensive experience and knowledge of manufacturing and maintaining analytical instruments.

Apart from sample throughput, the environmental conditions also need to be taken into account. Demanding environments, such as high ambient temperature, humidity, dirtiness etc can measurably shorten component lifetime and also the maintenance and component replacement intervals.

The content of this protocol is subject to change over time. In order to ensure you the correct parts, please make sure to indicate serial number and date of installation when contacting your FOSS representative.

Maintenance Procedure

Parts to be Exchanged

Step	Action	Part	P/N	OK
1	Replace	Adapter for dig. tube 250 ml	10000056	<input type="checkbox"/>
2	Replace	Non return valve	10003538	<input type="checkbox"/>
3	Replace valves in alkali pump	Valve kit reagent/water pump	15750093	<input type="checkbox"/>
4	Replace steam tubing	Silicone tubing 8/12 mm	15820006	<input type="checkbox"/>
5	Replace alkali tubing	Tubing reinforced for alkali	15820011	<input type="checkbox"/>
6	Replace water tubing	Tubing PVC 8/11 mm	15820004	<input type="checkbox"/>
7	Cleaning	Steam generator		<input type="checkbox"/>
8	Cleaning	Splash head		<input type="checkbox"/>

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associates

3

Check and Adjustment

Step	Action	Module	Measured	Limits	OK
1	Check alkali volume, 10 ml/stroke	Alkali pump	<i>100 ml</i>	At 50 ml -0/+3 ml	<input checked="" type="checkbox"/>
2	Check distillation volume		<i>110 ml</i>	100 - 150 ml/4min	<input checked="" type="checkbox"/>
3	Check front panel switches				<input checked="" type="checkbox"/>
4	Check cable, electrical connection and main power supply AC 220 Volts				<input checked="" type="checkbox"/>
5	Check level pins in steam generator				<input checked="" type="checkbox"/>
6	Check safety door switch				<input checked="" type="checkbox"/>

Remark _____

Customer's Signature
Engineer's Signature

Date *25/09/2021*

DQE Services Co.,Ltd.
32 Soi Ladprao-Wanghin 55, Ladprao-Wanghin Rd., Ladprao, Bangkok 10230
Phone : +66 (0)2 538 2054, Email : dqeservicesinfo@gmail.com

CERTIFICATE OF CALIBRATION

Certificate No. : SP22-007 Page 1 of 5

Customer : United Analyst and Engineering Consultant Co.,Ltd. (Head Office)

Address : 3 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong,
Bangkok 10260

Location of calibration : Laboratory 315

Equipment : UV-Vis Spectrophotometer

Manufacturer : Hitachi

Model : U-1900

Serial No. : 2021-064

ID No. : UAE.WAS.006/2552

Received Date : 20 January 2022

Calibration Date : 20 January 2022

Issue Date : 24 January 2022

Condition Instrument : Good

Calibrated by : [Redacted]

Technical Manager Quality Manager

The calibration result is applied only to the above calibrated item and was found accurate as shown on date and place of calibration only.

The measurement capability of the laboratory and its traceability to recognized national standards and to the unit of measurement realized at the corresponding national standards laboratory. This certificate may not be reproduced other than in full except with the prior written approval of the DQE Services Co., Ltd.

FM-708-02 R01 1/11/2021

เอกสารไม่ควบคุม

DQE Services Co.,Ltd.
32 Soi Ladprao-Wanghin 55, Ladprao-Wanghin Rd., Ladprao, Bangkok 10230
Phone : +66 (0)2 538 2054, Email : dqeservicesinfo@gmail.com

REPORT OF CALIBRATION

Certificate No. : SP22-007 Page 2 of 5

Environment Condition : Ambient Temperature 25 ± 5 °C
Relative humidity 55 ± 20 %RH

Calibration method : In-house method CP-01 Based on ASTM E275-08

Certified Reference Materials :

Material	Serial No.	Certificate No.	Due date
Absorbance Standard set	25760	95935	22 October 2023
Absorbance Standard set	25757	95929	22 October 2023
Wavelength Standard set	25806	95916	22 October 2023
Wavelength Standard set	25758	95915	22 October 2023

Traceability This certification is traceable to the International System of Unit maintained at National -
Institute of Standards and Technology (NIST) through Starna Scientific Limited

Spectral Band Width of UUC : 4.0 nm.

Scan Speed of UUC : 200 nm/min

Scan Interval of UUC : 0.1 nm.

Resolution of UUC : Photometric 0.001 Abs.
Wavelength 0.1 nm.

FM-708-02 R01 1/11/2021

เอกสารไม่ควบคุม

DQE Services Co.,Ltd.
32 Soi Ladprao-Wanghin 55, Ladprao-Wanghin Rd., Ladprao, Bangkok 10230
Phone : +66 (0)2 538 2054, Email : dqeservicesinfo@gmail.com

REPORT OF CALIBRATION

Certificate No. : SP22-007 Page 3 of 5

Calibration Results : Without adjustment

Photometric Accuracy :

Wavelength (nm.)	CRMs Values (Abs)	UUC Reading (Abs)	Correction (Abs)	Uncertainty (Abs)	Coverage factor k
420	0.0000	0.000	0.0000	0.0028	2.00
	0.5787	0.577	0.0017	0.0031	2.00
	1.0490	1.050	-0.0010	0.0029	2.00
	2.1900	2.183	0.0070	0.0080	2.00
440	0.0000	0.000	0.0000	0.0028	2.00
	0.5607	0.560	0.0007	0.0034	2.00
	1.0247	1.023	0.0017	0.0035	2.00
	2.1229	2.118	0.0049	0.0079	2.00
465	0.0000	0.000	0.0000	0.0028	2.00
	0.5236	0.521	0.0026	0.0030	2.00
	0.9634	0.963	0.0004	0.0029	2.00
	1.9763	1.974	0.0023	0.0070	2.00
546.1	0.0000	0.000	0.0000	0.0028	2.00
	0.5191	0.518	0.0011	0.0031	2.00
	1.0003	1.000	0.0003	0.0033	2.00
	1.9987	1.996	0.0027	0.0084	2.00
590	0.0000	0.000	0.0000	0.0028	2.00
	0.5523	0.552	0.0003	0.0030	2.00
	1.0809	1.082	-0.0011	0.0030	2.00
	2.0391	2.033	0.0061	0.0079	2.00
635	0.0000	0.000	0.0000	0.0028	2.00
	0.5601	0.562	-0.0019	0.0031	2.00
	1.0512	1.052	-0.0008	0.0030	2.00
	1.9294	1.925	0.0044	0.0079	2.00

FM-708-02 R01 1/11/2021

เอกสารไม่ควบคุม

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REPORT OF CALIBRATION

Certificate No. : SP22-007 Page 4 of 5

Photometric Accuracy :

Wavelength (nm.)	CRMs Values (Abs)	UUC Reading (Abs)	Correction (Abs)	Uncertainty (Abs)	Coverage factor k
235	0.0000	0.000	0.0000	0.0050	2.00
	0.7478	0.746	0.0018	0.0057	2.00
257	0.0000	0.000	0.0000	0.0050	2.00
	0.8686	0.861	0.0076	0.0059	2.00
313	0.0000	0.000	0.0000	0.0050	2.00
	0.2912	0.291	0.0002	0.0051	2.00
350	0.0000	0.000	0.0000	0.0050	2.00
	0.6448	0.638	0.0068	0.0055	2.00

FM-708-02 R01 1/11/2021

เอกสารไม่ควบคุม

DQE Services Co.,Ltd. 32 Soi Ladprao-Wanghin 55, Ladprao-Wanghin Rd., Ladprao, Bangkok 10230 Phone : +66 (0)2 538 2054, Email : dqeservicesinfo@gmail.com

REPORT OF CALIBRATION

Certificate No. : SP22-007 Page 5 of 5

Wavelength Accuracy :

CRMs Values (nm.)	UUC Reading (nm.)	Correction (nm.)	Uncertainty (nm.)	Coverage factor k
241.54	240.8	0.74	0.18	2.00
279.40	278.5	0.90	0.18	2.00
288.70	288.0	0.70	0.18	2.00
334.22	333.5	0.72	0.18	2.00
361.26	360.5	0.76	0.18	2.00
418.48	418.0	0.48	0.18	2.00
446.70	446.0	0.70	0.18	2.00
453.20	453.0	0.20	0.18	2.00
460.06	459.5	0.56	0.18	2.00
536.90	536.0	0.90	0.18	2.00
637.94	637.2	0.74	0.18	2.00
440.74	440.0	0.74	0.18	2.00
472.22	471.6	0.62	0.18	2.00
513.70	513.0	0.70	0.18	2.00
528.72	528.0	0.72	0.18	2.00
574.60	573.8	0.80	0.18	2.00
585.48	584.6	0.88	0.20	2.00
684.63	684.0	0.63	0.18	2.00
740.27	739.8	0.47	0.20	2.00
748.28	747.8	0.48	0.18	2.00
807.16	806.4	0.76	0.18	2.00
879.70	878.8	0.90	0.18	2.00

DQE Services Co.,Ltd. 32 Soi Ladprao-Wanghin 55, Ladprao-Wanghin Rd., Ladprao, Bangkok 10230 Phone : +66 (0)2 538 2054, Email : dqeservicesinfo@gmail.com

CERTIFICATE OF CALIBRATION

Certificate No. : SP22-016 Page 1 of 5

Customer : United Analyst and Engineering Consultant Co.,Ltd. (Head Office)

Address : 3 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260

Location of calibration : Laboratory 315

Equipment : UV-Vis Spectrophotometer

Manufacturer : Agilent Technologies

Model : Cary 60

Serial No. : MY15410009

ID No. : N/A

Received Date : 23 May 2022

Calibration Date : 23 May 2022

Issue Date : 26 May 2022

Condition Instrument : Good

Calibrated by : (Mr. Tanawat Rittinach) (Ms. Chonthicha Sangnern)

Technical Manager Quality Manager

The calibration result is applied only to the above calibrated item and was found accurate as shown on date and place of calibration only.

The measurement capability of the laboratory and its traceability to recognized national standards and to the unit of measurement realized at the corresponding national standards laboratory. This certificate may not be reproduced other than in full except with the prior written approval of the DQE Services Co., Ltd.

เอกสารไม่ควบคุม

เอกสารไม่ควบคุม

DQE Services Co.,Ltd. 32 Soi Ladprao-Wanghin 55, Ladprao-Wanghin Rd., Ladprao, Bangkok 10230 Phone : +66 (0)2 538 2054, Email : dqeservicesinfo@gmail.com

REPORT OF CALIBRATION

Certificate No. : SP22-016 Page 2 of 5

Environment Condition : Ambient Temperature 25 ± 5 °C

Relative humidity 55 ± 20 %RH

Calibration method : In-house method CP-01 Based on ASTM E275-08

Certified Reference Materials :

Material	Serial No.	Certificate No.	Due date
Absorbance Standard set	25760	95935	22 October 2023
Absorbance Standard set	25757	95929	22 October 2023
Wavelength Standard set	25806	95916	22 October 2023
Wavelength Standard set	25758	95915	22 October 2023

Traceability This certification is traceable to the International System of Unit maintained at National - Institute of Standards and Technology (NIST) through Starna Scientific Limited

Spectral Band Width of UUC : 1.5 nm.

Scan Speed of UUC : 90 nm/min

Scan Interval of UUC : 0.15 nm.

Resolution of UUC : Photometric 0.0001 Abs.

Wavelength 0.1 nm.

เอกสารไม่ควบคุม

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REPORT OF CALIBRATION

Certificate No. : SP22-016 Page 3 of 5

Calibration Results : Without adjustment

Photometric Accuracy :

Wavelength (nm.)	CRMs Values (Abs)	UUC Reading (Abs)	Correction (Abs)	Uncertainty (Abs)	Coverage factor k
420	0.0000	0.0000	0.0000	0.0028	2.00
	0.5787	0.5755	0.0032	0.0031	2.00
	1.0490	1.0436	0.0054	0.0029	2.00
	2.1900	2.1847	0.0053	0.0075	2.00
440	0.0000	0.0000	0.0000	0.0028	2.00
	0.5607	0.5588	0.0019	0.0034	2.00
	1.0247	1.0232	0.0015	0.0035	2.00
	2.1229	2.1211	0.0018	0.0082	2.00
465	0.0000	0.0000	0.0000	0.0028	2.00
	0.5236	0.5197	0.0039	0.0029	2.00
	0.9634	0.9625	0.0009	0.0028	2.00
	1.9763	1.9752	0.0011	0.0070	2.00
546.1	0.0000	-0.0001	0.0001	0.0028	2.00
	0.5191	0.5171	0.0020	0.0031	2.00
	1.0003	0.9984	0.0019	0.0033	2.00
	1.9987	1.9946	0.0041	0.0084	2.00
590	0.0000	0.0000	0.0000	0.0028	2.00
	0.5523	0.5509	0.0014	0.0030	2.00
	1.0809	1.0799	0.0010	0.0029	2.00
	2.0391	2.0329	0.0062	0.0080	2.00
635	0.0000	0.0000	0.0000	0.0028	2.00
	0.5601	0.5584	0.0017	0.0031	2.00
	1.0512	1.0498	0.0014	0.0029	2.00
	1.9294	1.9265	0.0029	0.0082	2.00

เอกสารไม่ควบคุม



REPORT OF CALIBRATION

Certificate No. : SP22-016

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Photometric Accuracy :

Wavelength (nm.)	CRMs Values (Abs)	UUC Reading (Abs)	Correction (Abs)	Uncertainty (Abs)	Coverage factor <i>k</i>
235	0.0000	0.0001	-0.0001	0.0050	2.00
	0.7478	0.7421	0.0057	0.0056	2.00
257	0.0000	0.0000	0.0000	0.0050	2.00
	0.8686	0.8619	0.0067	0.0059	2.00
313	0.0000	0.0000	0.0000	0.0050	2.00
	0.2912	0.2896	0.0016	0.0051	2.00
350	0.0000	0.0000	0.0000	0.0050	2.00
	0.6448	0.6403	0.0045	0.0055	2.00



REPORT OF CALIBRATION

Certificate No. : SP22-016

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Wavelength Accuracy :

CRMs Values (nm.)	UUC Reading (nm.)	Correction (nm.)	Uncertainty (nm.)	Coverage factor <i>k</i>
241.72	242.0	-0.28	0.18	2.00
279.45	279.5	-0.05	0.18	2.00
287.81	287.5	0.31	0.18	2.00
334.06	333.5	0.56	0.18	2.00
360.93	360.5	0.43	0.18	2.00
418.59	418.0	0.59	0.18	2.00
445.94	445.4	0.54	0.18	2.00
453.66	453.2	0.46	0.18	2.00
460.02	459.7	0.32	0.18	2.00
536.59	536.2	0.39	0.18	2.00
637.98	638.3	-0.32	0.18	2.00
431.38	431.0	0.38	0.18	2.00
472.50	472.5	0.00	0.18	2.00
513.47	513.5	-0.03	0.18	2.00
528.88	528.5	0.38	0.18	2.00
573.17	573.0	0.17	0.18	2.00
585.35	585.0	0.35	0.20	2.00
684.40	684.7	-0.30	0.18	2.00
740.72	740.8	-0.08	0.20	2.00
748.55	748.5	0.05	0.18	2.00
807.03	807.3	-0.27	0.18	2.00
879.28	879.0	0.28	0.18	2.00

Remark : - UUC = Unit Under Calibration

- N/A = Not Available

- The result expanded uncertainty of measurement U is stated as the standard uncertainty of measurement multiplied by the coverage factor *k*,

which for a normal distribution corresponds to a coverage probability of approximately 95%

- * Indicates non TISI accredited

- End of Certificate -

เอกสารไม่ควบคุม

FM-708-02 R01 1/11/2021

เอกสารไม่ควบคุม

FM-708-02 R01 1/11/2021

ภาคผนวก ซ

หนังสือรับแจ้งเปลี่ยนชื่อโครงการ

ที่ ทส ๑๐๑๐.๕/๖ ๑ ๗ ๐



สำนักงานนโยบายและแผน
ทรัพยากรธรรมชาติและสิ่งแวดล้อม
๑๑๘/๑ อาคารทิปโก้ ๒ ถนนพระรามที่ ๖
แขวงพญาไท เขตพญาไท กรุงเทพฯ ๑๐๔๐๐

๒ ๓ เมษายน ๒๕๖๔

เรื่อง การเปลี่ยนชื่อเจ้าของและชื่อโครงการในรายงานการวิเคราะห์ผลกระทบสิ่งแวดล้อมโครงการ ไทม์ รีเจนซี
เรียน ผู้จัดการนิติบุคคลอาคารชุด เบ็ล อเวนิว 2

อ้างถึง ๑. หนังสือสำนักงานนโยบายและแผนทรัพยากรธรรมชาติและสิ่งแวดล้อม ที่ ทส ๑๐๐๙/๘๑
ลงวันที่ ๖ มกราคม ๒๕๕๙
๒. หนังสือนิติบุคคลอาคารชุด เบ็ล อเวนิว 2 ที่ BGR2/tn/L009/2564 ลงวันที่ ๑๑ มีนาคม ๒๕๖๔

ตามหนังสือที่อ้างถึง ๑ สำนักงานนโยบายและแผนทรัพยากรธรรมชาติและสิ่งแวดล้อม ได้แจ้งมติคณะกรรมการผู้ชำนาญการพิจารณารายงานการวิเคราะห์ผลกระทบสิ่งแวดล้อมโครงการในเขตพื้นที่ กรุงเทพมหานคร ในการประชุมครั้งที่ ๕/๒๕๕๘ เมื่อวันที่ ๔ พฤศจิกายน ๒๕๕๘ มีมติให้ความเห็นชอบรายงาน การวิเคราะห์ผลกระทบสิ่งแวดล้อมโครงการ ไทม์ รีเจนซี ของบริษัท ไทม์ รีเจนซี จำกัด ตั้งอยู่ที่ ซอยทวีมิตร ถนนพระราม ๙ แขวงห้วยขวาง เขตห้วยขวาง กรุงเทพมหานคร มีขนาดพื้นที่โครงการ ๑๘-๒-๐๘ ไร่ เป็น โครงการประเภทอาคารอยู่อาศัยรวม มีจำนวน ๒,๐๒๔ ห้อง จัดทำรายงานการวิเคราะห์ผลกระทบสิ่งแวดล้อมโดย บริษัท เอส ที เอส เอ็นจิเนียริง คอนซัลแตนท์ จำกัด โดยให้เจ้าของโครงการปฏิบัติตามมาตรการป้องกันและแก้ไข ผลกระทบสิ่งแวดล้อม และมาตรการติดตามตรวจสอบผลกระทบสิ่งแวดล้อมที่เสนอไว้ในรายงานฯ อย่าง ครบครัด และตามหนังสือที่อ้างถึง ๒ นิติบุคคลอาคารชุด เบ็ล อเวนิว 2 แจ้งความประสงค์ขอเปลี่ยนชื่อเจ้าของ และชื่อโครงการในรายงานการวิเคราะห์ผลกระทบสิ่งแวดล้อมโครงการจากเดิม “โครงการ ไทม์ รีเจนซี ของบริษัท ไทม์ รีเจนซี จำกัด” เป็น “โครงการ BELLE AVENUE (กลุ่มอาคาร A และ B) ของนิติบุคคลอาคารชุด เบ็ล อเวนิว 2” มีจำนวนห้องชุดพักอาศัย ๙๙๑ ห้อง เนื่องจากพื้นที่และห้องพักอาศัยที่มีจำนวนมากของโครงการ จึงมีการแบ่งกลุ่มบริหาร จัดการ โดยนิติบุคคลอาคารชุด ความละเอียดแจ้งแล้ว นั้น

สำนักงานนโยบายและแผนทรัพยากรธรรมชาติและสิ่งแวดล้อม รับทราบการขอเปลี่ยนชื่อ โครงการในรายงานการวิเคราะห์ผลกระทบสิ่งแวดล้อมจากเดิม “โครงการ ไทม์ รีเจนซี” เป็น “โครงการ BELLE AVENUE (กลุ่มอาคาร A และ B)” มีจำนวนห้องชุดพักอาศัย ๙๙๑ ห้อง ซึ่งการปฏิบัติตามมาตรการป้องกันและแก้ไข ผลกระทบสิ่งแวดล้อม และมาตรการติดตามตรวจสอบผลกระทบสิ่งแวดล้อมตามที่ได้รับความเห็นชอบรายงานฯ ที่ให้ โครงการยึดถือปฏิบัติอย่างเคร่งครัด ช่วงเปิดดำเนินการ อยู่ในอำนาจหน้าที่ของนิติบุคคลอาคารชุด เบ็ล อเวนิว 2 ตามกฎหมายว่าด้วยอาคารชุด ทั้งนี้ สำนักงานนโยบายฯ ได้มีหนังสือแจ้งกรุงเทพมหานคร เพื่อทราบด้วยแล้ว

จึงเรียนมาเพื่อโปรดทราบ

ขอแสดงความนับถือ

(นายพิรุณ สัยยะสิทธิ์พานิช)

รองเลขาธิการฯ ปฏิบัติราชการแทน

เลขาธิการสำนักงานนโยบายและแผนทรัพยากรธรรมชาติและสิ่งแวดล้อม

กองวิเคราะห์ผลกระทบสิ่งแวดล้อม

โทรศัพท์ ๐ ๒๒๖๕ ๖๖๒๔

โทรสาร ๐ ๒๒๖๕ ๖๖๑๖

ไปรษณีย์อิเล็กทรอนิกส์ sarabun@onep.go.th