

ภาคผนวก 3

เอกสารชี้แจงระเบียบห้องปฏิบัติการวิเคราะห์เอกชน

ที่ อก ๐๓๒๐/๑๑๓๔๒



กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๕๐๐

๒๗ กรกฎาคม ๒๕๖๖

เรื่อง ต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

เรียน กรรมการผู้จัดการ บริษัท อีสเทิร์น ไทย คอนซัลติ้ง ๑๙๙๒ จำกัด

อ้างถึง คำขอต่ออายุของห้องปฏิบัติการวิเคราะห์เอกชน ลงวันที่ ๗ มิถุนายน ๒๕๖๖

สิ่งที่ส่งมาด้วย เอกสารแนบท้ายหนังสือรับต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

๑. รายชื่อผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ จำนวน ๔๐ ราย
๒. รายชื่อเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๒๕ ราย
๓. ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๒๙๒ รายการ
จำนวน ๑๙ แผ่น

ตามหนังสือที่อ้างถึง บริษัท อีสเทิร์น ไทย คอนซัลติ้ง ๑๙๙๒ จำกัด ขอต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ว-๐๐๓ สถานที่ตั้งเลขที่ ๖๘๓ หมู่ที่ ๑๑ ถนนสุขุมวิท ๘ ตำบลหนองขาม อำเภอศรีราชา จังหวัดชลบุรี ต่อกรมโรงงานอุตสาหกรรม นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้บริษัท อีสเทิร์น ไทย คอนซัลติ้ง ๑๙๙๒ จำกัด ต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน โดยมีองค์ประกอบดังนี้

- ก. ผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ จำนวน ๔๐ ราย ตามสิ่งที่ส่งมาด้วย ๑
- ข. เจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๒๕ ราย ตามสิ่งที่ส่งมาด้วย ๒
- ค. ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนให้วิเคราะห์ในน้ำเสีย จำนวน ๔๗ รายการ
อากาศเสีย (ปล่องระบาย) จำนวน ๒๑ รายการ น้ำใต้ดิน จำนวน ๑๑๑ รายการ สิ่งปฏิกูลหรือวัสดุที่ไม่ใช้แล้ว
จำนวน ๑๘ รายการ และดิน จำนวน ๙๕ รายการ รวมทั้งสิ้นจำนวน ๒๙๒ รายการ ตามสิ่งที่ส่งมาด้วย ๓

หนังสือฉบับนี้จะหมดอายุในวันที่ ๕ กรกฎาคม ๒๕๖๙ หากประสงค์จะต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ให้ยื่นคำขอต่ออายุพร้อมเอกสารประกอบคำขอต่อกรมโรงงานอุตสาหกรรม ภายใน ๓๐ วัน ก่อนวันสิ้นอายุของหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ทั้งนี้ สามารถยื่นคำขอผ่านระบบอิเล็กทรอนิกส์ได้ที่หน้าเว็บไซต์กรมโรงงานอุตสาหกรรม

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นายทวี อำพาพันธ์)

ผู้อำนวยการศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก
ปฏิบัติราชการแทนอธิบดีกรมโรงงานอุตสาหกรรม

ศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก

โทร. ๐ ๓๓๑๓ ๖๐๕๙ ต่อ ๕๐๐๑-๒

ไปรษณีย์อิเล็กทรอนิกส์ eirw@diw.mail.go.th



“อุตสาหกรรมก้าวไกล ประเทศไทยก้าวหน้า ร่วมกันพัฒนา อุตสาหกรรมสีเขียว”

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เอกสารแนบท้ายหนังสือรับต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

บริษัท อีสเทิร์น ไทย คอนซัลตติ้ง ๑๙๙๒ จำกัด เลขทะเบียน ว-๐๐๓

ที่ อก ๐๓๒๐/๑๑๓๔๒

ลงวันที่ ๒๗ กรกฎาคม ๒๕๖๖

ก. ผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ จำนวน ๔๐ ราย

๑) นางสาวมาลีเกษ เลขะวัจกุล	ทะเบียนเลขที่	ว-๐๐๓-ค-๐๐๐๑
๒) นายวัฒนา โคตรหล้า	ทะเบียนเลขที่	ว-๐๐๓-ค-๐๐๐๒
๓) นางวรรณเพ็ญ เหลาจินดาวรรณ	ทะเบียนเลขที่	ว-๐๐๓-ค-๐๐๐๓
๔) นายกะวีร์ สุธาทรัพย์	ทะเบียนเลขที่	ว-๐๐๓-ค-๐๐๐๔
๕) นางสาวนันท์ณภัส แบนขุนทด	ทะเบียนเลขที่	ว-๐๐๓-ค-๐๐๐๕
๖) นางสาวพรนภา หลงคำหงษ์	ทะเบียนเลขที่	ว-๐๐๓-ค-๐๐๐๖
๗) นางสาวอภิรติ ขึ้นอารมย์	ทะเบียนเลขที่	ว-๐๐๓-ค-๐๐๐๗
๘) นางสาวอัจฉรี จิตตะยโสธร	ทะเบียนเลขที่	ว-๐๐๓-ค-๐๐๐๘
๙) นางสาวจิรพร ปานคง	ทะเบียนเลขที่	ว-๐๐๓-ค-๐๐๐๙
๑๐) นายสุทธา สองธนี	ทะเบียนเลขที่	ว-๐๐๓-ค-๐๐๑๐
๑๑) นางสาวนันท์ประภา อุษสูงเนิน	ทะเบียนเลขที่	ว-๐๐๓-ค-๐๐๑๑
๑๒) นายธงไชย บุญศักดิ์	ทะเบียนเลขที่	ว-๐๐๓-ค-๐๐๑๒
๑๓) นางสาวนันทพร กลิ่นโสภณ	ทะเบียนเลขที่	ว-๐๐๓-ค-๐๐๑๓
๑๔) นายธีระพงษ์ นวลอินทร์	ทะเบียนเลขที่	ว-๐๐๓-ค-๐๐๑๔
๑๕) นางสาวแพรว พลเสน	ทะเบียนเลขที่	ว-๐๐๓-ค-๐๐๑๕
๑๖) นายทรงพล ผิวอ้วน	ทะเบียนเลขที่	ว-๐๐๓-ค-๐๐๑๖
๑๗) นายภาคภูมิ บัวสวัสดิ์	ทะเบียนเลขที่	ว-๐๐๓-ค-๐๐๑๗
๑๘) นางสาวจันทน์ สายพันธ์	ทะเบียนเลขที่	ว-๐๐๓-ค-๐๐๑๘
๑๙) นายภาณุพงศ์ บำรุงรส	ทะเบียนเลขที่	ว-๐๐๓-ค-๐๐๑๙
๒๐) นางสาวปภาณิน จันต๊ะสอน	ทะเบียนเลขที่	ว-๐๐๓-ค-๐๐๒๐
๒๑) นายวรากร ไวทยะเสวี	ทะเบียนเลขที่	ว-๐๐๓-ค-๐๐๒๑
๒๒) นางสาววรรณภา ไชยศิริ	ทะเบียนเลขที่	ว-๐๐๓-ค-๐๐๒๒
๒๓) นางสาวพรพิมล ภูมิคอนสาร	ทะเบียนเลขที่	ว-๐๐๓-ค-๐๐๒๓
๒๔) นางสาวธมลวรรณ ผลอ้อ	ทะเบียนเลขที่	ว-๐๐๓-ค-๐๐๒๔
๒๕) นางสาวบุญเรือง บุญถม	ทะเบียนเลขที่	ว-๐๐๓-ค-๐๐๒๕
๒๖) นางสาวภัสนันท์ ป้อมน้อย	ทะเบียนเลขที่	ว-๐๐๓-ค-๐๐๒๖
๒๗) นายชานูวัฒน์ โชตะวงศ์	ทะเบียนเลขที่	ว-๐๐๓-ค-๐๐๒๗
๒๘) นางสาวพจนิษฐ์ งามวิสัย	ทะเบียนเลขที่	ว-๐๐๓-ค-๐๐๒๘
๒๙) นายวิษณุวัตร สิงห์โต	ทะเบียนเลขที่	ว-๐๐๓-ค-๐๐๒๙
๓๐) นางสาวนุกูล อามศรี	ทะเบียนเลขที่	ว-๐๐๓-ค-๐๐๓๐
๓๑) นายศุภฤกษ์ พาดกลาง	ทะเบียนเลขที่	ว-๐๐๓-ค-๐๐๓๑
๓๒) นายณิขพล ทองหล่อ	ทะเบียนเลขที่	ว-๐๐๓-ค-๐๐๓๒
๓๓) นายธรรมรัตน์ โพธิ์ตันคำ	ทะเบียนเลขที่	ว-๐๐๓-ค-๐๐๓๓
๓๔) นายโอชา ขวัญศิริมงคล	ทะเบียนเลขที่	ว-๐๐๓-ค-๐๐๓๔
๓๕) นายเมธี สุขประเสริฐ	ทะเบียนเลขที่	ว-๐๐๓-ค-๐๐๓๕

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๓๖) นางสาวพรพนท...

๓๖) นางสาวพรพินันท์ วิริยกุลกุล	ทะเบียนเลขที่	ว-๐๐๓-ค-๐๐๓๖
๓๗) นางสาวอาภาภรณ์ เสริมสนธิ	ทะเบียนเลขที่	ว-๐๐๓-ค-๐๐๓๗
๓๘) นางสาวนภัทร์ธมณต์ ประดิษฐ์นุช	ทะเบียนเลขที่	ว-๐๐๓-ค-๐๐๓๘
๓๙) นางสาวสุนิษา เอ็งเล้ง	ทะเบียนเลขที่	ว-๐๐๓-ค-๐๐๓๙
๔๐) นางสาวระพิน อ้นชั้น	ทะเบียนเลขที่	ว-๐๐๓-ค-๐๐๔๐

ข. เจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๒๕ ราย

๑) นางสาวดวงกมล เนื่อทอง	ทะเบียนเลขที่	ว-๐๐๓-จ-๐๐๐๑
๒) นางสาววัชรภรณ์ อินทสุข	ทะเบียนเลขที่	ว-๐๐๓-จ-๐๐๐๒
๓) นางสาวกัญจน์ถวิกา จันทร์ขอดแก้ว	ทะเบียนเลขที่	ว-๐๐๓-จ-๐๐๐๓
๔) นางสาวฉัตรสุดา มงคลโภชน์	ทะเบียนเลขที่	ว-๐๐๓-จ-๐๐๐๔
๕) นางสาวณัฐวดี อำมาตย์ทัศน์	ทะเบียนเลขที่	ว-๐๐๓-จ-๐๐๐๕
๖) นางสาวนิอรอุมา ปาระ	ทะเบียนเลขที่	ว-๐๐๓-จ-๐๐๐๖
๗) นางสาวธัญลักษณ์ ชันโต	ทะเบียนเลขที่	ว-๐๐๓-จ-๐๐๐๗
๘) นางสาวสุทธิดา สร้างแก้ว	ทะเบียนเลขที่	ว-๐๐๓-จ-๐๐๐๘
๙) นายอุดมทรัพย์ เจนจบจริง	ทะเบียนเลขที่	ว-๐๐๓-จ-๐๐๐๙
๑๐) นายนราธิป สงวนศิลป์	ทะเบียนเลขที่	ว-๐๐๓-จ-๐๐๑๐
๑๑) นายวีระชัย พอใจ	ทะเบียนเลขที่	ว-๐๐๓-จ-๐๐๑๑
๑๒) นายอัญชลี ทะพงษ์	ทะเบียนเลขที่	ว-๐๐๓-จ-๐๐๑๒
๑๓) นางสาวสุมลิตรา มีแก่น	ทะเบียนเลขที่	ว-๐๐๓-จ-๐๐๑๓
๑๔) นางสาวสวรรณยา เพชรประไพ	ทะเบียนเลขที่	ว-๐๐๓-จ-๐๐๑๔
๑๕) นางสาวจุฑามาศ เจริญพรหม	ทะเบียนเลขที่	ว-๐๐๓-จ-๐๐๑๕
๑๖) นางสาวนิภาพร คำชมภู	ทะเบียนเลขที่	ว-๐๐๓-จ-๐๐๑๖
๑๗) นางสาวอรชา พันธุ์เมือง	ทะเบียนเลขที่	ว-๐๐๓-จ-๐๐๑๗
๑๘) นายกิตติ ไพโรจน์	ทะเบียนเลขที่	ว-๐๐๓-จ-๐๐๑๘
๑๙) นายชาญณรงค์ ตั้งธรรมรักษ์	ทะเบียนเลขที่	ว-๐๐๓-จ-๐๐๑๙
๒๐) นางสาวปวีศา เอสันเทียะ	ทะเบียนเลขที่	ว-๐๐๓-จ-๐๐๒๐
๒๑) นางสาวจุฑาทิพย์ กิจดี	ทะเบียนเลขที่	ว-๐๐๓-จ-๐๐๒๑
๒๒) นางสาวสุภาวดี ศรีละออง	ทะเบียนเลขที่	ว-๐๐๓-จ-๐๐๒๒
๒๓) นางสาวณัฐชยา บรรพบุตร	ทะเบียนเลขที่	ว-๐๐๓-จ-๐๐๒๓
๒๔) นางสาวณัฐนิช นนตานอก	ทะเบียนเลขที่	ว-๐๐๓-จ-๐๐๒๔
๒๕) นางสาวดวงสุดา แสนวันดี	ทะเบียนเลขที่	ว-๐๐๓-จ-๐๐๒๕

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เอกสารแนบท้ายหนังสือรับต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

บริษัท อีสเทิร์น ไทย คอนซัลติ้ง ๑๙๙๒ จำกัด เลขทะเบียน ว-๐๐๓

ที่ อก ๐๓๒๐/๑๑๓๔๒

ลงวันที่ ๒๗ กรกฎาคม ๒๕๖๖

ขอขยายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๒๙๒ รายการ

น้ำเสีย จำนวน 47 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Aldrin	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[4]
2	Arsenic	1) Continuous 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	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[4]
5	β -BHC	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[4]
6	δ -BHC	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[4]
7	γ -BHC	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[4]
8	Biochemical Oxygen Demand	1) 5-Day BOD Test, Membrane Electrode Method ^[4] 2) 5-Day BOD Test, Azide Modification Method ^[4]
9	Cadmium	Digestion, Inductively Coupled Plasma Method ^[4]
10	Chemical Oxygen Demand	Closed Reflux, Titrimetric Method ^[4]
11	cis-Chlordane	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[4]
12	trans-Chlordane	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[4]
13	Chromium	1) Digestion, Direct Air-Acetylene Flame Method ^[4] 2) Digestion, Inductively Coupled Plasma Method ^[4]


~~COPY~~

14 Color...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
14	Color	ADMI Weighted-Ordinate Spectrophotometric Method ^[4]
15	Copper	1) Digestion, Direct Air-Acetylene Flame Method ^[4] 2) Digestion, Inductively Coupled Plasma Method ^[4]
16	Cyanide	Distillation, Colorimetric Method ^[4]
17	4,4'-DDD	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[4]
18	4,4'-DDE	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[4]
19	DDT	Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[4]
20	Dieldrin	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[4]
21	Endosulfan I	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[4]
22	Endosulfan II	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[4]
23	Endosulfan sulfate	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[4]
24	Endrin	Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[4]
25	Endrin aldehyde	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[4]
26	Endrin ketone	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[4]
27	Formaldehyde	Distillation, Colorimetric Method ^[3]
28	Free Chlorine	1) Iodometric Method ^[4] 2) Colorimetric Method ^[4]

COPY

29 Heptachlor...

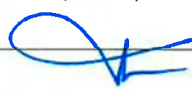
ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
29	Heptachlor	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[4]
30	Heptachlor Epoxide	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[4]
31	Hexavalent Chromium	Filtration, Colorimetric Method ^[4]
32	Lead	1) Digestion, Direct Air-Acetylene Flame Method ^[4] 2) Digestion, Inductively Coupled Plasma Method ^[4]
33	Manganese	Digestion, Inductively Coupled Plasma Method ^[4]
34	Mercury	Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ^[4]
35	Methoxychlor	Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[4]
36	Nickel	1) Digestion, Direct Air-Acetylene Flame Method ^[4] 2) Digestion, Inductively Coupled Plasma Method ^[4]
37	Oil and Grease	Liquid-Liquid, Partition-Gravimetric Method ^[4]
38	pH	Electrometric Method ^[4]
39	Phenols	Distillation, Direct Photometric Method ^[4]
40	Selenium	Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^[4]
41	Sulfide	ZnS Precipitation, Iodometric Method ^[4]
42	Temperature	Field Method ^[4]
43	Trivalent Chromium	1) Digestion, Direct Air-Acetylene Flame Method; Filtration, Colorimetric Method; Calculation ^[4] 2) Digestion, Inductively Coupled Plasma Method; Colorimetric Method; Calculation ^[4]
44	Total Dissolved Solids	Dried at 180 °C ^[4]
45	Total Kjeldahl Nitrogen	Macro Kjeldahl Method ^[4]
46	Total Suspended Solids	Dried at 103-105 °C ^[4]
47	Zinc	Digestion, Inductively Coupled Plasma Method ^[4]

COPY

อากาศเสีย...

อากาศเสีย (ปล่อยระบาย) จำนวน 21 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Antimony	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5]
2	Arsenic	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5]
3	Cadmium	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5]
4	Carbon Monoxide	1) Bag, Non-Dispersive Infrared Method ^[5] 2) Instrumental Analyzer Method ^[5]
5	Chromium	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5]
6	Cobalt	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5]
7	Copper	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5]
8	Hydrogen Sulfide	Absorption Sampling, Iodometric Method ^[5]
9	Lead	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5]
10	Manganese	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5]
11	Mercury	Isokinetic Sampling, Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ^[5]
12	Nickel	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5]
13	Opacity	Ringelmann's Method ^[1,5]
14	Oxides of Nitrogen	1) Absorption Sampling, Phenoldisulfonic Acid Method ^[8] 2) Instrumental Analyzer Method ^[7]
15	Selenium	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5]
16	Sulfur Dioxide	1) Absorption Sampling , Barium-Thorin Titrimetric Method ^[5] 2) Instrumental Analyzer Method ^[5]
17	Sulfuric Acid	Isokinetic Sampling, Barium-Thorin Titrimetric Method ^[6]
18	Tin	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5]


COPY

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
19	Total Suspended Particulate	Isokinetic Sampling, Gravimetric Method ^[6]
20	Vanadium	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5]
21	Xylene	Adsorption Sampling, Gas Chromatographic Method ^[6]

น้ำใต้ดิน จำนวน 111 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Acenaphthene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
2	Acetone	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
3	Aldrin	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
4	Anthracene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
5	Antimony	Digestion, Inductively Coupled Plasma Method ^[4]
6	Arsenic	1) Continuous Hydride Generation/Atomic Absorption Spectrometric Method ^[4] 2) Digestion, Inductively Coupled Plasma Method ^[4]
7	Barium	Digestion, Inductively Coupled Plasma Method ^[4]
8	Benz(a)anthracene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
9	Benzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
10	Benzo(b)fluoranthene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
11	Benzo(k)fluoranthene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
12	Benzo(a)pyrene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
13	Benzo[g,h,i]perylene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
14	Beryllium	Digestion, Inductively Coupled Plasma Method ^[4]

COPY

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
15	Bis(2-chloroethyl)ether	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
16	Bis(2-ethylhexyl)phthalate	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
17	Bromodichloromethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
18	Bromoform	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
19	Butanol	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
20	Butyl benzyl phthalate	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
21	Cadmium	Digestion, Inductively Coupled Plasma Method ^[4]
22	Carbazole	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
23	Carbon disulfide	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
24	Carbon tetrachloride	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
25	Chlordane	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
26	p-Chloroaniline	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
27	Chlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
28	Chlorodibromomethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
29	Chloroform	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
30	2-Chlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
31	Chromium	1) Digestion, Direct Air-Acetylene Flame Method ^[4] 2) Digestion, Inductively Coupled Plasma Method ^[4]
32	Chromium (III)	1) Digestion, Direct Air-Acetylene Flame Method; Filtration, Colorimetric Method; Calculation ^[4] 2) Digestion, Inductively Coupled Plasma Method; Filtration, Colorimetric Method; Calculation ^[4]

COPY

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
33	Chromium (VI)	Filtration, Colorimetric Method ^[4]
34	Chrysene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
35	Cyanide	Distillation, Colorimetric Method ^[4]
36	DDD	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
37	DDE	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
38	DDT	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
39	Dibenz(a,h)anthracene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
40	Di-n-butyl phthalate	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
41	1,2-Dichlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
42	1,3-Dichlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
43	1,4-Dichlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
44	1,1-Dichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
45	1,2-Dichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
46	1,1-Dichloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
47	cis-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
48	trans-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
49	2,4-Dichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
50	1,2-Dichloropropane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
51	1,3-Dichloropropane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]

COPY

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
52	Dieldrin	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
53	Diethyl phthalate	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
54	2,4-Dimethylphenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
55	2,4-Dinitrotoluene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
56	2,6-Dinitrotoluene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
57	Di-n-octyl phthalate	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
58	Endosulfan	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
59	Endrin	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
60	Ethylbenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
61	Fluoranthene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
62	Fluorene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
63	Heptachlor	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
64	Heptachlor epoxide	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
65	Hexachlorobenzene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
66	Hexachloro-1,3-butadiene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
67	n-Hexane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
68	α -HCH	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
69	β -HCH	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]

COPY

70 γ -HCH...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
70	γ -HCH	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
71	Hexachlorocyclopentadiene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
72	Hexachloroethane	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
73	Indeno(1,2,3-cd)pyrene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
74	Isophorone	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
75	Lead	1) Digestion, Direct Air-Acetylene Flame Method ^[4] 2) Digestion, Inductively Coupled Plasma Method ^[4]
76	Manganese	Digestion, Inductively Coupled Plasma Method ^[4]
77	Mercury	Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ^[4]
78	Methoxychlor	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
79	Methylene chloride	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
80	2-Methylphenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
81	2-Methylnaphthalene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
82	Methyl tert-butyl ether	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
83	Naphthalene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
84	Nickel	Digestion, Inductively Coupled Plasma Method ^[4]
85	Nitrobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
86	N-Nitrosodi-n-propylamine	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
87	pH	Electrometric Method ^[4]
88	Phenanthrene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]

COPY

89 Phenol...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
89	Phenol	1) Distillation, Direct Photometric Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
90	Pyrene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
91	Selenium	Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^[4]
92	Silver	Digestion, Inductively Coupled Plasma Method ^[4]
93	Styrene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
94	1,1,2,2-Tetrachloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
95	Trichloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
96	1,2,4-Trichlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
97	1,1,1-Trichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
98	1,1,2-Trichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
99	Tetrachloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
100	Toluene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
101	2,4,5-Trichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
102	2,4,6-Trichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
103	1,3,5-Trimethylbenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
104	Vanadium	Digestion, Inductively Coupled Plasma Method ^[4]
105	Vinyl acetate	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
106	Vinyl chloride	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]

COPY

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
107	m-Xylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
108	o-Xylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
109	p-Xylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
110	Xylene (Total)	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
111	Zinc	Digestion, Inductively Coupled Plasma Method ^[4]

สิ่งปฏิกูลหรือวัสดุที่ไม่ใช้แล้ว จำนวน 18 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Antimony	Digestion, Inductively Coupled Plasma Method ^[9,10]
2	Arsenic	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[2,9,10] 2) Digestion, Inductively Coupled Plasma Method ^[9,10]
3	Barium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[2,9,10] 2) Digestion, Inductively Coupled Plasma Method ^[9,10]
4	Beryllium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[2,9,10] 2) Digestion, Inductively Coupled Plasma Method ^[9,10]
5	Cadmium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[2,9,10] 2) Digestion, Inductively Coupled Plasma Method ^[9,10]
6	Chromium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[2,9,10] 2) Digestion, Inductively Coupled Plasma Method ^[9,10]
7	Chromium (VI)	1) Waste Extraction, Digestion, Colorimetric Method ^[2,13] 2) Alkaline Digestion, Colorimetric Method ^[9,13]
8	Cobalt	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[2,9,10] 2) Digestion, Inductively Coupled Plasma Method ^[9,10]
9	Copper	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[2,9,10] 2) Digestion, Inductively Coupled Plasma Method ^[9,10]

COPY

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
10	Lead	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[2,9,10] 2) Digestion, Inductively Coupled Plasma Method ^[9,10]
11	Mercury	1) Waste Extraction, Digestion, Cold Vapor Atomic Absorption Spectrometric Method ^[2,11] 2) Digestion, Cold vapor Atomic Absorption Spectrometric Method ^[9,11]
12	Nickel	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[2,9,10] 2) Digestion, Inductively Coupled Plasma Method ^[9,10]
13	Molybdenum	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[2,9,10] 2) Digestion, Inductively Coupled Plasma Method ^[9,10]
14	Selenium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[2,9,10] 2) Digestion, Inductively Coupled Plasma Method ^[9,10]
15	Silver	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[2,9,10] 2) Digestion, Inductively Coupled Plasma Method ^[9,10]
16	Thallium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[2,9,10] 2) Digestion, Inductively Coupled Plasma Method ^[9,10]
17	Vanadium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[2,9,10] 2) Digestion, Inductively Coupled Plasma Method ^[9,10]
18	Zinc	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[2,9,10] 2) Digestion, Inductively Coupled Plasma Method ^[9,10]



COPY

ดิน จำนวน 95 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Acenaphthene	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[15,17]
2	Acetone	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[14,16]
3	Anthracene	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[15,17]
4	Antimony	Digestion, Inductively Coupled Plasma Method ^[9,10]
5	Arsenic	Digestion, Inductively Coupled Plasma Method ^[9,10]
6	Barium	Digestion, Inductively Coupled Plasma Method ^[9,10]
7	Benz(a)anthracene	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[15,17]
8	Benzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[14,16]
9	Benzo(b)fluoranthene	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[15,17]
10	Benzo(k)fluoranthene	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[15,17]
11	Benzo(a)pyrene	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[15,17]
12	Benzo[g,h,i]perylene	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[15,17]
13	Beryllium	Digestion, Inductively Coupled Plasma Method ^[9,10]
14	Bis(2-chloroethyl)ether	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[15,17]
15	Bis(2-ethylhexyl)phthalate	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[15,17]
16	Bromodichloromethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[14,16]
17	Bromoform	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[14,16]
18	Butanol	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[14,16]

COPY

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
19	Butyl benzyl phthalate	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[15,17]
20	Cadmium	Digestion, Inductively Coupled Plasma Method ^[9,10]
21	Carbazole	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[15,17]
22	Carbon disulfide	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[14,16]
23	Carbon tetrachloride	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[14,16]
24	p-Chloroaniline	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[15,17]
25	Chlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[14,16]
26	Chlorodibromomethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[14,16]
27	Chloroform	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[14,16]
28	2-Chlorophenol	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[15,17]
29	Chromium	Digestion, Inductively Coupled Plasma Method ^[9,10]
30	Chromium (III)	Digestion, Inductively Coupled Plasma Method; Filtration, Colorimetric Method; Calculation ^[9,10]
31	Chromium (VI)	Alkaline Digestion, Colorimetric Method ^[12,13]
32	Chrysene	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[15,17]
33	Dibenz(a,h)anthracene	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[15,17]
34	Di-n-butyl phthalate	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[15,17]
35	1,2-Dichlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[14,16]
36	1,3-Dichlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[14,16]
37	1,4-Dichlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[14,16]

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38 1,1-Dichloroethane...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
38	1,1-Dichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[14,16]
39	1,2-Dichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[14,16]
40	1,1-Dichloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[14,16]
41	cis-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[14,16]
42	trans-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[14,16]
43	2,4-Dichlorophenol	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[15,17]
44	1,2-Dichloropropane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[14,16]
45	1,3-Dichloropropane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[14,16]
46	Diethyl phthalate	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[15,17]
47	2,4-Dimethylphenol	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[15,17]
48	2,4-Dinitrotoluene	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[15,17]
49	2,6-Dinitrotoluene	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[15,17]
50	Di-n-octyl phthalate	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[15,17]
51	Ethylbenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[14,16]
52	Fluoranthene	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[15,17]
53	Fluorene	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[15,17]
54	Hexachlorobenzene	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[15,17]
55	Hexachloro-1,3-butadiene	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[15,17]

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ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
56	n-Hexane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[14,16]
57	Hexachlorocyclopentadiene	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[15,17]
58	Hexachloroethane	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[15,17]
59	Indeno(1,2,3-cd)pyrene	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[15,17]
60	Isophorone	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[15,17]
61	Lead	Digestion, Inductively Coupled Plasma Method ^[9,10]
62	Manganese	Digestion, Inductively Coupled Plasma Method ^[9,10]
63	Mercury	Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ^[9,11]
64	Methylene chloride	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[14,16]
65	2-Methylphenol	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[15,17]
66	2-Methylnaphthalene	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[15,17]
67	Methyl tert-butyl ether	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[14,16]
68	Naphthalene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[14,16]
69	Nickel	Digestion, Inductively Coupled Plasma Method ^[9,10]
70	Nitrobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[14,16]
71	N-Nitrosodi-n-propylamine	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[15,17]
72	Phenanthrene	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[15,17]
73	Phenol	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[15,17]
74	Pyrene	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[15,17]

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ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
75	Selenium	Digestion, Inductively Coupled Plasma Method ^[9,10]
76	Silver	Digestion, Inductively Coupled Plasma Method ^[9,10]
77	Styrene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[14,16]
78	1,1,2,2-Tetrachloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[14,16]
79	Tetrachloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[14,16]
80	Toluene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[14,16]
81	1,2,4-Trichlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[14,16]
82	1,1,1-Trichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[14,16]
83	1,1,2-Trichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[14,16]
84	Trichloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[14,16]
85	2,4,5-Trichlorophenol	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[15,17]
86	2,4,6-Trichlorophenol	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[15,17]
87	1,3,5-Trimethylbenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[14,16]
88	Vanadium	Digestion, Inductively Coupled Plasma Method ^[9,10]
89	Vinyl acetate	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[14,16]
90	Vinyl chloride	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[14,16]
91	m-Xylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[14,16]
92	o-Xylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[14,16]
93	p-Xylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[14,16]

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ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
94	Xylene (Total)	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[14,16]
95	Zinc	Digestion, Inductively Coupled Plasma Method ^[9,10]

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ที่ อก ๐๓๒๐/ ๔๖๐๔

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๔๐๐

๑๔ พฤษภาคม ๒๕๖๗

เรื่อง เปลี่ยนแปลงเอกสารอ้างอิงวิธีวิเคราะห์สารมลพิษ เปลี่ยนแปลงสารมลพิษในดิน และเปลี่ยนแปลงบุคลากร
ของห้องปฏิบัติการวิเคราะห์

เรียน กรรมการผู้จัดการ บริษัท อีสเทิร์น ไทย คอนซัลติ้ง ๑๙๙๒ จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน
ลงวันที่ ๔ มีนาคม ๒๕๖๗

สิ่งที่ส่งมาด้วย เอกสารแนบท้ายหนังสือเปลี่ยนแปลงเอกสารอ้างอิงวิธีวิเคราะห์สารมลพิษ และเปลี่ยนแปลง
สารมลพิษบริษัท อีสเทิร์น ไทย คอนซัลติ้ง ๑๙๙๒ จำกัด จำนวน ๑๒ แผ่น

ตามคำขอ ที่อ้างถึง บริษัท อีสเทิร์น ไทย คอนซัลติ้ง ๑๙๙๒ จำกัด ห้องปฏิบัติการวิเคราะห์
เอกชน เลขทะเบียน ว-๐๐๓ สถานที่ตั้งเลขที่ ๖๘๓ หมู่ที่ ๑๑ ถนนสุขาภิบาล ๘ ตำบลหนองขาม
อำเภอศรีราชา จังหวัดชลบุรี แจ้งขอเปลี่ยนแปลงเอกสารอ้างอิงวิธีวิเคราะห์สารมลพิษในน้ำเสีย น้ำใต้ดิน
เปลี่ยนแปลงสารมลพิษในดิน และเปลี่ยนแปลงบุคลากร นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว มีความเห็นดังนี้

๑. ให้ยกเลิกผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ จำนวน ๑ ราย

นายวัฒนา โคตรหล้า ทะเบียนเลขที่ ว-๐๐๓-ค-๐๐๐๒

๒. ให้ยกเลิกเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๓ ราย

๑) นางสาวอัญชลี ทะพงษ์ ทะเบียนเลขที่ ว-๐๐๓-จ-๐๐๑๒

๒) นางสาวจุฑามาศ เจริญพรหม ทะเบียนเลขที่ ว-๐๐๓-จ-๐๐๑๕

๓) นางสาวณัฐนิช นนตานอก ทะเบียนเลขที่ ว-๐๐๓-จ-๐๐๒๔

๓. ให้ยกเลิกขอบข่ายรายการสารมลพิษในน้ำเสีย และน้ำใต้ดินตามรายการเอกสารแนบท้าย
หนังสือต่ออายุรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชนที่ อก ๐๓๒๐/๑๑๓๔๒ ลงวันที่ ๒๗ กรกฎาคม ๒๕๖๖

๔. ให้วิเคราะห์สารมลพิษตามขอบข่ายที่ได้รับขึ้นทะเบียนให้วิเคราะห์ในน้ำเสีย จำนวน ๔๗ รายการ
และน้ำใต้ดิน จำนวน ๑๑๑ รายการ รวมทั้งสิ้นจำนวน ๑๕๘ รายการ ตามเอกสารแนบท้ายหนังสือเปลี่ยนแปลง
เอกสารอ้างอิงวิธีวิเคราะห์สารมลพิษ เปลี่ยนแปลงสารมลพิษในดิน และเปลี่ยนแปลงบุคลากร ดังสิ่งที่ส่งมาด้วย

๕. ให้วิเคราะห์สารมลพิษตามขอบข่ายที่ได้รับขึ้นทะเบียนให้วิเคราะห์เพิ่มเติมในดิน จำนวน
๑๒ รายการ ตามเอกสารแนบท้ายหนังสือเปลี่ยนแปลงเอกสารอ้างอิงวิธีวิเคราะห์สารมลพิษเปลี่ยนแปลงสารมลพิษ
ในดิน และเปลี่ยนแปลงบุคลากร ดังสิ่งที่ส่งมาด้วย

อนึ่ง หนังสือ

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อนึ่ง หนังสือฉบับนี้จะหมดอายุพร้อมหนังสือต่ออายุรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์
เอกชนในวันที่ ๕ กรกฎาคม ๒๕๖๙

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ



(นายพรยศ กลั่นกรอง)

รองอธิบดี ปฏิบัติราชการแทน
อธิบดีกรมโรงงานอุตสาหกรรม

ศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก

โทร. ๐ ๓๓๑๓ ๖๐๕๙ ต่อ ๕๐๐๑-๒

ไปรษณีย์อิเล็กทรอนิกส์ eirw@diw.mail.go.th

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“อุตสาหกรรมก้าวไกล ประเทศไทยก้าวหน้า ร่วมกันพัฒนา อุตสาหกรรมสีเขียว”



เอกสารแนบท้ายหนังสือเปลี่ยนแปลงเอกสารอ้างอิงวิธีวิเคราะห์สารมลพิษ

บริษัท อีสเทิร์น ไทย คอนซัลติ้ง ๑๙๙๒ จำกัด

เลขทะเบียน ๖-๐๐๓

ที่ อก ๐๓๒๐/

ลงวันที่

ขอขยายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๑๗๐ รายการ
น้ำเสีย จำนวน 47 รายการ

ลำดับ ที่	สารมลพิษ	วิธีวิเคราะห์
1	Aldrin	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[1] 2) Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[1]
2	Arsenic	1) Continuous Hydride Generation/Atomic Absorption Spectrometric Method ^[1] 2) Digestion, Inductively Coupled Plasma Method ^[1]
3	Barium	Digestion, Inductively Coupled Plasma Method ^[1]
4	α -BHC	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[1] 2) Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[1]
5	β -BHC	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[1] 2) Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[1]
6	δ -BHC	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[1] 2) Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[1]
7	γ -BHC	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[1] 2) Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[1]
8	Biochemical Oxygen Demand	1) 5-Day BOD Test, Membrane Electrode Method ^[1] 2) 5-Day BOD Test, Azide Modification Method ^[1]
9	Cadmium	Digestion, Inductively Coupled Plasma Method ^[1]
10	Chemical Oxygen Demand	Closed Reflux, Titrimetric Method ^[1]
11	cis-Chlordane	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[1] 2) Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[1]

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12 trans-Chlordane ...

ลำดับ ที่	สารมลพิษ	วิธีวิเคราะห์
12	trans-Chlordane	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[1] 2) Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[1]
13	Chromium	1) Digestion, Direct Air-Acetylene Flame Method ^[1] 2) Digestion, Inductively Coupled Plasma Method ^[1]
14	Color	ADMI Weighted-Ordinate Spectrophotometric Method ^[1]
15	Copper	1) Digestion, Direct Air-Acetylene Flame Method ^[1] 2) Digestion, Inductively Coupled Plasma Method ^[1]
16	Cyanide	Distillation, Colorimetric Method ^[1]
17	4,4'-DDD	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[1] 2) Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[1]
18	4,4'-DDE	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[1] 2) Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[1]
19	DDT	Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[1]
20	Dieldrin	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[1] 2) Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[1]
21	Endosulfan I	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[1] 2) Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[1]
22	Endosulfan II	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[1] 2) Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[1]
23	Endosulfan sulfate	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[1] 2) Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[1]
24	Endrin	Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[1]

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25 Endrin aldehyde ...

ลำดับ ที่	สารมลพิษ	วิธีวิเคราะห์
25	Endrin aldehyde	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[1] 2) Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[1]
26	Endrin ketone	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[1] 2) Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[1]
27	Formaldehyde	Distillation, Colorimetric Method ^[4]
28	Free Chlorine	1) Iodometric Method ^[1] 2) Colorimetric Method ^[1]
29	Heptachlor	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[1] 2) Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[1]
30	Heptachlor Epoxide	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[1] 2) Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[1]
31	Hexavalent Chromium	Filtration, Colorimetric Method ^[1]
32	Lead	1) Digestion, Direct Air-Acetylene Flame Method ^[1] 2) Digestion, Inductively Coupled Plasma Method ^[1]
33	Manganese	Digestion, Inductively Coupled Plasma Method ^[1]
34	Mercury	Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ^[1]
35	Methoxychlor	Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method ^[1]
36	Nickel	1) Digestion, Direct Air-Acetylene Flame Method ^[1] 2) Digestion, Inductively Coupled Plasma Method ^[1]
37	Oil and Grease	Liquid-Liquid, Partition-Gravimetric Method ^[1]
38	pH	Electrometric Method ^[1]
39	Phenols	Distillation, Direct Photometric Method ^[1]
40	Selenium	Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^[1]

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ลำดับ ที่	สารมลพิษ	วิธีวิเคราะห์
41	Sulfide	ZnS Precipitation, Iodometric Method ^[1]
42	Temperature	Field Method ^[1]
43	Trivalent Chromium	1) Digestion, Direct Air-Acetylene Flame Method; Filtration, Colorimetric Method; Calculation ^[1] 2) Digestion, Inductively Coupled Plasma Method; Colorimetric Method; Calculation ^[1]
44	Total Dissolved Solids	Dried at 180 °C ^[1]
45	Total Kjeldahl Nitrogen	Macro Kjeldahl Method ^[1]
46	Total Suspended Solids	Dried at 103-105 °C ^[1]
47	Zinc	Digestion, Inductively Coupled Plasma Method ^[1]

น้ำใต้ดิน จำนวน 111 รายการ

ลำดับ ที่	สารมลพิษ	วิธีวิเคราะห์
1	Acenaphthene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]
2	Acetone	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[1]
3	Aldrin	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]
4	Anthracene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]
5	Antimony	Digestion, Inductively Coupled Plasma Method ^[1]
6	Arsenic	1) Continuous Hydride Generation/Atomic Absorption Spectrometric Method ^[1] 2) Digestion, Inductively Coupled Plasma Method ^[1]
7	Barium	Digestion, Inductively Coupled Plasma Method ^[1]
8	Benz(a)anthracene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]

COPY

ลำดับ ที่	สารมลพิษ	วิธีวิเคราะห์
9	Benzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[1]
10	Benzo(b)fluoranthene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]
11	Benzo(k)fluoranthene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]
12	Benzo(a)pyrene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]
13	Benzo[g,h,i]perylene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]
14	Beryllium	Digestion, Inductively Coupled Plasma Method ^[1]
15	Bis(2-chloroethyl)ether	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]
16	Bis(2-ethylhexyl)phthalate	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]
17	Bromodichloromethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[1]
18	Bromoform	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[1]
19	Butanol	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[1]
20	Butyl benzyl phthalate	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]
21	Cadmium	Digestion, Inductively Coupled Plasma Method ^[1]
22	Carbazole	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]
23	Carbon disulfide	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[1]
24	Carbon tetrachloride	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[1]

~~COPY~~

ลำดับ ที่	สารมลพิษ	วิธีวิเคราะห์
25	Chlordane	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]
26	p-Chloroaniline	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]
27	Chlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[1]
28	Chlorodibromomethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[1]
29	Chloroform	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[1]
30	2-Chlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]
31	Chromium	1) Digestion, Direct Air-Acetylene Flame Method ^[1] 2) Digestion, Inductively Coupled Plasma Method ^[1]
32	Chromium (III)	1) Digestion, Direct Air-Acetylene Flame Method; Filtration, Colorimetric Method; Calculation ^[1] 2) Digestion, Inductively Coupled Plasma Method; Filtration, Colorimetric Method; Calculation ^[1]
33	Chromium (VI)	Filtration, Colorimetric Method ^[1]
34	Chrysene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]
35	Cyanide	Distillation, Colorimetric Method ^[1]
36	DDD	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]
37	DDE	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]
38	DDT	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]
39	Dibenz(a,h)anthracene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]

ลำดับ ที่	สารมลพิษ	วิธีวิเคราะห์
40	Di-n-butyl phthalate	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]
41	1,2-Dichlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[1]
42	1,3-Dichlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[1]
43	1,4-Dichlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[1]
44	1,1-Dichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[1]
45	1,2-Dichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[1]
46	1,1-Dichloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[1]
47	cis-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[1]
48	trans-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[1]
49	2,4-Dichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]
50	1,2-Dichloropropane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[1]
51	1,3-Dichloropropane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[1]
52	Dieldrin	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]
53	Diethyl phthalate	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]
54	2,4-Dimethylphenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]

COPY

55 2,4-Dinitrotoluene ...

ลำดับ ที่	สารมลพิษ	วิธีวิเคราะห์
55	2,4-Dinitrotoluene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]
56	2,6-Dinitrotoluene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]
57	Di-n-octyl phthalate	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]
58	Endosulfan	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]
59	Endrin	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]
60	Ethylbenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[1]
61	Fluoranthene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]
62	Fluorene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]
63	Heptachlor	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]
64	Heptachlor epoxide	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]
65	Hexachlorobenzene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]
66	Hexachloro-1,3-butadiene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]
67	n-Hexane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[1]
68	α -HCH	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]
69	β -HCH	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]

COPY

ลำดับ ที่	สารมลพิษ	วิธีวิเคราะห์
70	γ -HCH	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]
71	Hexachlorocyclopentadiene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]
72	Hexachloroethane	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]
73	Indeno(1,2,3-cd)pyrene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]
74	Isophorone	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]
75	Lead	1) Digestion, Direct Air-Acetylene Flame Method ^[1] 2) Digestion, Inductively Coupled Plasma Method ^[1]
76	Manganese	Digestion, Inductively Coupled Plasma Method ^[1]
77	Mercury	Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ^[1]
78	Methoxychlor	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]
79	Methylene chloride	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[1]
80	2-Methylphenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]
81	2-Methylnaphthalene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]
82	Methyl tert-butyl ether	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[1]
83	Naphthalene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[1]
84	Nickel	Digestion, Inductively Coupled Plasma Method ^[1]
85	Nitrobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[1]

COPY

litrosodi-n-propylamine ...

ลำดับ ที่	สารมลพิษ	วิธีวิเคราะห์
86	N-Nitrosodi-n-propylamine	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1]
87	pH	Electrometric Method ^[4]
88	Phenanthrene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
89	Phenol	1) Distillation, Direct Photometric Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
90	Pyrene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
91	Selenium	Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^[4]
92	Silver	Digestion, Inductively Coupled Plasma Method ^[4]
93	Styrene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
94	1,1,2,2-Tetrachloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
95	Trichloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
96	1,2,4-Trichlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
97	1,1,1-Trichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
98	1,1,2-Trichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
99	Tetrachloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
100	Toluene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
101	2,4,5-Trichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]

COPY

2 2,4,6-Trichlorophenol ...

ลำดับ ที่	สารมลพิษ	วิธีวิเคราะห์
102	2,4,6-Trichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
103	1,3,5-Trimethylbenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
104	Vanadium	Digestion, Inductively Coupled Plasma Method ^[4]
105	Vinyl acetate	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
106	Vinyl chloride	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
107	m-Xylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
108	o-Xylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
109	p-Xylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
110	Xylene (Total)	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[4]
111	Zinc	Digestion, Inductively Coupled Plasma Method ^[4]

ดิน จำนวน 12 รายการ

ลำดับ ที่	สารมลพิษ	วิธีวิเคราะห์
1	α -HCH	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[2,3]
2	β -HCH	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[2,3]
3	γ -HCH	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[2,3]
4	Heptachlor	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[2,3]

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ลำดับ ที่	สารมลพิษ	วิธีวิเคราะห์
5	Aldrin	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[2,3]
6	Heptachlor epoxide	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[2,3]
7	Chlordane	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[2,3]
8	Dieldrin	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[2,3]
9	Endrin	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[2,3]
10	DDD	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[2,3]
11	DDT	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[2,3]
12	Methoxychlor	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[2,3]

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ที่ อก ๐๓๑๐(๓)/ ๘๓ ๔ ๕



กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๔๐๐

๐๙ ตุลาคม ๒๕๖๔

เรื่อง เปลี่ยนแปลงบุคลากรและสารมลพิษที่วิเคราะห์

เรียน กรรมการผู้จัดการ บริษัท อีสเทิร์น ไทย คอนซัลติ้ง ๑๙๙๒ จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน
ลงวันที่ ๒๙ สิงหาคม ๒๕๖๔

สิ่งที่ส่งมาด้วย เอกสารแนบท้ายหนังสือเปลี่ยนแปลงบุคลากรและสารมลพิษที่วิเคราะห์
บริษัท อีสเทิร์น ไทย คอนซัลติ้ง ๑๙๙๒ จำกัด จำนวน ๑ แผ่น

ตามคำขอที่อ้างถึง บริษัท อีสเทิร์น ไทย คอนซัลติ้ง ๑๙๙๒ จำกัด ห้องปฏิบัติการวิเคราะห์
เอกชน เลขทะเบียน ว-๐๐๓ สถานที่ตั้งเลขที่ ๖๘๓ หมู่ที่ ๑๑ ถนนสุขาภิบาล ๘ ตำบลหนองขาม อำเภอศรีราชา
จังหวัดชลบุรี ขอเปลี่ยนแปลงบุคลากรและสารมลพิษที่วิเคราะห์ ต่อกรมโรงงานอุตสาหกรรม นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว มีความเห็นดังนี้

๑. ให้ยกเลิกผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ จำนวน ๑ ราย

นายภาคภูมิ บัวสวัสดิ์ ทะเบียนเลขที่ ว-๐๐๓-ค-๐๐๑๓๗

๒. ให้ยกเลิกเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๓ ราย

๑) นางสาวนอรอุมา ปาระ ทะเบียนเลขที่ ว-๐๐๓-จ-๐๐๐๖

๒) นางสาวสุทธิดา สร้างแก้ว ทะเบียนเลขที่ ว-๐๐๓-จ-๐๐๐๘

๓) นางสาวดวงสุดา แสนวันดี ทะเบียนเลขที่ ว-๐๐๓-จ-๐๐๒๕

๓. ให้เพิ่มเจ้าหน้าที่ห้องปฏิบัติการวิเคราะห์เอกชน จำนวน ๑ ราย

นายวรารุช อารีเอื้อ ทะเบียนเลขที่ ว-๐๐๓-จ-๐๐๒๖

๔. ให้เพิ่มขอบข่ายชนิดสารมลพิษที่วิเคราะห์ในน้ำใต้ดิน และดิน ตามสิ่งที่ส่งมาด้วย

อนึ่ง หนังสือฉบับนี้จะสิ้นสุดอายุพร้อมหนังสือต่ออายุรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
ในวันที่ ๕ กรกฎาคม ๒๕๖๙

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นางสาวปัทมวรรณ คุณประเสริฐ)

ผู้อำนวยการกองวิจัยและเตือนภัยมลพิษโรงงาน

ปฏิบัติราชการแทนอธิบดีกรมโรงงานอุตสาหกรรม

ศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก

โทร. ๐ ๓๓๑๓ ๖๐๕๙ ต่อ ๕๐๐๑-๒

ไปรษณีย์อิเล็กทรอนิกส์ eirw@diw.mail.go.th

COPY



“อุตสาหกรรมก้าวไกล ประเทศไทยก้าวหน้า ร่วมกันพัฒนา อุตสาหกรรมสีเขียว”



เอกสารแนบท้ายหนังสือเปลี่ยนแปลงบุคลากรและสารมลพิษที่วิเคราะห์

บริษัท อีสเทิร์น ไทย คอนซัลติ้ง ๑๙๙๒ จำกัด
ที่ ออก ๐๓๑๐(๓)/ ๘๓ ๔ ๕

เลขทะเบียน ว-๐๐๓
ลงวันที่ ๐๙ ตุลาคม ๒๕๖๔

ขอขยายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๙ รายการ
น้ำใต้ดิน จำนวน 4 รายการ

ลำดับที่	ชนิดสารมลพิษ	วิธีวิเคราะห์
1	Aluminum	Digestion, Inductively Coupled Plasma Method ^[1]
2	Copper	Digestion, Inductively Coupled Plasma Method ^[1]
3	Iron	Digestion, Inductively Coupled Plasma Method ^[1]
4	Molybdenum	Digestion, Inductively Coupled Plasma Method ^[1]

ดิน จำนวน 5 รายการ

ลำดับที่	ชนิดสารมลพิษ	วิธีวิเคราะห์
1	Aluminum	Digestion, Inductively Coupled Plasma Method ^[2,3]
2	Copper	Digestion, Inductively Coupled Plasma Method ^[2,3]
3	Iron	Digestion, Inductively Coupled Plasma Method ^[2,3]
4	Molybdenum	Digestion, Inductively Coupled Plasma Method ^[2,3]
5	pH	Electrometric Method ^[4]

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ที่ อว 0303/169

ใบรับรองความสามารถห้องปฏิบัติการทดสอบ

ใบรับรองฉบับนี้ให้ไว้เพื่อแสดงว่า

ห้องปฏิบัติการ บริษัท อีสเทิร์น ไทย คอนซัลติ้ง 1992 จำกัด
เลขที่ 683 หมู่ที่ 11 ถนนสุขาภิบาล 8 ตำบลหนองขาม
อำเภอศรีราชา จังหวัดชลบุรี 20230

ได้ผ่านการประเมินความสามารถห้องปฏิบัติการทดสอบตามมาตรฐาน ISO/IEC 17025 : 2017
และข้อกำหนด กฎระเบียบ และเงื่อนไขการรับรองความสามารถห้องปฏิบัติการทดสอบ
ของสำนักบริหารและรับรองห้องปฏิบัติการ กรมวิทยาศาสตร์บริการ

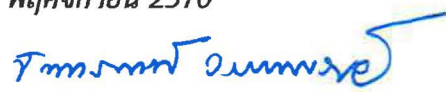
หมายเลขการรับรองระบบงานที่ ทดสอบ - 0159

รายละเอียดการรับรองดังขอบข่ายการรับรองแนบท้าย

ออกให้ ณ วันที่ : 10 มกราคม 2568

หมดอายุ วันที่ : 6 พฤศจิกายน 2570

ลงชื่อ :



(นางจันทน์ วรสรรพวิทย)

ผู้อำนวยการสำนักบริหารและรับรองห้องปฏิบัติการ

สำนักบริหารและรับรองห้องปฏิบัติการ กรมวิทยาศาสตร์บริการ
กระทรวงการอุดมศึกษา วิทยาศาสตร์ วิจัยและนวัตกรรม

ขอข่ายการรับรองความสามารถห้องปฏิบัติการทดสอบ

ชื่อห้องปฏิบัติการ : ห้องปฏิบัติการ บริษัท อีสเทิร์น ไทย คอนซัลตัง 1992 จำกัด

สถานที่ตั้ง : เลขที่ 683 หมู่ที่ 11 ถนนสุขาภิบาล 8 ตำบลหนองขาม
อำเภอศรีราชา จังหวัดชลบุรี 20230

หมายเลขการรับรองระบบงานที่ : ทดสอบ - 0159

สถานะของห้องปฏิบัติการ : ☒ ถาวร ☐ นอกสถานที่ ☐ชั่วคราว ☐เคลื่อนที่

ลำดับ ที่	วัสดุ / ผลิตภัณฑ์ที่ทดสอบ	รายการที่ทดสอบ / ช่วงของการทดสอบ	วิธีทดสอบ / เทคนิคที่ใช้
1	น้ำ	- ซีโอดี 40 mg/L ถึง 5 000 mg/L - โปรท 0.001 mg/L ถึง 0.02 mg/L - บีโอดี 2 mg/L ถึง 5 000 mg/L	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24 th ed., 2023, part 5220 C Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24 th ed., 2023, part 3112 B Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24 th ed., 2023, part 5210 B

ออกครั้งแรก ณ วันที่ 21 พฤศจิกายน 2560

ฉบับที่ 5

สำนักบริหารและรับรองห้องปฏิบัติการ กรมวิทยาศาสตร์บริการ กระทรวงการอุดมศึกษา วิทยาศาสตร์ วิจัย และนวัตกรรม

ขอข่ายการรับรองความสามารถห้องปฏิบัติการทดสอบ

ชื่อห้องปฏิบัติการ : ห้องปฏิบัติการ บริษัท อีสเทิร์น ไทย คอนซัลติง 1992 จำกัด

สถานที่ตั้ง : เลขที่ 683 หมู่ที่ 11 ถนนสุขาภิบาล 8 ตำบลหนองขาม
อำเภอศรีราชา จังหวัดชลบุรี 20230

หมายเลขการรับรองระบบงานที่ : ทดสอบ - 0159

สถานะของห้องปฏิบัติการ : ☒ ถาวร ☐ นอกสถานที่ ☐ชั่วคราว ☐เคลื่อนที่

ลำดับ ที่	วัสดุ / ผลิตภัณฑ์ที่ทดสอบ	รายการที่ทดสอบ / ช่วงของการทดสอบ	วิธีทดสอบ / เทคนิคที่ใช้
1 (ต่อ)	น้ำ	- สารที่ละลายได้ทั้งหมด ที่อุณหภูมิ 180 °C 25 mg/L ถึง 10 000 mg/L - สารแขวนลอยทั้งหมด ที่อุณหภูมิ 103 °C ถึง 105 °C 5 mg/L ถึง 2 000 mg/L - ฟลูออไรด์ 0.5 mg/L ถึง 10 mg/L	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 2540 C Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 2540 D Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 4500-F⁻ C

ออกครั้งแรก ณ วันที่ 21 พฤศจิกายน 2560

ฉบับที่ 5

สำนักบริหารและรับรองห้องปฏิบัติการ กรมวิทยาศาสตร์บริการ กระทรวงการอุดมศึกษา วิทยาศาสตร์ วิจัย และนวัตกรรม

ขอข่ายการรับรองความสามารถห้องปฏิบัติการทดสอบ

ชื่อห้องปฏิบัติการ : ห้องปฏิบัติการ บริษัท อีสเทิร์น ไทย คอนซัลตติ้ง 1992 จำกัด

สถานที่ตั้ง : เลขที่ 683 หมู่ที่ 11 ถนนสุขาภิบาล 8 ตำบลหนองขาม
อำเภอศรีราชา จังหวัดชลบุรี 20230

หมายเลขการรับรองระบบงานที่ : ทดสอบ - 0159

สถานะของห้องปฏิบัติการ : ☒ ถาวร ☐ นอกสถานที่ ☐ชั่วคราว ☐ เคลื่อนที่

ลำดับ ที่	วัสดุ / ผลิตภัณฑ์ที่ทดสอบ	รายการที่ทดสอบ / ช่วงของการทดสอบ	วิธีทดสอบ / เทคนิคที่ใช้
1 (ต่อ)	น้ำ	- คลอไรด์ 50 mg/L ถึง 2 000 mg/L - ความกระด้างทั้งหมด (คำนวณเป็นแคลเซียมคาร์บอเนต) 50 mg/L ถึง 500 mg/L	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24 th ed., 2023, part 4500-Cl ⁻ B Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24 th ed., 2023, part 2340 C

ออกครั้งแรก ณ วันที่ 21 พฤศจิกายน 2560

ฉบับที่ 5

สำนักบริหารและรับรองห้องปฏิบัติการ กรมวิทยาศาสตร์บริการ กระทรวงการอุดมศึกษา วิทยาศาสตร์ วิจัย และนวัตกรรม

ขอข่ายการรับรองความสามารถห้องปฏิบัติการทดสอบ

ชื่อห้องปฏิบัติการ : ห้องปฏิบัติการ บริษัท อีสเทิร์น ไทย คอนซัลติง 1992 จำกัด

สถานที่ตั้ง : เลขที่ 683 หมู่ที่ 11 ถนนสุขาภิบาล 8 ตำบลหนองขาม
อำเภอศรีราชา จังหวัดชลบุรี 20230

หมายเลขการรับรองระบบงานที่ : ทดสอบ - 0159

สถานะของห้องปฏิบัติการ : ☒ ถาวร ☐ นอกสถานที่ ☐ชั่วคราว ☐ เคลื่อนที่

ลำดับ ที่	วัสดุ / ผลิตภัณฑ์ที่ทดสอบ	รายการที่ทดสอบ / ช่วงของการทดสอบ	วิธีทดสอบ / เทคนิคที่ใช้
2	น้ำเสีย	- ซีโอดี 40 mg/L ถึง 5 000 mg/L - โปรท 0.001 mg/L ถึง 0.02 mg/L - บีโอดี 2 mg/L ถึง 5 000 mg/L	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24 th ed., 2023, part 5220 C Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24 th ed., 2023, part 3112 B Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24 th ed., 2023, part 5210 B

ออกครั้งแรก ณ วันที่ 21 พฤศจิกายน 2560

ฉบับที่ 5

สำนักบริหารและรับรองห้องปฏิบัติการ กรมวิทยาศาสตร์บริการ กระทรวงการอุดมศึกษา วิทยาศาสตร์ วิจัย และนวัตกรรม

ขอข่ายการรับรองความสามารถห้องปฏิบัติการทดสอบ

ชื่อห้องปฏิบัติการ : ห้องปฏิบัติการ บริษัท อีสเทิร์น ไทย คอนซัลติง 1992 จำกัด

สถานที่ตั้ง : เลขที่ 683 หมู่ที่ 11 ถนนสุขาภิบาล 8 ตำบลหนองขาม
อำเภอศรีราชา จังหวัดชลบุรี 20230

หมายเลขการรับรองระบบงานที่ : ทดสอบ - 0159

สถานะของห้องปฏิบัติการ : ☒ ถาวร ☐ นอกสถานที่ ☐ชั่วคราว ☐เคลื่อนที่

ลำดับ ที่	วัสดุ / ผลิตภัณฑ์ที่ทดสอบ	รายการที่ทดสอบ / ช่วงของการทดสอบ	วิธีทดสอบ / เทคนิคที่ใช้
2 (ต่อ)	น้ำเสีย	- สารที่ละลายได้ทั้งหมด ที่อุณหภูมิ 180 °C 25 mg/L ถึง 10 000 mg/L - สารแขวนลอยทั้งหมด ที่อุณหภูมิ 103 °C ถึง 105 °C 5 mg/L ถึง 2 000 mg/L - ฟลูออไรด์ 0.5 mg/L ถึง 10 mg/L	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 2540 C Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 2540 D Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 4500-F⁻ C

ออกครั้งแรก ณ วันที่ 21 พฤศจิกายน 2560

ฉบับที่ 5

สำนักบริหารและรับรองห้องปฏิบัติการ กรมวิทยาศาสตร์บริการ กระทรวงการอุดมศึกษา วิทยาศาสตร์ วิจัย และนวัตกรรม

ขอข่ายการรับรองความสามารถห้องปฏิบัติการทดสอบ

ชื่อห้องปฏิบัติการ : ห้องปฏิบัติการ บริษัท อีสเทิร์น ไทย คอนซัลตติ้ง 1992 จำกัด

สถานที่ตั้ง : เลขที่ 683 หมู่ที่ 11 ถนนสุขาภิบาล 8 ตำบลหนองขาม
อำเภอศรีราชา จังหวัดชลบุรี 20230

หมายเลขการรับรองระบบงานที่ : ทดสอบ - 0159

สถานะของห้องปฏิบัติการ : ☒ ถาวร ☐ นอกสถานที่ ☐ชั่วคราว ☐เคลื่อนที่

ลำดับ ที่	วัสดุ / ผลิตภัณฑ์ที่ทดสอบ	รายการที่ทดสอบ / ช่วงของการทดสอบ	วิธีทดสอบ / เทคนิคที่ใช้
2 (ต่อ)	น้ำเสีย	- คลอไรด์ 50 mg/L ถึง 2 000 mg/L - ความกระด้างทั้งหมด (คำนวณเป็นแคลเซียมคาร์บอเนต) 50 mg/L ถึง 500 mg/L	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24 th ed., 2023, part 4500-Cl ⁻ B Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24 th ed., 2023, part 2340 C
3	น้ำทะเล	- สารแขวนลอยทั้งหมด ที่อุณหภูมิ 103 °C ถึง 105 °C 5 mg/L ถึง 100 mg/L	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24 th ed., 2023, part 2540 D

ออกให้ ณ วันที่ : 10 มกราคม 2568

ลงชื่อ :



(นางจันทร์รัตน์ วรสรรพวิทย)

ผู้อำนวยการสำนักบริหารและรับรองห้องปฏิบัติการ

ออกครั้งแรก ณ วันที่ 21 พฤศจิกายน 2560

ฉบับที่ 5



ใบรับรองเลขที่ 23-LB0251
(Certificate No.)

ใบรับรองระบบงาน (Certificate of Accreditation)

อาศัยอำนาจตามความในพระราชบัญญัติการมาตรฐานแห่งชาติ พ.ศ. ๒๕๕๑
(By Virtue of National Standardization Act B.E. 2551 (2008))

เลขาธิการสำนักงานมาตรฐานผลิตภัณฑ์อุตสาหกรรม
(Secretary-General, Thai Industrial Standards Institute)

ออกใบรับรองฉบับนี้ให้
(Issues this certificate to)

บริษัท อีสเทิร์น ไทย คอนซัลติง 1992 จำกัด
(Eastern Thai Consulting 1992 Co., Ltd.)

ตั้งอยู่เลขที่
(Address)

๖๘๓ หมู่ที่ ๑๑ ถนนสุขาภิบาล ๘ ตำบลหนองขาม อำเภอสรีราชา จังหวัดชลบุรี
(683 Moo 11, Sukhapibarn 8 Road, Nongkham, Sriracha, Chonburi)

ได้รับการรับรองความสามารถ
(Certificate of competence)

ตามมาตรฐานเลขที่ มอก. ๑๗๐๒๕ - ๒๕๖๑
(Standard No. TIS 17025-2561 (2018) (ISO/IEC 17025: 2017))

ข้อกำหนดทั่วไปว่าด้วยความสามารถของ ห้องปฏิบัติการทดสอบและห้องปฏิบัติการสอบเทียบ
(General requirements for the competence of testing and calibration laboratories)

หมายเลขการรับรองที่ ทดสอบ ๑๗๑๒
(Accreditation No. Testing 1712)

โดยมีรายละเอียดสาขาและขอบข่ายที่ได้ใบรับรอง แสดงไว้ใน QR CODE และ www.tisi.go.th
(Details of the scheme and scope of the certificate are shown in QR CODE and www.tisi.go.th)

ออกให้ ณ วันที่ ๒๓ สิงหาคม พ.ศ. ๒๕๖๖
(Issue date : 23 August B.E. 2566 (2023))

(นายเอกนิติ รมยานนท์)

รองเลขาธิการสำนักงานมาตรฐานผลิตภัณฑ์อุตสาหกรรม

ปฏิบัติราชการแทน

เลขาธิการสำนักงานมาตรฐานผลิตภัณฑ์อุตสาหกรรม



c88f6993



รายละเอียดสาขาและขอบข่ายใบรับรองห้องปฏิบัติการ

(Scope of Accreditation for Testing)

ใบรับรองเลขที่ 23-LB0251

(Certification No. 23-LB0251)



ชื่อห้องปฏิบัติการ

(Laboratory Name)

บริษัท อีสเทิร์น ไทย คอนซัลติง 1992 จำกัด

(Eastern Thai Consulting 1992 Co.,Ltd.)

หมายเลขการรับรองที่

(Accreditation No.)

ทดสอบ 1712

(Testing 1712)

ฉบับที่ 01

(Issue No.01)

ออกให้ตั้งแต่วันที่ 17 กรกฎาคม พ.ศ. 2566

(Valid from)

(17 July B.E.2566 (2023))

ถึงวันที่ 16 กรกฎาคม พ.ศ. 2571

(Until) (16 July B.E.2571 (2028))

สถานภาพห้องปฏิบัติการ

(Laboratory status)

☒ ถาวร

(Permanent)

☐ นอกสถานที่

(Site)

☐ชั่วคราว

(Temporary)

☐เคลื่อนที่

(Mobile)

☐หลายสถานที่

(Multisite)

สาขาการทดสอบ (Field of Testing)	รายการทดสอบ (Parameter)	วิธีทดสอบ (Test Method)
สาขาสังแวดล้อม (Environmental field) 1. น้ำ (Water)	- โลหะหนัก (Heavy metal) - โครเมียม (Cr) 0.03 mg/L to 2.00 mg/L - ทองแดง (Cu) 0.03 mg/L to 2.00 mg/L - เหล็ก (Fe) 0.03 mg/L to 2.00 mg/L - ตะกั่ว (Pb) 0.01 mg/L to 1.00 mg/L - นิกเกิล (Ni) 0.03 mg/L to 2.00 mg/L - อลูมิเนียม (Al) 0.10 mg/L to 2.00 mg/L - แบเรียม (Ba) 0.03 mg/L to 2.00 mg/L - แคดเมียม (Cd) 0.003 mg/L to 1.00 mg/L - แมงกานีส (Mn) 0.03 mg/L to 2.00 mg/L - เงิน (Ag) 0.05 mg/L to 2.00 mg/L - สังกะสี (Zn) 0.03 mg/L to 2.00 mg/L	- Standard Method for the Examination of Water and Wastewater, APHA, AWWA, WEF 23rd edition 2017. Part 3030 F and 3120 B

กระทรวงอุตสาหกรรมสำนักงานมาตรฐานผลิตภัณฑ์อุตสาหกรรม

(Ministry of Industry, Thai Industrial Standards Institute)

รายละเอียดสาขาและขอบข่ายใบรับรองห้องปฏิบัติการ

(Scope of Accreditation for Testing)

ใบรับรองเลขที่ 23-LB0251

(Certification No. 23-LB0251)



ฉบับที่ 01

(Issue No.)

ออกให้ตั้งแต่วันที่ 17 กรกฎาคม พ.ศ. 2566

(Valid from)

(17 July B.E.2566 (2023))

ถึงวันที่ 16 กรกฎาคม พ.ศ. 2571

(Until) (16 July B.E.2571 (2028))

สถานภาพห้องปฏิบัติการ

(Laboratory status)

☒ ถาวร

(Permanent)

☐ นอกสถานที่

(Site)

☐ชั่วคราว

(Temporary)

☐เคลื่อนที่

(Mobile)

☐หลายสถานที่

(Multisite)

สาขาการทดสอบ (Field of Testing)	รายการทดสอบ (Parameter)	วิธีทดสอบ (Test Method)
สาขาสิ่งแวดล้อม (Environmental field) 1. น้ำ (ต่อ) (Water) (cont.) 2. น้ำเสีย (Wastewater)	- ไขมันและน้ำมัน (Oil & Grease) 3.0 mg/L - 20.0 mg/L - โลหะหนัก (Heavy metal) - โครเมียม (Cr) 0.03 mg/L to 2.00 mg/L - ทองแดง (Cu) 0.03 mg/L to 2.00 mg/L - เหล็ก (Fe) 0.03 mg/L to 2.00 mg/L - ตะกั่ว (Pb) 0.03 mg/L to 2.00 mg/L - นิกเกิล (Ni) 0.03 mg/L to 2.00 mg/L - อลูมิเนียม (Al) 0.10 mg/L to 2.00 mg/L - แบเรียม (Ba) 0.03 mg/L to 2.00 mg/L - แคดเมียม (Cd) 0.03 mg/L to 2.00 mg/L	- Standard Method for the Examination of Water and Wastewater, APHA, AWWA, WEF 23rd edition 2017. Part 5520 B - Standard Method for the Examination of Water and Wastewater, APHA, AWWA, WEF 23rd edition 2017. Part 3030 F and 3120 B

รายละเอียดสาขาและขอบข่ายใบรับรองห้องปฏิบัติการ

(Scope of Accreditation for Testing)

ใบรับรองเลขที่ 23-LB0251

(Certification No. 23-LB0251)



ฉบับที่ 01

(Issue No.01)

ออกให้ตั้งแต่วันที่ 17 กรกฎาคม พ.ศ. 2566

(Valid from)

(17 July B.E.2566 (2023))

ถึงวันที่ 16 กรกฎาคม พ.ศ. 2571

(Until) (16 July B.E.2571 (2028))

สถานภาพห้องปฏิบัติการ

(Laboratory status)

☒ ถาวร

(Permanent)

☐ นอกสถานที่

(Site)

☐ชั่วคราว

(Temporary)

☐เคลื่อนที่

(Mobile)

☐หลายสถานที่

(Multisite)

สาขาการทดสอบ (Field of Testing)	รายการทดสอบ (Parameter)	วิธีทดสอบ (Test Method)
สาขาสังแวดล้อม (Environmental field) 2. น้ำเสีย (ต่อ) (Wastewater) (cont.)	- โลหะหนัก (ต่อ) (Heavy metal) (cont.) • แมงกานีส (Mn) 0.03 mg/L to 2.00 mg/L • เงิน (Ag) 0.05 mg/L to 2.00 mg/L • สังกะสี (Zn) 0.03 mg/L to 2.00 mg/L - ไขมันและน้ำมัน (Oil & Grease) 3.0 mg/L - 20.0 mg/L	- Standard Method for the Examination of Water and Wastewater, APHA, AWWA, WEF 23rd edition 2017. Part 3030 F and 3120 B - Standard Method for the Examination of Water and Wastewater, APHA, AWWA, WEF 23rd edition 2017. Part 5520 B

รายละเอียดสาขาและขอบข่ายใบรับรองห้องปฏิบัติการ

(Scope of Accreditation for Testing)

ใบรับรองเลขที่ 23-LB0251

(Certification No. 23-LB0251)



ฉบับที่ 01

(Issue No.)

ออกให้ตั้งแต่วันที่ 17 กรกฎาคม พ.ศ. 2566

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ถึงวันที่ 16 กรกฎาคม พ.ศ. 2571

(Until) (16 July B.E.2571 (2028))

สถานภาพห้องปฏิบัติการ

(Laboratory status)

☐ ถาวร

(Permanent)

☒ นอกสถานที่

(Site)

☐ชั่วคราว

(Temporary)

☐เคลื่อนที่

(Mobile)

☐หลายสถานที่

(Multisite)

สาขาการทดสอบ (Field of Testing)	รายการทดสอบ (Parameter)	วิธีทดสอบ (Test Method)
สาขาสีงแวดล้อม (Environmental field) 3.พื้นที่การทำงาน (Workplace)	- ระดับเสียง (Sound Level) • ระดับเสียงเฉลี่ย L_{eqT} ช่วง 30 - 130 dB(A) • ระดับเสียงสูงสุด L_{max} ช่วง 30 - 130 dB(A)	- ISO 11202:2010 - ประกาศกระทรวงอุตสาหกรรม เรื่องมาตรการคุ้มครองความปลอดภัยในการประกอบกิจการโรงงานเกี่ยวกับสภาวะแวดล้อมในการทำงาน พ.ศ.2546 ลงวันที่ 6 พ.ย. 2546 (Notification of The Ministry of Industry B.E. 2546 (2003) on the Safety Protection Measures in Factory Regarding Working Area Environment, dated November 6, 2003) - ประกาศกรมสวัสดิการและคุ้มครองแรงงาน เรื่องมาตรฐานระดับเสียงที่ยอมให้ลูกจ้างได้รับเฉลี่ยตลอดระยะเวลาการทำงานในแต่ละวัน ลงวันที่ 13 ธ.ค. 2560 (Notification of the Department of Labor Protection and Welfare on the standard of noise level that employees are allowed to receive in average period of work each day, dated December 13, 2017.) - ประกาศกรมสวัสดิการและคุ้มครองแรงงาน เรื่องหลักเกณฑ์ วิธีการตรวจวัดและการวิเคราะห์สภาวะการทำงานเกี่ยวกับระดับความร้อน แสงสว่าง หรือเสียง รวมทั้งระยะเวลาและประเภทกิจการที่ต้องดำเนินการ ลงวันที่ 8 ก.พ. 2561 (Notification of the Department of Labor Protection and Welfare on Criteria, Measurement Methods, and Analysis of Working Conditions Regarding Heat, Light, or Noise Levels, Including Duration and Types of Businesses to Be Performed, dated February 8, 2018.)

กระทรวงอุตสาหกรรมสำนักงานมาตรฐานผลิตภัณฑ์อุตสาหกรรม

(Ministry of Industry, Thai Industrial Standards Institute)

รายละเอียดสาขาและขอบข่ายใบรับรองห้องปฏิบัติการ

(Scope of Accreditation for Testing)

ใบรับรองเลขที่ 23-LB0251

(Certification No. 23-LB0251)



ฉบับที่ 01

(Issue No.)

ออกให้ตั้งแต่วันที่ 17 กรกฎาคม พ.ศ. 2566

(Valid from)

(17 July B.E.2566 (2023))

ถึงวันที่ 16 กรกฎาคม พ.ศ. 2571

(Until) (16 July B.E.2571 (2028))

สถานภาพห้องปฏิบัติการ

(Laboratory status)

☐ ถาวร

(Permanent)

☒ นอกสถานที่

(Site)

☐ชั่วคราว

(Temporary)

☐เคลื่อนที่

(Mobile)

☐หลายสถานที่

(Multisite)

สาขาการทดสอบ (Field of Testing)	รายการทดสอบ (Parameter)	วิธีทดสอบ (Test Method)
สาขาสิ่งแวดล้อม (Environmental field) 4. บรรยากาศ (Ambient)	- ระดับเสียง (Sound Level) • ระดับเสียงเฉลี่ย LeqT ช่วง 30.0 - 130.0 dB(A) • ระดับเสียงสูงสุด Lmax ช่วง 30.0 - 130.0 dB(A)	- ISO 1996 - 1 : 2016 - ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 15 (2540) เรื่องกำหนด มาตรฐาน ระดับเสียงโดยทั่วไป ลงวันที่ 12 มี.ค. 2540 (Notification of The National Environmental Board Volume 15 B.E. 2540 (1997) on the general noise level standards, dated March 12, 1997) - ประกาศกรมควบคุมมลพิษ เรื่อง การ คำนวณค่าระดับเสียง ลงวันที่ 11 ส.ค. 2540 (Notification of the Pollution Control Department on the calculation of the noise level, dated August 11, 1997.) - ประกาศกรมโรงงานอุตสาหกรรม เรื่อง วิธีการตรวจวัดระดับเสียงการรบกวน ระดับ เสียงเฉลี่ย 24 ชั่วโมง และระดับเสียงสูงสุดที่ เกิดจากการประกอบกิจการโรงงาน พ.ศ. 2553 ลงวันที่ 20 ธ.ค. 2553 (Notification of the Department of Industrial Works on Methods for Measuring Noise Annoyance, Noise Levels 24-Hour Average and Maximum Noise Level from Factory B.E. 2553, dated December 20, 2010.)

ANALYTICAL BALANCE (DU)

Model : XS205DU

Serial No. : B344940005



Certificate No. : 25-205/16

Sample Code : 25-90375-006

CERTIFICATE OF CALIBRATION

Customer : EASTERN THAI CONSULTING 1992 CO., LTD.
683 Moo 11, Sukhapibarn 8 Rd, Nongkham,
Siracha, Chonburi 20230

Location of Calibration : EASTERN THAI CONSULTING 1992 CO., LTD.
(Analytical Balance Room)

Equipment : ELECTRONIC BALANCE

Manufacturer : METTLER TOLEDO

Model : XS205DU

Serial No. : B344940005

ID No. : LABE 05/3

Date of Receipt : 26 November 2025

Date of Calibration : 26 November 2025

Calibrated by : Mr. Thanadol Pholthep
Scientist

Approved by :
(Mr. Somchai Neampunt)
Signed for Director

Issue date : 28 November 2025

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

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

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 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 Asia Medical and Agricultural Laboratory and Research Center Public Company Limited (AMARC).



Certificate No. : 25-205/16

Sample Code : 25-90375-006

REPORT OF CALIBRATION

Equipment : ELECTRONIC BALANCE
Manufacturer : METTLER TOLEDO
Model : XS205DU
Capacity : Max 81 g / 200 g
Resolution : 0.00001 g / 0.0001 g
Serial No. : B344940005
ID No. : LABE 05/3

Result of Calibration

1. Test weight and repeatability of reading

Repeatability is a measure of the ability of a balance to supply the same result in repetitive weighings with one and the same load under the same measurement condition. The measurement of the repeatability must include both the balance specifications and the ambient (vibration, fluctuating air current/temperature/humidity, etc.) Operator handling of the balance is also included in the standard deviation.

Unit : g	Range : 81	☐ Before adjustment	☐ After adjustment
Nominal value	40	80	
Standard weight	40.000087	80.000088	
Average reading of indicator	40.000004	80.000004	
Standard deviation	0.000007	0.000007	
Unit : g	Range : 200	☐ Before adjustment	☐ After adjustment
Nominal value	100	200	
Standard weight	99.999988	200.000015	
Average reading of indicator	99.99999	199.9997	
Standard deviation	0.000005	0.000005	

ANALYTICAL BALANCE

Model : MS204TS/00

Serial No. : B904136539



Certificate No. : 25-205714

Sample Code : 25-90375-004

CERTIFICATE OF CALIBRATION

Customer : EASTERN THAI CONSULTING 1992 CO., LTD.
683 Moo 11, Sukhapibarn 8 Rd, Nongkham,
Siracha, Chonburi 20230

Location of Calibration : EASTERN THAI CONSULTING 1992 CO., LTD.
(Analytical Balance Room)

Equipment : ELECTRONIC BALANCE

Manufacturer : METTLER TOLEDO

Model : MS204TS/00

Serial No. : B904136539

ID No. : LABE 05/4

Date of Receipt : 26 November 2025

Date of Calibration : 26 November 2025

Calibrated by : Mr. Pisek Into

Scientist

Issue date : 28 November 2025

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

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

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 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 Asia Medical and Agricultural Laboratory and Research Center Public Company Limited (AMARC)



Certificate No. : 25-205714

Sample Code : 25-90375-004

REPORT OF CALIBRATION

Equipment : ELECTRONIC BALANCE

Manufacturer : METTLER TOLEDO

Model : MS204TS/00

Capacity : Max 220 g

Resolution : 0.0001 g

Serial No. : B904136539

ID No. : LABE 05/4

Result of Calibration

1. Test weight and repeatability of reading

Repeatability is a measure of the ability of a balance to supply the same result in repetitive weighings with one and the same load under the same measurement condition. The measurement of the repeatability must include both the balance specifications and the ambient (vibration, fluctuating air current/temperature/humidity, etc.) Operator handling of the balance is also included in the standard deviation.

Unit : g	Range : 220	Before adjustment	After adjustment
No adjustment	Nominal value	100 200 100 200	
Adjustment	Standard weight	100.000045 200.000047 100.000045 200.000047	
	Average reading of indicator	100.00002 200.00004 100.00000 200.00000	
	Standard deviation	0.00005 0.00006 0.00005 0.00005	

Unit : Range : Before adjustment After adjustment

Nominal value

Standard weight

Average reading of indicator

Standard deviation

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Certificate No. : 25-205714
Sample Code : 25-90375-004

Page 3 of 4

REPORT OF CALIBRATION

Result of Calibration

2. Sensitivity or value of a scale division

Change in the output variable of a measuring instrument divided by the associated change in the input variable.

Unit : g

Range : 220		Range :	
Test Point	Sensitivity, S	Test Point	Sensitivity, S
0	0.9972		
100	0.9969		
200	0.9969		

3. Departure of indication from nominal value, Linearity

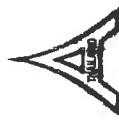
Unit : g

Nominal Value	Standard Value	Average Reading of Indicator	Correction Value	Expanded Uncertainty	Coverage Factor (k)
Unload	0.0000000	0.0000	0.0000	0.000094	2.01
0.01	0.0100031	0.0100	0.0000	0.000094	2.01
0.05	0.0500055	0.0500	0.0000	0.000094	2.01
0.1	0.1000023	0.1000	0.0000	0.000094	2.01
1	1.0000136	1.0000	0.0000	0.000095	2.01
5	5.0000210	5.0000	0.0000	0.000096	2.01
10	10.000002	10.0000	0.0000	0.000097	2.01
50	50.000016	50.0000	0.0000	0.00012	2.01
100	100.000045	100.0000	0.0000	0.00016	2.00
150	150.000061	150.0000	0.0001	0.00022	2.00
200	200.000047	200.0000	0.0000	0.00027	2.00

Signature

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%. The standard uncertainty of measurement has been determined in accordance with UKAS M3003.

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Certificate No. : 25-205714
Sample Code : 25-90375-004

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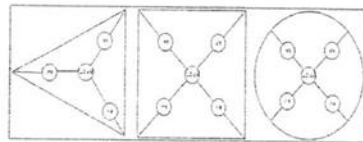
REPORT OF CALIBRATION

Result of Calibration :

4. Eccentric or off-centre loading

Deviation of the measurement value through off - center (eccentric) loading. The corner load increases with the weight of the load and its removal from the center of the pan support.

Weighing pan ☐ Triangular ☐ Rectangular ☒ Circle
Test weight : 100
Unit : g



Range	Position	Reading of Indicator	Reading of Indicator
1	220	100.0000	
2		100.0001	
3		99.9999	
4		100.0001	
5		99.9999	
6		100.0000	
Maximum difference		0.0001	

Condition of Calibration

1. Calibration Method : WI CL-004 base on UKAS LAB 14: 2019

2. The result of calibration was found accurate as shown on date and place of calibration only

3. Condition of Calibration Item: Normal

4. This certification is traceable to the International System of Unit maintained at :
Through the reference standard laboratory of Asia Medical and Agricultural Laboratory and Research Center Public

Company Limited (Instrument number 1)

5. Reference standard instrument :

Instrument : STANDARD WEIGHT 1 mg to 1 kg
Class : E2
ID.No. : LB-WE-79

Certificate No. : 25-142885

Due Date : 27 July 2026

End of Report

Signature

COPY

BAROMETER

Serial No. : N/A[S41020124]



CALIBRATION LABORATORY CO., LTD.

210-11, 14, 55 Soi Prasert Manukit 29 Yaek 4, Prasert Manukit Rd., Ladphrao, Bangkok 10230
Tel 02-578-0353-4 Fax 02-578-2672 www.calibration.com Email: sale@calibration.com



CLC
Accredited
ISO/IEC 17025

CERTIFICATE OF CALIBRATION

FOR

NOMENCLATURE : BAROMETER
MANUFACTURER : BARIO
MODEL / TYPE : N/A
SERIAL NO. : N/A[S41020124]
CLID. NO. : 212500828
JOB CONTROL NO. : 250507051351
CALIBRATION SERVICE : ☒ IN-LABORATORY ☐ ON-SITE

CUSTOMER : EASTERN THAI CONSULTING 1992 CO., LTD.
683 MOO 11, SUKHAPIBARN 8 RD,
NONGKHAM, SRIRACHA, CHONBURI 20230

DATE OF RECEIVED : 07 May 2025

DATE OF ISSUED : 09 May 2025

The report of calibration shall not be reproduced except in full without approval of the Calibration Laboratory Co., Ltd.

Calibrated By :

Sittipong Pimdee
Calibration Engineer



Approved By :

Mongkol Yotsoontorn
Authorized Signatory
09 May 2025

This Calibration Certificate documents the traceability to national standards, which realize the units of measurement according to the International System of Units (SI)

Certificate No. Q25051351

F3-011-05/12-23

page 1 of 3



@ckcalibration



CALIBRATION LABORATORY CO., LTD.

210-11, 14, 55 Soi Prasert Manukit 29 Yaek 4, Prasert Manukit Rd., Ladphrao, Bangkok 10230
Tel 02-578-0353-4 Fax 02-578-2672 www.calibration.com Email: sale@calibration.com



CLC
Accredited
ISO/IEC 17025

REPORT OF CALIBRATION

FOR

NOMENCLATURE : BAROMETER
MANUFACTURER : BARIO
MODEL / TYPE : N/A
SERIAL NO. : N/A[S41020124]
DATE OF CALIBRATION : 08 May 2025

ENVIRONMENT CONDITIONS :

Temperature : $(23 \pm 2) ^\circ\text{C}$

Relative Humidity : $(55 \pm 10) \% \text{RH}$

PROCEDURE USED :

This instrument was calibrated under procedure No. CLC-CPPP-08 according to DKD-R 6-1 as calibration guidelines.

The calibration was performed by direct measurement with Reference Pressure Monitor which maintained by the Calibration Laboratory Co., Ltd.

REFERENCE STANDARD USED :

Reference Pressure Monitor, Fluke Model RPM3 S/N. 829.

TRACEABILITY :

The measurements are traceable to International System of Units (SI), through National Institute of Metrology (Thailand).
Certificate No. MP-0245-24, Due Date 11 November 2025.

UNCERTAINTY :

The reported uncertainty is based on a standard uncertainty multiplied by coverage factor of $k = 2$. It has been evaluated according to the "Calibration of Pressure Gauges (DKD-R 6-1)" which provides a level of confidence approximately 95%.

Certificate No. Q25051351

F3-011-05/12-23

page 2 of 3



@ckcalibration



CALIBRATION LABORATORY CO., LTD.

2910 1114, 55 Soi Pongrat Manukit 29 Yothin 4, Pongrat Manukit Rd. Lumphini, Bangkok 10250
Tel: 02-566 0254 F.A. 09-578-2672 www.ccl-lab.com E-mail: ccl@calibration.com



ISO 9001:2015



CONDITION OF CALIBRATION ITEM : RECEIVED IN GOOD OPERATIONAL CONDITION
MEASUREMENT RESULTS : (X) without adjustment () adjustment

The DUC was exercised by applying a known pressure from its zero to full scale 1 times. Then 2 series of known gauge pressure were applied. The STD reading were recorded and the means value were reported in the table below.

CALIBRATION DATA

CORRECTION OF PRESSURE

DUC Test point (hPa)	STD Reading (hPa)		Correction (hPa)	
	Up	Down	Up	Down
990	990.7	990.7	+0.7	+0.7
1000	1000.7	1000.8	+0.7	+0.8
1010	1010.8	1010.8	+0.8	+0.8
1020	1020.8	1020.9	+0.8	+0.9
1030	1030.9	1030.9	+0.9	+0.9

Uncertainty of measurement ± 0.7 hPa

Transmitting fluid : Air

Note: The Scope of Accredited ANAB Certificate No. ACDM-2814 Version 015 Page 44 of 68

This report is valid for the above stated instrument/s only.

End of Certificate

Certificate No. Q25051351

F3-011-05/12-23

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actcalibration

BAROMETER

Serial No. : N/A[S41020124]



CALIBRATION LABORATORY CO., LTD.

101-1, 1st Floor, Bldg. 20, Nakhon Phanom Road, Nakhon Phanom, 44000, Thailand
Tel: 09-0000-0000, Fax: 09-0000-0000, Email: info@clc.co.th



CONDITION OF CALIBRATION ITEM : RECEIVED IN GOOD OPERATIONAL CONDITION
MEASUREMENT RESULTS : (X) without adjustment () adjustment

The DUC was exercised by applying a known pressure from its zero to full scale 1 times. Then 2 series of known gauge pressure were applied. The STD reading were recorded and the means value were reported in the table below.

CALIBRATION DATA

CORRECTION OF PRESSURE

DUC Test point (hPa)	STD Reading (hPa)		Correction (hPa)	
	Up	Down	Up	Down
990	990.9	991.0	+0.9	+1.0
1000	1001.0	1001.1	+1.0	+1.1
1010	1011.2	1011.3	+1.2	+1.3
1020	1021.3	1021.4	+1.3	+1.4
1030	1031.4	1031.4	+1.4	+1.4

Uncertainty of measurement ± 0.9 hPa

Transmitting fluid : Air

Note: The Scope of Accredited ANAB Certificate No. ACDM-2814 Version 018 Page 47 of 73

This report is valid for the above stated instrument/s only.

Certificate No. Q26056453

P3-01-05/12-23

End of Certificate

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Page 3 of 3



CLC Calibration

DRY GAS METER XC-572-V

Serial No. : A2007510

Certificate Of Calibration

Method 5 Pre-Test Console Calibration - Cubic meter (m3)

Meter Console Information

Console Model : XC-572-V
 Console Serial : A2007510
 DGM Model #: SK25EX
 DGM Serial #: 00010219

Calibration Condition

Cal. Date: 24-Sep-25
 Due Date: 24-Sep-26
 Cal. Report No.: WDS-SV6809001
 Ambient Temp (°C): 25
 Pressure (mm Hg): 758
 Relative Humidity (%): 60

Factors/Conversion

Std. Temp. (°K): 298
 Std. Pressure (mm Hg): 760
 K₁ (K/mm Hg): 0.3857

Reference Equipment

WTM Model: W-NKoDa-5B WTM Cal. Due Date: Dec. 2026
 WTM Serial: 600245 Gamma: 1.0000

UUT Meter (DGM)

Reference Meter (WTM)

Run Time (minutes)	DGM Orifice (mm H ₂ O)	Volume		Outlet Temp		Volume		Outlet Temp	
		Initial	Final	Initial	Final	Initial	Final	Initial	Final
θ	P _{m(g)}	V _{int}	V _{ext}	T _{int}	T _{ext}	V _{int}	V _{ext}	T _{int}	T _{ext}
15.00	13.0	0.2808	0.4541	31	31	134.96748	135.13508	25	25
10.00	25.0	0.4844	0.6485	31	31	135.16304	135.32127	25	26
8.00	50.0	0.6702	0.8561	32	32	135.34120	135.52029	26	26
7.00	80.0	0.8899	1.0948	32	32	135.55153	135.74909	26	26
5.00	120.0	1.1160	1.2917	32	32	135.76810	135.93872	26	26

Standardized Data

Calibration Results

Test Meter		Reference Meter		Correction Factor		Flow Rate		ΔH@ (mm H ₂ O)	
Std. Volume	Std. Flow Rate	Std. Volume	Std. Flow Rate	"Gamma"	Variation	Std & Corr	0.0212 SCMM	Variation	
V _{m(std)} (m ³)	Q _{m(std)} m ³ /min	V _{w(std)} (m ³)	Q _{w(std)} m ³ /min	(Y)	(ΔY)	Q _{m(std/corr)}	ΔH _o	ΔΔH _o	
0.167	0.011	0.164	0.011	0.985	0.006	0.011	47.078	0.689	
0.158	0.016	0.155	0.015	0.980	0.000	0.015	45.402	-0.988	
0.179	0.022	0.175	0.022	0.978	-0.002	0.022	45.587	-0.803	
0.198	0.028	0.193	0.028	0.976	-0.004	0.028	46.157	-0.233	
0.170	0.034	0.167	0.033	0.979	0.000	0.033	47.725	1.335	
				0.980	= Y Avg.		46.390	= ΔH@ Avg.	

Pass/Fail Result: **Pass**

Note: For Calibration Factor Y, the ratio of the reading of the calibration meter to the dry gas meter, acceptable tolerance of individual values from the average is ±0.02

Note: For ΔH_o, orifice pressure differential that equates to 0.73cfm (0.0212m³/min) at standard temperature and pressure, acceptable tolerance of individual values from the average is ±0.2inches (5.1mm) H₂O

Approved By: _____

(Patpasu Chaisana)
 Service Manager

WISDOM
SCIENCE

Date: 24-Sep-25

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Certificate of Calibration - Supplemental

METHOD 6 PRE-TEST CONSOLE CALIBRATION

Nomenclature

Equations

Calibration Train

P_o - Barometric Pressure
 DGM - Dry Gas Meter
 K₁ - Constant based on standard temp and press
 θ - Run time, in minutes
 P_m - ΔH (Meter Pressure, gauge)
 V_m - Volume collected by test meter, corrected for STP
 Q_{m(std)} - Calculated flow rate of test meter
 K' - Critical orifice coefficient
 P_w - Measured pressure of reference meter
 T_w - Temperature measured in reference meter
 T_m - Temperature measured in test meter
 Y - Ratio of volume collected from test meter and orifice
 sc - Scaling Factor
 Counts_{std} - Number of pulse counts, standardized
 Counts_{total} - Number of raw pulse counts of a calibration run

$$V_{w(std)} = Y * K_1 \frac{V_w * (P_{bar} + \frac{P_m(g)}{13.6})}{T_w}$$

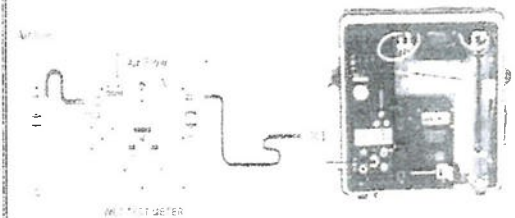
$$V_{m(std)} = Counts_{std} * Y_{sc(avg)}$$

$$Counts_{std} = K_1 \frac{C_{total} * (P_{bar} + \frac{P_m}{13.6})}{T_m}$$

$$Q_{w(std)} = \frac{V_{w(std)}}{\theta} \quad Y_{sc} = \frac{V_{w(std)}}{Counts_{std}}$$

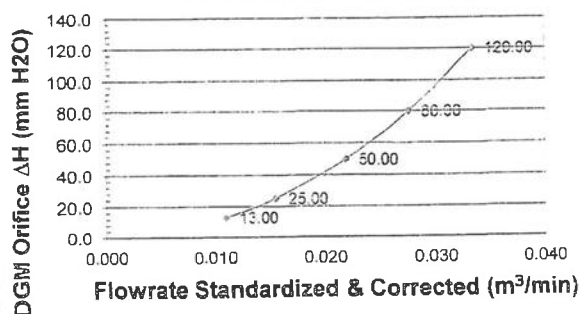
$$K_1 = \frac{T_{std}}{P_{std}} \quad Y = \frac{V_{w(std)}}{V_{m(std)}}$$

$$Metric \Delta H_o = \frac{P_{std} * 0.0011696 * (P_{bar} + \frac{P_m}{13.6})}{T_m} * \left(\frac{T_w - \theta}{T_w - P_{std}} \right)^2$$

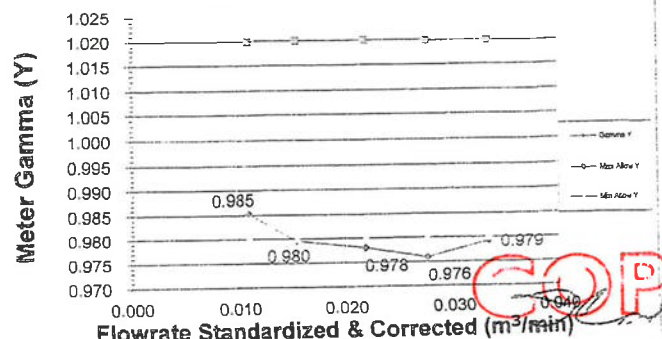


Calibration Graphs

Meter Pressure vs Flowrate



Meter Gamma vs Flowrate



TEMPERATURE DISPLAY CALIBRATION

Water Console Information:

Console Model :	XC-S72-V
Console serial :	A2007510
Temp Indicator Model :	765-KF
Temp Indicator Serial :	JC17852

Calibration Conditions

Cal. Date :	24-Sep-25
Due Date :	21-Sep-28
Cal. Report No. :	WDS-SV680001
Ambient Temp. (°C) :	25
Pressure (mm Hg) :	758
Humidity (%) :	60

Reference Equipment

Temp. Meter Model :	Fluke 714B
Serial No. :	80990035
Cal. Date :	07-Apr-25
Temp. Meter Model :	Fluke 179
Serial No. :	58620112
Cal. Date :	06-Feb-25

Temperature Sensor Calibration

Reference Point #	Ref. Thermometer Temperature °C	Thermocouple Display Temperature °C	Temperature Difference °C
1	-16.0	-16.0	0.0
2	36.0	36.0	0.0
3	93.0	93.0	0.0
4	149.0	149.0	0.0
5	260.0	260.0	0.0
6	371.0	372.0	-1.0
7	482.0	483.0	-1.0
8	593.0	594.0	-1.0
9	816.0	817.0	-1.0
10	1038.0	1039.0	-1.0
Maximum :			1.0

Note

* For valid test results, the maximum difference between temperature readings should $\leq 1.0^{\circ}\text{C}$ (EPA Method 5, Section 6.1.1.8).
Perform all TC Channel calibrations. Except meter (DGM) channel

PASS

DCM Out Temperature Sensor Calibration

Temperature point #	Ref. Thermometer Temperature °C	Thermocouple Display Temperature °C	Temperature Difference °C
Ice	0.0	0.0	0.0
Ambient	28.5	27.0	-0.5
Heat	114.3	115.0	-0.7
Difference Range			
Temp. Difference		$\pm 2^{\circ}\text{F}$ or $\pm 1.1^{\circ}\text{C}$	

PASS

Note

The temperatures of the thermocouple and reference thermometers shall agree to within $\pm 2^{\circ}\text{F}$ (EPA Method 5, section 10.5)

Approved By :

P. Chaisana

(Patpasu Chaisana)

Service Manager

WISDOM SCIENCE

WISDOM SCIENCE (THAILAND) PUBLIC CO., LTD.
11/15 Lumphini Town, Ratchaprarop Road, Ratchaprarop Suburb, Bangkok 10330, Thailand
Tel: 02-120-1122

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DRY GAS METER MC-572

Serial No. : 0011024



WISDOM SCIENCE

Certificate Of Calibration

Method 5 Pre-Test Console Calibration - Cubic meter (m3)

Meter Console Information

Console Model : MC-572
 Console Serial : 0011024
 DGM Model #: SK25EX
 DGM Serial #: 00005437

Calibration Condition

Cal. Date: 25-Jan-26
 Due Date: 25-Jan-27
 Cal. Report No.: WDS-SV6901003
 Ambient Temp (°C): 25
 Pressure (mm Hg): 758
 Relative Humidity (%): 60

Factors/Conversion

Std. Temp. (°K): 298
 Std. Pressure (mm Hg): 760
 K₁ (K/mm Hg): 0.3857

Reference Equipment

WTM Model: W-NKoDa-5B WTM Cal. Due Date: Jan. 2027
 WTM Serial: 600245 Gamma: 1.0000

Run Time (minutes)	DGM Orifice (mm H ₂ O)	Volume		Outlet Temp		Volume		Outlet Temp	
		Initial	Final	Initial	Final	Initial	Final	Initial	Final
θ	P _{m(g)}	V _{mi}	V _{mf}	T _{mi}	T _{mf}	V _{ri}	V _{rf}	T _{ri}	T _{rf}
15.00	13.0	1325.8454	1326.0209	24	24	150.37336	150.55701	27	27
10.00	25.0	1326.0448	1326.2062	24	25	150.58598	150.75296	27	27
8.00	50.0	1326.2250	1326.4054	25	25	150.77379	150.95979	27	27
7.00	80.0	1326.4286	1326.6286	26	26	150.98358	151.18895	27	27
5.00	120.0	1326.6411	1326.8148	26	26	151.20211	151.38001	27	27

Standardized Data				Calibration Results				
Test Meter		Reference Meter		Correction Factor		Flow Rate	ΔH@ (mm H ₂ O)	
Std. Volume	Std. Flow Rate	Std. Volume	Std. Flow Rate	"Gamma"	Variation	Std & Corr	0.0212 SCMM	Variation
V _{m(std)} (m ³)	Q _{m(std)} m ³ /min	V _{r(std)} (m ³)	Q _{r(std)} m ³ /min	(Y)	(ΔY)	Q _{m(std/corr)}	ΔH _g	ΔΔH _g
0.173	0.012	0.179	0.012	1.035	0.014	0.012	40.673	-2.374
0.159	0.016	0.163	0.016	1.023	0.003	0.016	42.078	-0.969
0.178	0.022	0.181	0.023	1.019	-0.001	0.023	43.545	0.498
0.197	0.028	0.200	0.029	1.016	-0.005	0.029	43.861	0.814
0.172	0.034	0.173	0.035	1.009	-0.011	0.035	45.079	2.032
				1.020	= Y Avg.		43.047	= ΔH _g Avg.

Pass/Fail Result: Pass

Note: For Calibration Factor Y, the ratio of the reading of the calibration meter to the dry gas meter, acceptable tolerance of individual values from the average is ±0.02.

Note: For ΔH_g, orifice pressure differential that equates to 0.75cfm (0.0212m³/min) at standard temperature and pressure, acceptable tolerance of individual values from the average is ±0.2inches (5.1mm) H₂O.

Approved By:
 (Patpasu Chaisana)
 Service Manager

Date: 25-Jan-26

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Certificate of Calibration - Supplemental

METHOD 5 PRE-TEST CONSOLE CALIBRATION

Nomenclature

P_b - Barometric Pressure
 DGM - Dry Gas Meter
 K₁ - Constant based on standard temp and press
 θ - Run time, in minutes
 P_m - ΔH (Meter Pressure, gauge)
 V_m - Volume collected by test meter, corrected for STP
 Q_{m(std)} - Calculated flow rate of test meter
 K' - Critical orifice coefficient
 P_m - Measured pressure of reference meter
 T_r - Temperature measured in reference meter
 T_m - Temperature measured in test meter
 Y - Ratio of volume collected from test meter and orifice
 SC - Scaling Factor
 Counts_{std} - Number of pulse counts, standardized
 Counts_{total} - Number of raw pulse counts of a calibration run

Equations

$$V_{u(std)} = Y * K_1 \frac{V_w * (P_{bar} + \frac{P_{m(std)}}{13.6})}{T_u}$$

$$V_{m(std)} = Counts_{std} * Y_{sc(avg)}$$

$$Counts_{std} = K_1 \frac{C_{total} * (P_{bar} + \frac{P_{m(std)}}{13.6})}{T_m}$$

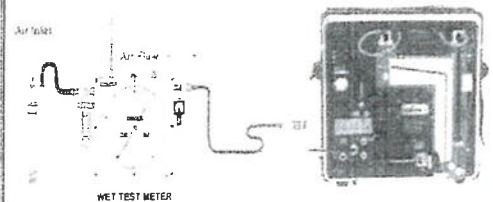
$$Q_{u(std)} = \frac{V_{u(std)}}{\theta}$$

$$Y = \frac{V_{u(std)}}{V_{m(std)}}$$

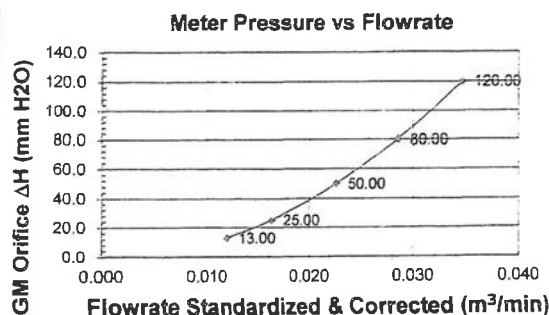
$$K_1 = \frac{T_{std}}{P_{std}}$$

$$Metric: \Delta H_g = \frac{P_{m(std)} * 0.0011596 * (P_{bar} + \frac{P_{m(std)}}{13.6})}{T_m} * \left(\frac{T_w * \theta}{V_u * P_{bar}} \right)^2$$

Calibration Train

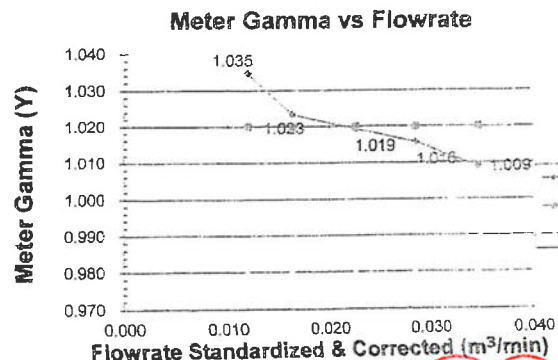


Calibration Graphs



Console Serial: 0011024

Console Model: MC-572



Console Serial: 0011024

Console Model: MC-572

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TEMPERATURE DISPLAY CALIBRATION

Meter Console Information

Conceal Model : MC-572
Conceal Serial : 0011024
Temp Indicator Model : 765-KF
Temp Indicator Serial : JC02882

Calibration Conditions

Cal. Date : 25-Jan-26
Due Date : 25-Jan-27
Cal. Report No. : WDS-SV8001003
Ambient Temp (°C) : 25
Pressure (mm Hg) : 758
Humidity (%) : 60

Reference Equipment

Temp Meter Model : Fluke 714B
Serial No. : 9090035
Cal. Date : 07-Apr-25
Temp Meter Model : Fluke 179
Serial No. : 58820112
Cal. Date : 06-Feb-25

Temperature Sensor Calibration

Reference Point #	Ref Thermometer Temperature °C	Thermocouple Display Temperature °C	Temperature Difference °C
1	-18.0	-17.0	1.0
2	38.0	38.0	0.0
3	93.0	93.0	0.0
4	149.0	150.0	-1.0
5	261.0	260.0	1.0
6	371.0	372.0	-1.0
7	482.0	483.0	-1.0
8	594.0	594.0	0.0
9	815.0	815.0	0.0
10	1038.0	1038.0	1.0
Maximum			1.0

Note

1 For valid test results, the maximum difference between temperature readings should $\leq 1.0^{\circ}\text{C}$ (EPA Method 5, Section 6.1.1.8).
Perform all TC Channel calibrations Except meter (DGM) channel

PASS

DGM Out Temperature Sensor Calibration

Temperature point #	Ref Thermometer Temperature °C	Thermocouple Display Temperature °C	Temperature Difference °C
Ice	0.0	0.0	0.0
Ambient	29.4	30.0	-0.6
Heat	113.2	114.0	-0.8

Difference Range

Temp. Difference $\pm 2^{\circ}\text{F}$ or $\pm 1.1^{\circ}\text{C}$

PASS

Note

The temperatures of the thermocouple and reference thermometers shall agree to within $\pm 2^{\circ}\text{F}$ (EPA Method 5, section 10.5)

Approved By :

Pastor
(Pulpas Chalsana)

Service Manager

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DRY GAS METER MC-572

Serial No. : 0504003

Certificate Of Calibration

Method 5 Pre-Test Console Calibration - Cubic meter (m3)

Meter Console Information

Console Model : MC-572
Console Serial : 0504003
DGM Model #: G2.5
DGM Serial #: 202205100796

Calibration Condition

Cal. Date : 09-Mar-26
Due Date : 08-Mar-27
Cal. Report No.: WDS-SV6902009
Ambient Temp (°C): 25
Pressure (mm Hg): 758
Relative Humidity (%): 80

Factors/Conversion

Std. Temp. (°K): 298
Std. Pressure (mm Hg): 760
K₁ (K/mm Hg): 0.3857

Reference Equipment

WTM Model: W-NKoDa-5B WTM Cal. Due Date: Jan. 2027
WTM Serial: 600245 Gamma: 1.0000

Run Time (minutes)	DGM Orifice (mm H ₂ O)	Volume		Outlet Temp		Volume		Outlet Temp	
		Initial	Final	Initial	Final	Initial	Final	Initial	Final
15.00	13.0	1.8494	2.0072	27	27	161.94235	162.09910	30	30
10.00	25.0	2.0275	2.1830	28	28	162.11834	162.27201	30	30
8.00	50.0	2.3704	2.5530	28	28	162.45057	162.63178	30	30
7.00	80.0	2.5916	2.7969	28	28	162.66630	162.87039	30	30
5.00	120.0	2.8238	3.0039	28	29	162.89345	163.07313	30	30

Standardized Data				Calibration Results			
Test Meter		Reference Meter		Correction Factor		Flow Rate	
Std. Volume	Std. Flow Rate	Std. Volume	Std. Flow Rate	"Gamma"	Variation	Std & Corr	ΔH@ (mm H ₂ O)
V _{test} (m ³)	Q _{test} m ³ /min	V _{ref} (m ³)	Q _{ref} m ³ /min	(Y)	(ΔY)	Q _{test@corr}	ΔH _g
0.154	0.010	0.151	0.010	0.982	0.001	0.010	56.383
0.151	0.015	0.148	0.015	0.979	-0.002	0.015	50.092
0.178	0.022	0.175	0.022	0.981	0.000	0.022	46.333
0.201	0.029	0.197	0.028	0.980	-0.001	0.028	45.005
0.176	0.035	0.173	0.035	0.983	0.002	0.035	44.631
				0.981	= Y Avg.	48.489 = ΔH@ Avg.	

Pass/Fail Result: **Pass**

Note: For Calibration Factor Y, the ratio of the reading of the calibration meter to the dry gas meter, acceptable tolerance of individual values from the average is ±0.02.

Note: For ΔH_g, orifice pressure differential that equates to 0.75cfm (0.0212m³/min) at standard temperature and pressure, acceptable tolerance of individual values from the average is ±0.2inches (5.1mm) H₂O.

Approved By: 
(Patpasu Chaisana)
Service Manager

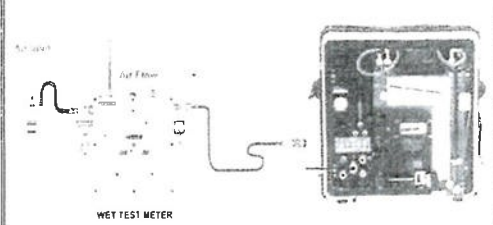
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Date: 09-Mar-26

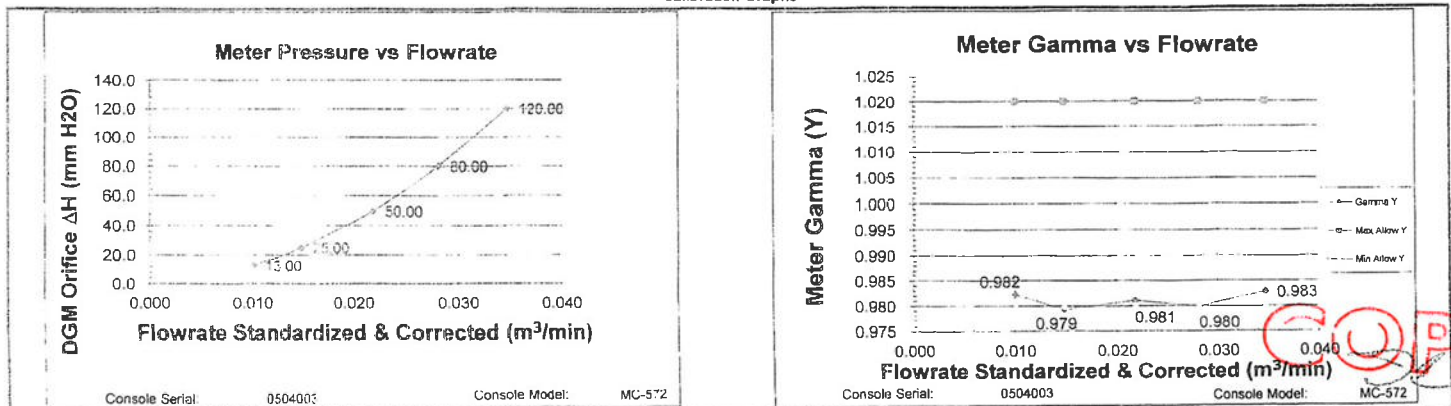
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Certificate of Calibration - Supplemental

METHOD 5 PRE-TEST CONSOLE CALIBRATION

Nonomenclature	Equations	Calibration Train
P_b - Barometric Pressure DGM - Dry Gas Meter K₁ - Constant based on standard temp and press θ - Run time, in minutes P_m - ΔH (Meter Pressure, gauge) V_m - Volume collected by test meter, corrected for STP Q_{m@sc} - Calculated flow rate of test meter K' - Critical orifice coefficient P_w - Measured pressure of reference meter T_w - Temperature measured in reference meter T_m - Temperature measured in test meter Y - Ratio of volume collected from test meter and orifice sc - Scaling Factor Counts_{std} - Number of pulse counts, standardized Counts_{total} - Number of raw pulse counts of a calibration run	$V_{w(std)} = Y * K_1 * \frac{V_w * (P_{bar} + \frac{P_{outlet}}{13.6})}{T_w}$ $V_{m(std)} = Counts_{std} * Y_{sc(avg)}$ $Counts_{std} = K_1 * \frac{(Counts_{total} * V_{m(std)} - \frac{V_w}{13.6})}{T_w}$ $Q_{k(std)} = \frac{V_{w(std)}}{\theta}$ $K_1 = \frac{T_{sc}}{P_{sc}}$ $Y = \frac{V_{m(std)}}{V_{w(std)}}$ $Metric \Delta H_g = \frac{P_{sc} - (13.6 * (10 * P_{sc} - P_{sc} + \frac{P_{sc}}{13.6}))}{T_{sc}} * (\frac{T_w * \theta}{V_w * P_{bar}})^2$	 WET TEST METER

Calibration Graphs





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TEMPERATURE DISPLAY CALIBRATION

Meter Console Information

Console Model : MC-572
 Console Serial : 0504003
 Temp Indicator Model : 785-KF
 Temp Indicator Serial : JC05830

Calibration Conditions

Cal. Date : 09-Mar-28
 Due Date : 09-Mar-27
 Cal. Report No. : WDS-SV902009
 Ambient Temp (°C) : 25
 Pressure (mm Hg) : 759
 Humidity (%) : 60

Reference Equipment

Temp Meter Model : Fluke 714B
 Serial No. : 80590035
 Cal. Date : 07-Apr-25
 Temp Meter Model : Fluke 179
 Serial No. : 5820112
 Cal. Date : 06-Feb-26

Temperature Sensor Calibration

Reference Point	Ref. Thermometer Temperature	Thermocouple Display Temperature	Temperature Difference
#	°C	°C	°C
1	-16.0	-17.0	1.0
2	38.0	38.0	0.0
3	93.0	93.0	0.0
4	149.0	149.0	0.0
5	281.0	280.0	1.0
6	371.0	372.0	-1.0
7	482.0	483.0	-1.0
8	594.0	595.0	-1.0
9	815.0	816.0	-1.0
10	1039.0	1038.0	1.0
Maximum			1.0

Note

* For valid test results, the maximum difference between temperature readings should $\leq 1.0^{\circ}\text{C}$ (EPA Method 5, Section 6.1.1.8).
 Perform all TC Channel calibrations. Except meter (DGM) channel

PASS

DGM Out Temperature Sensor Calibration

Temperature point	Ref. Thermometer Temperature	Thermocouple Display Temperature	Temperature Difference
#	°C	°C	°C
Ice	0.0	0.0	0.0
Ambient	29.6	30.0	-0.4
Heat	112.7	113.0	-0.3

Difference Range

Temp. Difference $\pm 2^{\circ}\text{F}$ or $\pm 1.1^{\circ}\text{C}$

PASS

Note

The temperatures of the thermocouple and reference thermometers shall agree to within $\pm 2^{\circ}\text{F}$ (EPA Method 5, section 10.5)

Approved By :

(Perpasu Chaisana)

Service Manager

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 Tel: 02-120-4122

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Flue gas Analyzer

Testo 350

Serial No. 63455658/0722



Certificate No.: G 250296
Date of issue : 04-Nov-25

Instrument description : Flue Gas Analyzer
Instrument model : Testo 350
Instrument serial no. : 63455658/0722
Control unit serial no. : 03601409/0722
ID no. or control no. :
Manufacturer : Testo SE & Co. KGaA
Probe description :
Probe model :
Probe serial no. :
Customer name : Eastern Thai Consulting 1992 Company Limited
Customer address : 683 Moo 11, Sukhaphiban 8 Road, Nongkhham, Si Racha, Chon Buri 20280

Total pages of certificate : 2 Pages
Receiving no. : L-253802
Receiving date. : 03-Nov-25
Parameter of calibration : Gas Calibration (Oxygen 2.506, 9.984, 21.01 %vol, Carbon Monoxide 80.38, 300.9, 1001 ppm, Nitrogen Dioxide 30.68, 81.8, 202.3 ppm, Nitric Oxide 30.0, 151.8, 322 ppm, Sulphur Dioxide 50.4, 100.7, 605.9 ppm)

Condition of UUC. : Used
Ambient condition : All of the Measurement were carried out the stabilized laboratory
Temperature : 23 $\pm$ 5 $^{\circ}$ C
Humidity : 55 $\pm$ 15 %RH

Calibration place : 17/121 Soi Ngamwongwan 47 Yaek 48, Toongsonghong, Lakso, Bangkok 10210

Calibration procedure no : This instrument was calibrated by comparison with Standard gas mixture according to calibration Work Instruction no. WI-CL-28-C

The calibration certificate expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%. This certificate is applied only to item under test Environmental condition.

This Calibration Certificate may not be reproduced other than in full except with the permission of the issuing laboratory. Calibration certificates without signature and seal not valid and The results relate only to the items tested/calibrated.

This calibration certificate documents are traceability to national standards, which realize measurement according to the International System of Units (SI).

Date of calibration : 04-Nov-25

Kamthai
Mr. Kwanchai Khamdoun
Calibration Technician

D. Wuttu
Mrs. Nongluck Wongsettee
Technical Manager

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Certificate No.: G 250296

Standard References (Table 1)

Standard	Certificate No.	Vendor	Due date
Oxygen (O2) 2.506 % Vol	1287/25	Linde	08-May-29
Oxygen (O2) 9.984 % Vol	CG-0090-25	Nint	24-Jun-30
Oxygen (O2) 21.01 % Vol	CG-0112-24	Nint	01-Aug-29
Carbon monoxide (CO) 80.38 ppm	CG-0105-25	Nint	04-Aug-30
Carbon monoxide (CO) 300.9 ppm	1422/25	Linde	21-May-29
Carbon monoxide (CO) 1001 ppm	CG-0085-24	Nint	22-May-29
Nitrogen Dioxide (NO2) 30.68 ppm	2832/24	Linde	08-Sep-26
Nitrogen Dioxide (NO2) 81.8 ppm	2330/24	Linde	01-Aug-26
Nitrogen Dioxide (NO2) 202.3 ppm	2558/25	Linde	02-Sep-27
Nitric Oxide (NO) 30.0 ppm	CG-0065-24	Nint	06-May-26
Nitric Oxide (NO) 151.8 ppm	0404/25	Linde	09-Feb-27
Nitric Oxide (NO) 322 ppm	1234/25	Linde	04-May-27
Sulphur Dioxide (SO2) 50.4 ppm	1306/25	Linde	12-May-27
Sulphur Dioxide (SO2) 100.7 ppm	2662/24	Linde	25-Aug-26
Sulphur Dioxide (SO2) 605.9 ppm	1229/25	Linde	04-May-27

Measured room conditions

Temperature : 22.6 $^{\circ}$ C Humidity : 67.7 %RH Pressure : 1011.9 mbar

Calibration conditions

Gas Temperature : 23 $^{\circ}$ C Flow rate : 1,300 ml/min Gas pressure : 1016.5 mbar

Calibration Results (Without adjustment) (Table 2)

Parameter of Standard	Standard Values	Mean of UUC	Error	Uncertainty ($\pm$)
O2 (%Vol)	2.506	2.44	-0.066	0.15
O2 (%Vol)	9.984	10.12	0.136	0.23
O2 (%Vol)	21.01	21.15	0.14	0.30
CO (ppm)	80.38	81	0.62	3.0
CO (ppm)	300.9	303	2.1	6.0
CO (ppm)	1001	1006	5	12
NO2 (ppm)	30.68	29.4	-1.28	8.0
NO2 (ppm)	81.8	79.7	-2.1	8.0
NO2 (ppm)	202.3	199.1	-3.2	12
NO (ppm)	30	30	0.0	8.0
NO (ppm)	151.8	151	-0.8	8.0
NO (ppm)	322	323	1	12
SO2 (ppm)	50.4	50	-0.4	6.0
SO2 (ppm)	100.7	102	1.3	6.0
SO2 (ppm)	605.9	610	4.1	13

Remark : 1 cmol/mol = 1 %vol, 1 μ mol/mol = 1 ppm., Sensor(CO, NO2)New.

End of Report

COPY

Flue gas Analyzer

Testo 350

Serial No. 63455616/0722

Certificate No: G 250384
Date of issue : 02-Dec-25

Instrument description : Flue Gas Analyzer
Instrument model : Testo 350
Instrument serial no. : 63455616/0722
Control unit serial no. : 03600177/0722
ID no. or control no. :
Manufacturer : Testo SE & Co. KGaA
Probe model :
Probe serial no. :
Customer name : Eastern Thai Consulting 1992 Company Limited
Customer address : 683 Moo 11, Sukhapibarn 8 Road, Nongkham, Si Racha, Chon Buri 20280
Total pages of certificate : 2 Pages
Receiving no. : L-254783
Receiving date. : 27-Nov-25
Parameter of calibration : Gas Calibration (Oxygen, Carbon Monoxide, Nitrogen Dioxide, Nitric Oxide, Sulphur Dioxide)
Condition of UUC. : Used
Ambient condition : All of the Measurement were carried out the stabilized laboratory
Temperature : 23 ± 5 °C
Humidity : 55 ± 15 %RH
Calibration place : 17/121 Soi Ngamwongwan 47 Yaek 48, Toongsonghong, Lakso, Bangkok 10210
Calibration procedure no : This instrument was calibrated by comparison with Standard gas mixture according to calibration Work Instruction no. WI-CL-28-C

The calibration certificate expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.
This certificate is applied only to item under test Environmental condition.
This Calibration Certificate may not be reproduced other than in full except with the permission of the issuing laboratory. Calibration certificates without signature and seal not valid and The results relate only to the items tested/calibrated.
This calibration certificate documents are traceability to national standards, which realize measurement according to the International System of Units (SI).
Date of calibration : 02-Dec-25

Kamwongwan
Mr. Kwanchai Khamdoun
Calibration Technician
D. Wuttu
Mrs. Nongluck Wongsettee
Technical Manager

COPY

Certificate No.: G 250384

Standard References (Table 1)

Standard	Certificate No.	Vendor	Due date
Oxygen (O2) 2.506 % Vol	1287/25	Linde	08-May-29
Oxygen (O2) 9.984 % Vol	CG-0090-25	Nimt	24-Jun-30
Oxygen (O2) 21.01 % Vol	CG-0112-24	Nimt	01-Aug-29
Carbon monoxide (CO) 80.38 ppm	CG-0105-25	Nimt	04-Aug-30
Carbon monoxide (CO) 300.9 ppm	1422/25	Linde	21-May-29
Carbon monoxide (CO) 1000 ppm	3131/25	Linde	27-Oct-29
Nitrogen Dioxide (NO2) 30.68 ppm	2832/24	Linde	08-Sep-26
Nitrogen Dioxide (NO2) 81.8 ppm	2330/24	Linde	01-Aug-26
Nitrogen Dioxide (NO2) 202.3 ppm	2558/25	Linde	02-Sep-27
Nitric Oxide (NO) 30.0 ppm	CG-0065-24	Nimt	06-May-26
Nitric Oxide (NO) 151.8 ppm	0404/25	Linde	09-Feb-27
Nitric Oxide (NO) 322 ppm	1234/25	Linde	04-May-27
Sulphur Dioxide (SO2) 50.4 ppm	1306/25	Linde	12-May-27
Sulphur Dioxide (SO2) 100.7 ppm	2662/24	Linde	25-Aug-26
Sulphur Dioxide (SO2) 605.9 ppm	1229/25	Linde	04-May-27

Measured room conditions

Temperature : 23.3 °C Humidity : 61.9 %RH Pressure : 1010.4 mbar
Calibration conditions
Gas Temperature : 23 °C Flow rate : 1,300 ml/min Gas pressure : 1016.5 mbar

Calibration Results (Without adjustment) (Table 2)

Parameter of Standard	Standard Values	Mean of UUC	Error	Uncertainty (±)
O2 (%Vol)	2.506	2.45	-0.056	0.15
O2 (%Vol)	9.984	10.02	0.036	0.20
O2 (%Vol)	21.01	21.08	0.07	0.30
CO (ppm)	80.38	81	0.62	3.0
CO (ppm)	300.9	300	-0.9	6.0
CO (ppm)	1000	997	-3	12
NO2 (ppm)	30.68	28.7	-1.98	8.0
NO2 (ppm)	81.8	80.2	-1.6	8.0
NO2 (ppm)	202.3	202.8	0.5	12
NO (ppm)	30.0	31	1.0	8.0
NO (ppm)	151.8	154	2.2	8.0
NO (ppm)	322	325	3	12
SO2 (ppm)	50.4	50	-0.4	6.0
SO2 (ppm)	100.7	100	-0.7	6.0
SO2 (ppm)	605.9	605	-0.9	13

Remark : 1 cmol/mol = 1 %vol, 1 µmol/mol = 1 ppm., Sensor(CO, NO2, NO, SO2)New.

End of Certificate of Calibration

COPY

Flue gas Analyzer

Testo 350XL

Serial No. 01859560/006



Certificate No: G 260016
Date of issue : 12-Jan-26

Instrument description : Flue Gas Analyzer
Instrument model : Testo 350XL
Instrument serial no. : 01859560/006
Control unit serial no. : 01864498/006
ID no. or control no. : -
Manufacturer : Testo SE & Co. KGaA
Probe description : -
Probe model : -
Probe serial no. : -
Customer name : Eastern Thai Consulting 1992 Company Limited
Customer address : 683 Moo 11, Sukhapibarn 8 Road, Nongkham, Si Racha, Chon Buri 20280

Total pages of certificate : 2 Pages
Receiving no. : L-260025
Receiving date. : 30-Dec-25
Parameter of calibration : Gas Calibration(Oxygen, Carbon Monoxide, Nitrogen Dioxide, Nitric Oxide, Sulphur Dioxide)

Condition of UUC. : Used
Ambient condition : All of the Measurement were carried out the stabilized laboratory
Temperature : 23 ±5 °C
Humidity : 55 ± 15 %RH
Calibration place : 17/121 Soi Ngamwongwan 47 Yaek 48, Toongsonghong, Lakso, Bangkok 10210
Calibration procedure no. : This instrument was calibrated by comparison with Standard gas mixture according to calibration Work Instruction no. WI-CL-28-C

The calibration certificate expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.
This certificate is applied only to item under test Environmental condition.
This Calibration Certificate may not be reproduced other than in full except with the permission of the issuing laboratory.
Calibration certificates without signature and seal not valid and The results relate only to the items tested/calibrated.
This calibration certificate documents are traceability to national standards, which realize measurement according to the International System of Units (SI).

Date of calibration : 09-Jan-26

Kwanchoke

Mr. Kwanchai Khamdourng
Calibration Technician

D. Wilun

Mrs. Nongluck Wongsettee
Technical Manager

COPY



Certificate No.: G 260016

Standard References (Table 3)

Standard	Certificate No.	Vendor	Date date
Oxygen (O ₂) 21.01 % Vol	CG-012-24	Linde	24-Jun-26
Oxygen (O ₂) 19.994 % Vol	CG-012-25	Linde	01-Aug-29
Oxygen (O ₂) 21.01 % Vol	3176/25	Linde	04-Nov-27
Carbon monoxide (CO) 300.9 ppm	1422/25	Linde	21-May-26
Carbon monoxide (CO) 1000 ppm	3131/25	Linde	27-Oct-29
Nitrogen Dioxide (NO ₂) 30.68 ppm	2832/24	Linde	08-Sep-26
Nitrogen Dioxide (NO ₂) 61.3 ppm	2230/24	Linde	01-Aug-26
Nitrogen Dioxide (NO ₂) 202.3 ppm	2558/25	Linde	02-Sep-27
Nitric Oxide (NO) 30.0 ppm	CG-0065-24	Linde	06-May-26
Nitric Oxide (NO) 151.8 ppm	9404/25	Linde	09-Feb-27
Nitric Oxide (NO) 322 ppm	1234/25	Linde	04-May-27
Sulphur Dioxide (SO ₂) 50.4 ppm	1306/25	Linde	12-May-27
Sulphur Dioxide (SO ₂) 100.7 ppm	2662/24	Linde	25-Aug-26
Sulphur Dioxide (SO ₂) 605.9 ppm	1229/25	Linde	04-May-27

Measured room conditions

Temperature : 21.5 °C **Humidity :** 52.4 %RH **Pressure :** 1012.3 mbar

Calibration conditions

Gas Temperature : 23 °C **Flow rate :** 1,300 ml/min **Gas pressure :** 1017.5 mbar

Calibration Results (Without adjustment) (Table 2)

Parameter of Standard	Standard Values	Mean of UUC	Error	Uncertainty (±)
O ₂ (%Vol)	2.506	2.43	-0.076	0.15
O ₂ (%Vol)	9.984	9.97	-0.014	0.20
O ₂ (%Vol)	21.01	21.14	0.13	0.30
CO (ppm)	80.47	81	0.53	3.0
CO (ppm)	301	302	1.1	6.0
CO (ppm)	1000	999	-1	12
NO ₂ (ppm)	30.68	28.7	-1.98	8.0
NO ₂ (ppm)	81.8	78.3	-3.5	8.0
NO ₂ (ppm)	202.3	196.2	-6.1	12
NO (ppm)	30.0	31	1.0	8.0
NO (ppm)	151.8	151	-0.8	8.0
NO (ppm)	322	320	-2	12
SO ₂ (ppm)	50.4	49	-1.4	6.0
SO ₂ (ppm)	100.7	100	-0.7	6.0
SO ₂ (ppm)	605.9	602	-3.9	13

Remark : 1 cmol/mol = 1 %vol, 1 umol/mol = 1 ppm.

End of Certificate of Calibration

COPY

Heat Stress Monitor

Model : Ques Temp 34

Serial No. : TEU080012



Accredited calibration laboratory
ISO/IEC 17025:2017
NSC-TISI TIS 17025
CALIBRATION 0367

Jirantea Associates Co., Ltd
63/41-15, 67/15-36
Petchkasem 7/11, Rd. Wathapra, Bangkok, Thailand
Bangkok 10600 (Thailand)
T +66 086080812
Mobile +66 863999453
E mail: jiracalibration@jirantea.com
Web site: www.jirantea.com

Temperature measurement laboratory
Calibration services department

CERTIFICATE OF CALIBRATION

Certificate No. : CDT-010-69

MEASUREMENT ITEM : Heat Stress Monitor
MANUFACTURER : TSI QUEST
MODEL/TYPE : Ques Temp 34
SERIAL NUMBER : TEU080012
ID NUMBER : NO. 11
CONDITION AS-RECEIVED : Used item
CUSTOMER : Eastern Thai consulting 1992 Co., Ltd.
683 Moo 11, Sukhapiarn 8 Rd,
Nongkham, Sriracha, Chonburi 20250

RECEIVED DATE : 25 Dec 2025
MEASUREMENT DATE : 07 Jan 2026
ISSUE DATE : 08 Jan 2026

ENVIRONMENTAL CONDITIONS:

Ambient condition in the laboratory are as follow:
Temperature : 23.0 ± 3.0 °C
Relative Humidity : 55.0 ± 15.0 %RH

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

TABULATION OF RESULTS:

The table on next page give the measured values.

Calibrated by:
☐ Mr. Sorawit Thachalad
☒ Miss Jittaporn Letsomphol
☐ Miss Ruangrumpai Phoommit



Approved signatory

Mr. Parinya Booncharoen
Calibration Department Manager



THIS CERTIFICATE OF CALIBRATION MAY NOT BE REPRODUCED EXCEPT IN FULL UNLESS PERMISSION FOR REPRODUCTION HAS BEEN OBTAINED
IN WRITING FROM THE LABORATORY



NSC-TISI -- TIS 17025
CALIBRATION 0367

Page 1 of 2 Pages

Calibration procedure:
The temperature calibration was done by In-House calibration method as WI-CL-001 according to comparison method with standard digital temperature indicator and standard temperature probe. The temperature scale use was based on ITS-90.
Traceability:
The measurement results are traceable to the international system of units (SI) through National Institute of Metrology Thailand (NIMT) Certificate number: TT-1013-25; Certificate number: ER-0061-25.

Reference Used During Calibration:

1. Standard Temperature Probe
Model: STS-100 A500, Serial No.: 667682-09,
Due date: 9 Apr 2026
2. Digital Temperature Indicator
Model: DTI-1000-A MK II, Serial No.: 671407-00591 Due date: 22 Apr 2026

Uncertainty of Measurement:

The reported uncertainty of measurement is based on the standard uncertainty multiplied by a coverage factor $k=2$, which for a normal distribution corresponds to a coverage probability of approximately 95%. The standard uncertainty has been determined in accordance with the GUM 'Evaluation of measurement data - Guide to the expression of uncertainty in measurement'.



Continuation of Certificate of Calibration Number CDT-010-69

Result of Calibration: ☒ Without Adjustment ☐ With Adjustment

Calibration Range: 20 °C to 40 °C

Function:

Table 1: This equipment was connected with wet bulb Temperature probe Model: -, S/N: -.
Dimension: Diameter 4.77 mm. Length 70 mm.

Immersion Depth (mm)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
65	20.055	20.4	0.3	0.099
65	25.041	25.3	0.3	0.099
65	30.034	30.3	0.3	0.099
65	35.019	35.3	0.3	0.14
65	40.005	40.2	0.2	0.099

Table 2: This equipment was connected with Globe Temperature probe Model: -, S/N: -.
Dimension: Diameter 4.77 mm. Length 70 mm.

Immersion Depth (mm)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
65	20.055	20.3	0.2	0.099
65	25.041	25.3	0.3	0.099
65	30.034	30.3	0.3	0.099
65	35.019	35.3	0.3	0.14
65	40.005	40.1	0.1	0.099

Table 3: This equipment was connected with Dry Bulb Temperature probe Model: -, S/N: -.
Dimension: Diameter 4.77 mm. Length 70 mm.

Immersion Depth (mm)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
65	20.055	20.4	0.3	0.099
65	25.041	25.3	0.3	0.099
65	30.034	30.3	0.3	0.099
65	35.019	35.3	0.3	0.14
65	40.005	40.2	0.2	0.099

UUC*: Unit Under Calibration

Remark: The reported uncertainty of measurement is 0.14, based on standard uncertainty multiplied by a coverage factor $k=2$ 1.4 providing a level of confidence of approximately 95%.

End of Certificate of Calibration



JIRANTEA ASSOCIATES CO., LTD.



Heat Stress Monitor

Model : Ques Temp 34

Serial No. : TEU080013

Result of Calibration: ☒ Without Adjustment ☐ With Adjustment

Calibration Range: 20 °C to 40 °C

Function:

Table 1: This equipment was connected with wet bulb Temperature probe Model: -, S/N: -.
Dimension: Diameter 4.77 mm. Length 70 mm.

MEASUREMENT ITEM
MANUFACTURER : Heat Stress Monitor
MODEL/TYPE : TS1 QUEST
SERIAL NUMBER : Ques Temp 34
ID NUMBER : TEU080013
CONDITION AS-RECEIVED : NO. 12
CUSTOMER : Used item
: Eastern thai consulting 1992 Co., Ltd.
683 Moo 11, Sukhapibarn 8 Rd,
Nongkham, Sriacha, Chonburi 20230

RECEIVED DATE : 25 Dec 2025
MEASUREMENT DATE : 08 Jan 2026
ISSUE DATE : 08 Jan 2026

ENVIRONMENTAL CONDITIONS:

Ambient condition in the laboratory are as follow:
Temperature : 23.0 ± 3.0 °C
Relative Humidity : 55.0 ± 15.0 %RH

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

TABULATION OF RESULTS:

The table on next page give the measured values.

Calibration procedure:
The temperature calibration was done by
In-House calibration method as WI-CL-001
according to comparison method with standard
digital temperature indicator and standard
temperature probe. The temperature scale use
was based on ITS-90.

Traceability:
The measurement results are traceable to the
international system of units (SI) through
National Institute of Metrology Thailand (NIMT)
Certificate number: TT-1013-25, Certificate
number: ER-0061-25.

Reference Used During Calibration:

1. Standard Temperature Probe
Model: STS-100 A500, Serial No.: 667682-09,
Due date: 9 Apr 2026
2. Digital Temperature Indicator
Model: DTI-1000-A MK II, Serial No.: 671407-
00591 Due date: 22 Apr 2026

Uncertainty of Measurement:

The reported uncertainty of measurement is
based on the standard uncertainty multiplied by
a coverage factor k=2, which for a normal
distribution corresponds to a coverage
probability of approximately 95%. The standard
uncertainty has been determined in accordance
with the GUM 'Evaluation of measurement data
- Guide to the expression of uncertainty in
measurement'

CERTIFICATE OF CALIBRATION

Certificate No. : CDT-011-69

Immersion Depth (mm)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
65	20.024	20.5	0.5	0.099
65	25.041	25.3	0.3	0.099
65	30.029	30.3	0.3	0.14
65	35.020	35.2	0.2	0.14
65	40.009	40.2	0.2	0.099

Table 2: This equipment was connected with Globe Temperature probe Model: -, S/N: -.
Dimension: Diameter 4.77 mm. Length 70 mm.

Immersion Depth (mm)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
65	20.024	20.4	0.4	0.099
65	25.041	25.4	0.4	0.099
65	30.029	30.4	0.4	0.099
65	35.020	35.4	0.4	0.099
65	40.009	40.3	0.3	0.099

Table 3: This equipment was connected with Dry Bulb Temperature probe Model: -, S/N: -.
Dimension: Diameter 4.77 mm. Length 70 mm.

Immersion Depth (mm)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
65	20.024	20.4	0.4	0.099
65	25.041	25.3	0.3	0.099
65	30.029	30.2	0.2	0.14
65	35.020	35.1	0.1	0.14
65	40.009	39.9	-0.1	0.099

UUC*: Unit Under Calibration

Remark: The reported uncertainty of measurement is 0.14, based on standard uncertainty multiplied by a coverage factor k=2.14 providing a level of confidence of approximately 95%.

End of Certificate of Calibration

Approved signatory: Mr. Parinya Booncharoen
Calibration Department Manager

J
NAC
JIRANITE ASSOCIATES CO., LTD.

Calibrated by:
☒ Mr. Sorawit Thachalad
☒ Miss Jitraporn Lertsomphol
☐ Miss Ruangrumpai Phoomnit

J
NAC
JIRANITE ASSOCIATES CO., LTD.

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JIRANITE ASSOCIATES CO., LTD.

COPY

Heat Stress Monitor

Model : Ques Temp 34

Serial No. : TEU080014



Accredited calibration laboratory
ISO/IEC 17025:2017
NSC TISI TIS 17025
CALIBRATION 0367

Jirakate Associates Co., Ltd.
63/14-15, 67/15-16
Petchasarn 7/71, Rd. Wattana, Bangkok, Thailand
Tel: +66(0)2-65863999
Mobile: +66(0)2-65863999-53
E-mail: jrac-calibration@jirakate.com
Web site: www.jirakate.com

Temperature measurement laboratory
Calibration services department

CERTIFICATE OF CALIBRATION

Certificate No. : CDT-012-69

MEASUREMENT ITEM

MANUFACTURER : Heat Stress Monitor
MODEL/TYPE : TSI QUEST
SERIAL NUMBER : Ques Temp 34
ID NUMBER : TEU080014
CONDITION AS-RECEIVED : NO. 13
CUSTOMER : Used item
Eastern Thai consulting 1992 Co., Ltd.
683 Moo 11, Sukhapibarn 8 Rd,
Nongkham, Sriracha, Chonburi 20230

RECEIVED DATE

MEASUREMENT DATE : 25 Dec 2025
ISSUE DATE : 08 Jan 2026

ENVIRONMENTAL CONDITIONS:

Ambient condition in the laboratory are as follow:
Temperature : 23.0 ± 3.0 °C
Relative Humidity : 55.0 ± 15.0 %RH

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

TABULATION OF RESULTS:

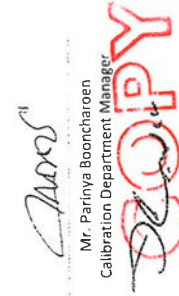
The table on next page give the measured values.

Calibrated by:

- ☐ Mr. Sorawit Thachalad
☒ Miss Jitraporn Lertsomphol
☐ Miss Ruangrumpai Phoommit

Approved signatory:

Mr. Parinya Booncharoen
Calibration Department Manager



Page 1 of 2 Pages

Calibration procedure:
The temperature calibration was done by In-House calibration method as WI-CL-001 according to comparison method with standard digital temperature indicator and standard temperature probe. The temperature scale use was based on ITS-90.

Traceability:
The measurement results are traceable to the International system of units (SI) through National Institute of Metrology Thailand (NIMT)
Certificate number: TT-1013-25, Certificate number: ER-0061-25.

Reference Used During Calibration:

- Standard Temperature Probe
Model: STS-100 A500, Serial No.: 667682-09,
Due date: 9 Apr 2026
- Digital Temperature Indicator
Model: DTI-1000-A MK II, Serial No.: 671407
00591 Due date: 22 Apr 2026

Uncertainty of Measurement:
The reported uncertainty of measurement is based on the standard uncertainty multiplied by a coverage factor $k=2$, which for a normal distribution corresponds to a coverage probability of approximately 95%. The standard uncertainty has been determined in accordance with the GUM 'Evaluation of measurement data - Guide to the expression of uncertainty in measurement'



Continuation of Certificate of Calibration Number CDT-012-69

Result of Calibration: ☒ Without Adjustment ☐ With Adjustment

Calibration Range: 20 °C to 40 °C

Function:

Table 1: This equipment was connected with wet bulb Temperature probe Model: -, S/N: -.
Dimension: Diameter 4.77 mm. Length 70 mm.

Immersion Depth (mm)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
65	20.024	20.5	0.5	0.099
65	25.042	25.4	0.4	0.099
65	30.029	30.4	0.4	0.099
65	35.020	35.3	0.3	0.099
65	40.010	40.3	0.3	0.099

Table 2: This equipment was connected with Globe Temperature probe Model: -, S/N: -.
Dimension: Diameter 4.77 mm. Length 70 mm.

Immersion Depth (mm)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
65	20.024	20.3	0.3	0.099
65	25.042	25.3	0.3	0.099
65	30.029	30.3	0.3	0.099
65	35.020	35.2	0.2	0.099
65	40.010	40.2	0.2	0.099

Table 3: This equipment was connected with Dry Bulb Temperature probe Model: -, S/N: -.
Dimension: Diameter 4.77 mm. Length 70 mm.

Immersion Depth (mm)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
65	20.024	20.4	0.4	0.099
65	25.042	25.3	0.3	0.099
65	30.029	30.3	0.3	0.099
65	35.020	35.3	0.3	0.14
65	40.010	40.3	0.3	0.099

UUC*: Unit Under Calibration

Remark: The reported uncertainty of measurement is 0.14, based on standard uncertainty multiplied by a coverage factor $k=2.14$ providing a level of confidence of approximately 95%.

End of Certificate of Calibration



Heat Stress Monitor

Model : Ques Temp 32

Serial No. : TPL090017



Jiranteer Associates Co., Ltd.
63/14-15, 67/35-36
Petchakarn 7/71, Rd. Wattana, Bangkok,
Bangkok 10500(Thailand)
Tel : +66(0)6600112
Mobile : +66(0)63999453
E-mail : jnac-calibration@jiranteer.com
Web site : www.jiranteer.com

Accredited calibration laboratory
ISO/IEC 17025:2017
NSC-TISI-TIS 17025
CALIBRATION 0367

Temperature measurement laboratory
Calibration services department.



NSC - TISI - TIS 17025
CALIBRATION 0367

CERTIFICATE OF CALIBRATION

Certificate No. : CDT-020-69

MEASUREMENT ITEM
MANUFACTURER
MODEL/TYPE
SERIAL NUMBER
ID NUMBER
CONDITION AS-RECEIVED
CUSTOMER

: Heat Stress Monitor
: 3M
: Ques Temp 32
: TPL090017
: NO. 7
: Used item
: Eastern Thai consulting 1992 Co.,Ltd.
683 Moo 11, Sukhapibarn 8 Rd,
Nongkham, Sriracha, Chonburi 20230

RECEIVED DATE
MEASUREMENT DATE
ISSUE DATE

: 25 Dec 2025
: 13 Jan 2026
: 15 Jan 2026

ENVIRONMENTAL CONDITIONS:

Ambient condition in the laboratory are as follow:
Temperature : 23.0 ± 3.0 °C
Relative Humidity : 55.0 ± 15.0 %RH

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

TABULATION OF RESULTS:

The table on next page give the measured values.

Calibrated by:
☐ Mr. Sorawit Thachalad
☒ Miss Jitraporn Lertsomphol
☐ Miss Ruangrumpai Phoommit



Approved signatory:

[Signature]

Mr. Parinya Booncharoen
Calibration Department Manager

[Signature]

Page 1 of 2 Pages

Calibration procedure:
The temperature calibration was done by In-House calibration method as WI-CL-001 according to comparison method with standard digital temperature indicator and standard temperature probe. The temperature scale use was based on ITS-90.

Traceability:
The measurement results are traceable to the international system of units (SI) through National Institute of Metrology Thailand (NIMT) Certificate number: TT-1013-25, Certificate number: ER-0061-25.

Reference Used During Calibration:

1. Standard Temperature Probe
Model: STS-100 A500, Serial No.: 667682-09,
Due date: 9 Apr 2026
2. Digital Temperature Indicator
Model: DTI-1000-A MK II, Serial No.: 671407-00591 Due date: 22 Apr 2026

Uncertainty of Measurement:

The reported uncertainty of measurement is based on the standard uncertainty multiplied by a coverage factor $k=2$, which for a normal distribution corresponds to a coverage probability of approximately 95%. The standard uncertainty has been determined in accordance with the GUM 'Evaluation of measurement data - Guide to the expression of uncertainty in measurement'



Continuation of Certificate of Calibration Number CDT-020-69

Result of Calibration: ☒ Without Adjustment ☐ With Adjustment

Calibration Range: 20 °C to 40 °C

Function:

Table 1: This equipment was connected with wet bulb Temperature probe Model: -, S/N: -, Dimension: Diameter 4.77 mm, Length 70 mm.

Immersion Depth (mm)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
65	20.014	19.8	-0.2	0.099
65	25.040	24.8	-0.2	0.099
65	30.031	29.7	-0.3	0.099
65	35.023	34.8	-0.2	0.099
65	40.002	39.8	-0.2	0.099

Table 2: This equipment was connected with Globe Temperature probe Model: -, S/N: -, Dimension: Diameter 4.77 mm, Length 70 mm.

Immersion Depth (mm)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
65	20.014	19.9	-0.1	0.099
65	25.040	24.9	-0.1	0.099
65	30.031	29.9	-0.1	0.099
65	35.023	34.9	-0.1	0.099
65	40.002	39.8	-0.2	0.099

Table 3: This equipment was connected with Dry Bulb Temperature probe Model: -, S/N: -, Dimension: Diameter 4.77 mm, Length 70 mm.

Immersion Depth (mm)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
65	20.014	19.6	-0.4	0.099
65	25.040	24.6	-0.4	0.099
65	30.031	29.6	-0.4	0.099
65	35.023	34.6	-0.4	0.099
65	40.002	39.6	-0.4	0.099

UUC*: Unit Under Calibration

End of Certificate of Calibration



Heat Stress Monitor

Model : Ques Temp 32

Serial No. : TPI050070



Accredited Calibration Laboratory
ISO/IEC 17025:2017
NAC CALIBRATION 0367



NAC-MRA
CALIBRATION 0367

Temperature measurement laboratory
Calibration services department

JANATEE ASSOCIATES Co., Ltd.
8/11a-15, 67/25, 36
Petchakoen 77/1, Rd. Watthana, Bangkok 10330
Bangkok 10600 (Thailand)
Tel: +66(0)8180812
Mobile: +66863599453
E-mail: jnr.calibration@janatee.com
Web site: www.janatee.com

CERTIFICATE OF CALIBRATION

Certificate No. : CDT-016-69

MEASUREMENT ITEM
MANUFACTURER
MODEL/TYPE
SERIAL NUMBER
ID NUMBER
CONDITION AS-RECEIVED
CUSTOMER

: Heat Stress Monitor
: QUEST TECHNOLOGIES
: Ques Temp 32
: TP1050070
: NO. 3
: Used item
: Eastern Thai Consulting 1992 Co., Ltd.
683 Moo 11, Sukhapibarn 8 Rd,
Nongkham, Sriracha, Chonburi 20230

RECEIVED DATE
MEASUREMENT DATE
ISSUE DATE

: 25 Dec 2025
: 12 Jan 2026
: 15 Jan 2026

ENVIRONMENTAL CONDITIONS:

Ambient condition in the laboratory are as follow:
Temperature : 23.0 ± 3.0 °C
Relative Humidity : 55.0 ± 15.0 %RH

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

TABULATION OF RESULTS:

The table on next page give the measured values.

Calibrated by:
☐ Mr. Sorawit Thachalad
☒ Miss Jitraporn Lertsomphol
☐ Miss Ruangrumpai Phoornmit



Approved signatory:

[Signature]

Mr. Parinya Booncharoen
Calibration Department Manager



THIS CERTIFICATE OF CALIBRATION MAY NOT BE REPRODUCED EXCEPT IN FULL UNLESS PERMISSION FOR REPRODUCTION HAS BEEN OBTAINED
IN WRITING FROM THE LABORATORY

Page 1 of 2 Pages

Calibration procedure:
The temperature calibration method as WI-CL-001
In-House calibration method as WI-CL-001
according to comparison method with standard
digital temperature indicator and standard
temperature probe. The temperature scale use
was based on ITS-90.

Traceability:
The measurement results are traceable to the
international system of units (SI) through
National Institute of Metrology Thailand (NIMT)
Certificate number: TT-1013-25, Certificate
number: FR-0061-25

Reference Used During Calibration:

- Standard Temperature Probe
Model: STS-100 A500, Serial No.: 667682-09,
Due date: 9 Apr 2026
- Digital Temperature Indicator
Model: DTI-1000-A MK II, Serial No.: 671407-
00591 Due date: 22 Apr 2026

Uncertainty of Measurement:

The reported uncertainty of measurement is
based on the standard uncertainty multiplied by
a coverage factor $k=2$, which for a normal
distribution corresponds to a coverage
probability of approximately 95%. The standard
uncertainty has been determined in accordance
with the GUM 'Evaluation of measurement data
- Guide to the expression of uncertainty in
measurement'

Continuation of Certificate of Calibration Number CDT-016-69

Result of Calibration: ☐ Without Adjustment ☒ With Adjustment

Calibration Range: 20 °C to 40 °C

Function:

Table 1: This equipment was connected with wet bulb Temperature probe Model: -, S/N: -
Dimension: Diameter 4.77 mm, Length 70 mm.

Immersion Depth (mm)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
65	20.055	20.4	0.3	0.099
65	25.040	25.4	0.4	0.099
65	30.033	30.3	0.3	0.099
65	35.023	35.3	0.3	0.099
65	40.004	40.3	0.3	0.099

Table 2: This equipment was connected with Globe Temperature probe Model: -, S/N: -
Dimension: Diameter 4.77 mm, Length 70 mm.

Immersion Depth (mm)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
65	20.055	20.2	0.1	0.099
65	25.040	25.2	0.2	0.099
65	30.033	30.2	0.2	0.099
65	35.023	35.2	0.2	0.099
65	40.004	40.2	0.2	0.099

Table 3: This equipment was connected with Dry Bulb Temperature probe Model: -, S/N: -
Dimension: Diameter 4.77 mm, Length 70 mm.

Immersion Depth (mm)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
65	20.055	20.4	0.3	0.099
65	25.040	25.3	0.3	0.099
65	30.033	30.3	0.3	0.099
65	35.023	35.3	0.3	0.099
65	40.004	40.3	0.3	0.099

UUC*: Unit Under Calibration

End of Certificate of Calibration

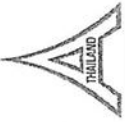


COPY

Hot Air Oven

Model : UFE 500

Serial No. : G511.0182



CERTIFICATE OF CALIBRATION

Customer : EASTERN THAI CONSULTING 1992 CO., LTD.

583 Moo 11, Sukhaphibarn 8 Rd., Nongkham,

Sriracha, Chonburi 20230

Location of Calibration : EASTERN THAI CONSULTING 1992 CO., LTD.

(Hot Lab)

Equipment : Temperature controlled enclosures (Hot air oven)

Manufacturer : Memmert

Serial No. : G511.0182

Date of Receipt : 16 December 2025

Condition of Calibration

1. Environment	1.1 Ambient temperature	Maximum	27.6 °C	Minimum	26.4 °C
	1.2 Relative humidity	Maximum	61.4 %	Minimum	54.0 %
	1.3 Line voltage supplied	Maximum	229.7 VAC	Minimum	225.6 VAC

2. Calibration method

TLAS-G-20: Guidelines for calibration and checks of temperature controlled enclosures.

3. Reference standard instrument

Instrument	ID No.	Certificate No.	Due Date
Data acquisition with sensor (RTD-PT100)	LB-DA-19 (RTD-302 to RTD-303, RTD-311, RTD-305 to RTD-310)	25-010559	04 February 2026

4. This certificate is traceable to the international system of unit (SI Unit).

The measurement is traceable to Asia Medical and Agricultural Laboratory and Research Center Public Company Limited.

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

6. Condition of calibration item : Normal

Calibrated by

Mr. Nathanan Phosri

Scientist

Approved by

(Mr. Somchai Neampunt)

Signed for Director

Issue date

17 December 2025

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

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

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 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 Asia Medical and Agricultural Laboratory and Research Center Public Company Limited (AMARC).

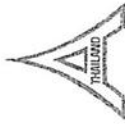
361 Soi Ladprao 122, Ladprao Road,

TEL 02 516-2422

FAX 02 516-6040

CONTACT@AMARC.CO.TH

WWW.AMARC.CO.TH



REPORT OF CALIBRATION

Page 2 of 3

Certificate No. : 25-215653

Sample Code : 25 94507-006

Results of Calibration

Resolution : 0.5 °C

1. Reporting of Temperature

Calibration point (°C)	UUC* setting (°C)	UUC* reading (°C)	Measured temperature at each positions (°C)								Uncertainty ± (°C)	Coverage factor k
			# 1	# 2	# 3	# 4	# 5	# 6	# 7	# 8		
103.5	103.5	103.5	103.98	103.97	103.67	103.76	104.10	104.22	103.80	103.52	103.92	2.00

2. Characterization results

Calibration point (°C)	Stability ± (°C)	Uniformity ± (°C)	Coverage factor k
104	0.07	0.48	0.84

Notes

UUC* = Unit Under Calibration

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NSC-TIS-TIS17025
CALIBRATION0152

REPORT OF CALIBRATION

Page 3 of 3

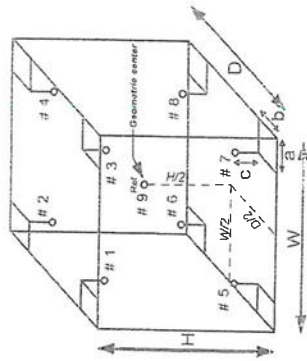
Certificate No. : 25-215653

Sample Code : 25.94507.006

Results of Calibration

Notes

- Sensor installation locations
 - All sensors at any corners or walls should be positioned 5 cm (a x b x c) from the wall.
 - The reference sensor is preferably located of the geometric center of the chamber.
- Interior dimensions approx of chamber :
W = 56 cm ; D = 40 cm ; H = 48 cm
- Air valve or fresh air level : Off
- Fan level : Open
- The quoted uncertainty includes "Stability of chamber and loading effect in chamber at 20% of uniformity".
- 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.
- Stability - one-half of the greatest maximum difference of measured temperatures at any one sensor.
- Overall variation - the difference of the maximum and the minimum measured temperatures throughout observation time.
- UUC* reading - the average reading of indicating device that forms the integral part of the enclosure.
- Calibration results without adjustment.

Figure: Example of sensor
installation Positions

The result expanded uncertainty of measurement U is stated as the standard uncertainty multiplied by the coverage factor k , which for a normal distribution corresponds to a coverage probability of approximately 95%. The standard uncertainty of measurement has been determined in accordance with UKAS M3003

- End of Report -

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INDUCTIBELY COUPLED PLASMA SPECTROMETER

Model : Prodigy 7

Serial No. : P70177



Instrument Performance Certificate

For ICP-OES

PRODUCT ID
Serial Number

Prodigy 7, Teledyne Leeman Labs
P70177

Customer Name
Address

Eastern Thai Consulting 1992 Co.,Ltd
683 Moo 11 Tambon Nong Kham, Si Racha, Chonburi 20230

Date of Qualified
Next Due date

Nov 3, 2025
May 2, 2025

This certifies for products which was performed in acceptable criteria specifications

Gas supply /Water chiller/Exhaust hood
Spectrometer

PASSED
PASSED
PASSED
PASSED
PASSED
PASSED

RF Generator
Sample Introduction & Autosampler
Software & Computer
Hardware Diagnostics Test
Analytical Test

Provided by

Scientist Instrument Co.,Ltd.
113 Soi Ekachai 44, Ekachai Road
Khlong Bang Phran, Bangkok
Bangkok 10150 Thailand

Certified by

Thunraphol Sakdayos
Service Engineer

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Preventive Maintenance Report

Customer Name: Eastern Thai Consulting 1992 Co.,Ltd
Instrument/Equipment: ICP-OES
Brand: Teledyne Leeman Labs
Date: Nov 3, 2025
Model: Prodigy 7
S/N: P70177

1. Gas Supply / Water Chiller / Exhaust Hood:		Status
Gas systems:		
Argon Pressure (80-95 psi):	90 psi	OK ☒
Nitrogen Pressure (80-95 psi):	- psi	OK ☐
No leak inspected		
Replace camera purge gas Dehydrator		
OK ☒ checked ok		
Water Chiller for RF generator		
Pressure 30 psi (2 L/min)		
Temperature: 22.46 C		
No leak inspected		
OK ☒ Ambient ok		
Water Chiller for Detector		
Check water level and refill		
Change water		
Temperature: 28 C		
Exhaust Hood:		
Air Flow rate (> 105 cfm) >105 cfm		
OK ☒		
2.Spectrometer		
Optical view position		
Axial peak positions x 332.0 y 12.00		
Radial peak positions x 422.6 y 11.46		
Hg lamp peak positions x 224.5 y 34.15		
Wavelength Calibrate with Hg Lamp		
Full Frame Image		
Temperature controlled 31 C		
Purge gas flow control Low/High		
Camera Support Module		
OK ☒		

Engineer Sign

Signature

COPY

3. RF Generator		Status
Plasma Control	Auto Start	OK ☒
	Extinguish	OK ☒
	RF power setting	OK ☒
	Igniter	OK ☒
	Air Knife	OK ☒
Coolant / Plasma Flow control	Aux Flow control	OK ☒
	Aux Flow	OK ☒
	Optimize sample introduction function	OK ☒
Camera Support Module	Camera Support Module	OK ☒
4. Sample Introduction & Autosampler		Status
Plasma torch	Plasma Torch	OK ☒
	Spray chamber	OK ☒
	Injector	OK ☒
Peristaltic pump and control	Nebulizer pressure	OK ☒
	speed control	OK ☒
	Sample tubing	OK ☒
Autosampler Control	Drain tubing	OK ☒
	Position movement	OK ☐ No Option
	Auto Rinse	OK ☐
5. Computer & Software Check:		Status
Interface Cable USB	Interface Cable USB	OK ☒
	Software Version 5.2	OK ☒
	Operation function check :	OK ☒
Open / Save / Edit method	Open / Save / Edit method	OK ☒
	Instrument Control	OK ☒
	Sequence	OK ☒
Full Frame Capture	Full Frame Capture	OK ☒
	Auto alignment / Hg alignment	OK ☒
	Calibration Curve	OK ☒
Re-Calculation	Re-Calculation	OK ☒
	Print Report	OK ☒

Engineer Sign
E. S. Mohamed

COPY

6. Hardware Diagnostics Test

Power Supply	Reference Value	Reading Value	Status
Power Supply	-12 VDC (+/- 5 %)	-13.7	Passed ☒
	+12 VDC (+/- 5 %)	11.91	Passed ☒
	3.3VDC (+/- 5 %)	3.306	Passed ☒
	+5.0 VDC (+/- 5 %)	4.995	Passed ☒
	+13.5 VDC (+/- 7.5 %)	13.4	Passed ☒
Plasma Generator	ICP Current 0.500A = 1kW	0.502	Passed ☒
	ICP Ref 5.0Vdc = 1kW	5.001	Passed ☒
	ICP Current 0.00 Vdc = 0kW	0.000	Passed ☒
	ICP Ref 0.00Vdc = 0kW	0.003	Passed ☒
	RF Water (Hz) OFF (1 Hz)	0	Passed ☒
	RF Water (Hz) ON (20-35 Hz)	22	Passed ☒
	Air Knife Pres. (0.00V) OFF	0.0	Passed ☒
	Air Knife Pres. (3.0 - 7.0 V) ON	4.2	Passed ☒
	Neb pressure setting of 2.5 psi	2.510	Passed ☒
	Cool flowrate setting of 10 lpm	10.0	Passed ☒
	Aux flowrate setting of 0.3 lpm	0.34	Passed ☒
	Camera Support Module		Passed ☒
Optical purge flowrate	Pump Current (0.000 A) OFF	0.0	Passed ☒
	Pump Voltage (0.000 V) OFF	0.0	Passed ☒
	Pump Current (0.8 to 4.0A) ON	1.033	Passed ☒
	Pump Voltage (8 to 13 V) ON	12.52	Passed ☒
	Water chiller Temp. Setting 25 °C	3.672	Passed ☒
	Cam Tec Temperature Setting -22 °C	-22	Passed ☒
	Optical Purge Low Setting 5 lpm	5.0	Passed ☒
	Optical Purge High Setting 10 lpm	10.0	Passed ☒
			Passed ☒
			Passed ☒

7. Cleaning & Replacement

	Status
O-Ring Torch replacement	OK ☒
Pump Tubing replacement	OK ☒
Glassware cleaning	OK ☒
Lubricate the roll peristaltic pump	OK ☒
Optical windows cleaning	OK ☒
Change & refilled Detector water chiller	OK ☒
Change & refilled RF Generator water Chiller	OK ☒

Engineer Sign
E. S. Mohamed

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8. Safety Interlock	Status
Argon pressure	OK ☒
Air Knife	OK ☒
RF power regulator	OK ☒
RF power temp	OK ☒
RF power current	OK ☒
RF water	OK ☒
Oscillator cover	OK ☒
Door switch	OK ☒
Camera purge	OK ☒
Camera TE cooler	OK ☒
Water chiller	OK ☒
Heater Fans	OK ☒

9. Analytical Test	Details	Status
Method Name	Mn Setup	
SRM Standard	Mn 5 ppm	
Calibration curve type	Linear	
Rho	1.0	OK ✓
Element	Mn	
QC standard Check	5 ppm	OK ✓

Customer Sign	Engineer Sign
<i>[Signature]</i>	<i>[Signature]</i>
06/18/2018	3/11/2018

Customer Sign	Engineer Sign
<i>[Signature]</i>	<i>[Signature]</i>
06/18/2018	3/11/2018

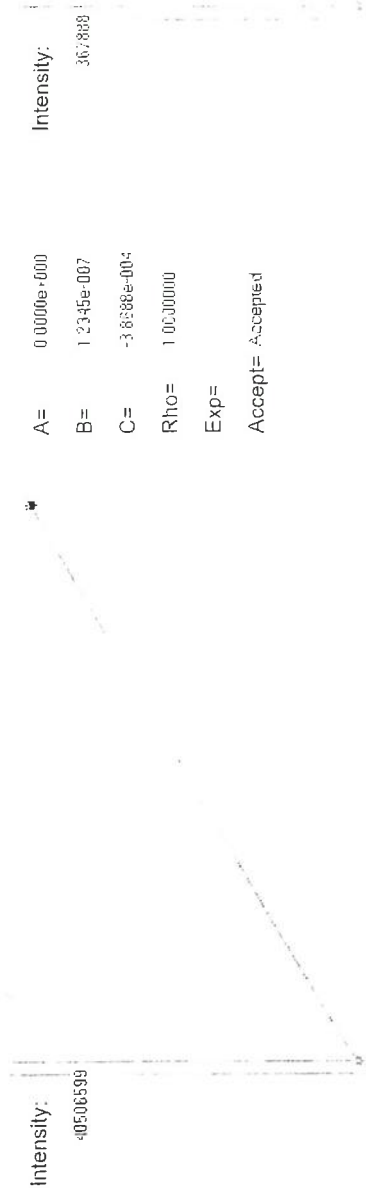
1000

YDP

Mn Setup - Mn 257.610

Linear

A= 0.0000e+000
 B= 1.2345e-007
 C= -3.8888e-004
 Rho= 1.0000000
 Exp=
 Accept= Accepted



Max Conc: 5.000 ppm

Std ID	Conc	Calc	Dev	Mean	SD of	%RSD	Rep 1	Rep 2	Rep 3	Rep 4	Rt	Std ID
Mn	5.000	5.000	0.000	40506599	0.2 %	578.179	40500970	40404947	40613882	2724		Mn
Blank	0	1.66e-016	0.000	3134			3952	2727				Blank

Mn Setup - Mn 257.610 r

Linear

A= 0.0000e+000
 B= 1.3506e-005
 C= -1.8587e-003
 Rho= 1.0000000
 Exp=
 Accept= Accepted



Max Conc: 5.000 ppm

Std ID	Conc	Calc	Dev	Mean	SD of	%RSD	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Mn	5.000	5.000	0.000	367888	0.6 %	3.859	368243	364847	370576	124	
Blank	0	-6.33e-017	-0.000	122			126	117			

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PM Test Report 3 November 2025

Case Number: 03799-25-114166

Sample ID	Line	Conc.	Intensity
Blank - 1	Mn 257.610		3952
Blank - 1	Mn 257.610 r		126
Blank - 2	Mn 257.610		2727
Blank - 2	Mn 257.610 r		117
Blank - 3	Mn 257.610		2724
Blank - 3	Mn 257.610 r		124
Mn - 1	Mn 257.610		40500970
Mn - 1	Mn 257.610 r		368243
Mn - 2	Mn 257.610		40404947
Mn - 2	Mn 257.610 r		364847
Mn - 3	Mn 257.610		40613882
Mn - 3	Mn 257.610 r		370576
QC Check 5 ppm - 1	Mn 257.610	5.0594	40988160
QC Check 5 ppm - 1	Mn 257.610 r	5.0111	368708
QC Check 5 ppm - 2	Mn 257.610	5.0271	40726441
QC Check 5 ppm - 2	Mn 257.610 r	5.0148	368980
QC Check 5 ppm - 3	Mn 257.610	5.0679	41056315
QC Check 5 ppm - 3	Mn 257.610 r	4.9638	365228
QC Check 5 ppm - 4	Mn 257.610	5.0515	40923751
QC Check 5 ppm - 4	Mn 257.610 r	5.0040	368180
QC Check 5 ppm - 5	Mn 257.610	5.0533	40938450
QC Check 5 ppm - 5	Mn 257.610 r	4.9881	367015
QC Check 5 ppm - 6	Mn 257.610	5.0864	41206181
QC Check 5 ppm - 6	Mn 257.610 r	4.9493	364157
QC Check 5 ppm - 7	Mn 257.610	5.0544	40947211
QC Check 5 ppm - 7	Mn 257.610 r	5.0685	372928
QC Check 5 ppm - 8	Mn 257.610	5.0681	41058127
QC Check 5 ppm - 8	Mn 257.610 r	4.9847	366763
QC Check 5 ppm - 9	Mn 257.610	5.0369	41048908
QC Check 5 ppm - 9	Mn 257.610 r	5.0494	371520
QC Check 5 ppm - 10	Mn 257.610	5.0481	40896149
QC Check 5 ppm - 10	Mn 257.610 r	4.9444	363799

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ORIFICE TRANSFER STANDARD CERTIFICATION

WORKSHEET TE-5025A

ROOTSMETER S/N 0438320



TISCH ENVIRONMENTAL, INC.
145 SOUTH MIAMI AVE
VILLAGE OF CLEVELAND, OH
45002
513.467.9000
877.283.7810 TOLL FREE
513.467.9009 FAX

ORIFICE TRANSFER STANDARD CERTIFICATION WORKSHEET TE-5025A

Date - Mar 24, 2016 Rootmeter S/N 0438320 Ta (K) - 295
Operator Tisch Orifice I.D. - 0136 Pa (mm) - 742.95

PLATE OR Run #	VOLUME START (m3)	VOLUME STOP (m3)	DIFF VOLUME (m3)	DIFF TIME (min)	METER DIFF Hg (mm)	ORIFICE DIFF H2O (in.)
1	NA	NA	1.00	1.3400	3.2	2.00
2	NA	NA	1.00	0.9510	6.3	4.00
3	NA	NA	1.00	0.8510	7.8	5.00
4	NA	NA	1.00	0.8130	8.6	5.50
5	NA	NA	1.00	0.6690	12.6	8.00

DATA TABULATION

Vstd	(x axis)	(y axis)			(y axis)
	Qstd		Va	Qa	
0.9832	0.7337	1.4054	0.9957	0.7430	0.8911
0.9791	1.0296	1.9875	0.9915	1.0426	1.2603
0.9770	1.1481	2.2221	0.9894	1.1626	1.4090
0.9760	1.2006	2.3305	0.9884	1.2157	1.4778
0.9707	1.4510	2.8107	0.9830	1.4694	1.7823
Qstd slope (m)	= 1.96262		Qa slope (m)	= 1.22896	
intercept (b)	= -0.03249		intercept (b)	= -0.02060	
coefficient (r)	= 0.99993		coefficient (r)	= 0.99993	
Y axis = SQRT[H2O(Pa/760) (298/Ta)]			Y axis = SQRT[H2O(Ta/Pa)]		

CALCULATIONS

Vstd = Diff. Vol [(Pa-Diff. Hg)/760] (298/Ta)
Qstd = Vstd/Time

Va = Diff Vol [(Pa-Diff Hg)/Pa]
Qa = Va/Time

For subsequent flow rate calculations:

$$Qstd = 1/m \{ [SQRT (H2O(Pa/760) (298/Ta))] - b \}$$
$$Qa = 1/m \{ [SQRT H2O(Ta/Pa)] - b \}$$

COPY

Primary Flow Calibrator

Serial No. : 110619 , 207510



CERTIFICATE OF CALIBRATION

FOR

NOMENCLATURE : PRIMARY FLOW CALIBRATOR
MANUFACTURER : BIOS INTERNATIONAL
MODEL / TYPE : DEFENDER 510-L
SERIAL NO. : 110619
CLID. NO. : 212500238
JOB CONTROL NO. : 260113004617
CALIBRATION SERVICE : ☒ IN-LABORATORY ☐ ON-SITE

CUSTOMER : EASTERN THAI CONSULTING 1992 CO., LTD.
683 MOO 11, SUKHAPIBARN 8 RD,
NONGKHAM, SRIRACHA, CHONBURI 20230

DATE OF RECEIVED : 13 January 2026

DATE OF ISSUED : 15 January 2026

The report of calibration shall not be reproduced except in full without approval of the Calibration Laboratory Co., Ltd.

Calibrated By :

Supphakit Sakuntaharn

Calibration Engineer



Approved By :

Mongkol Yotsontorn

Authorized Signatory

15 January 2026

This Calibration Certificate documents the traceability to national standards, which realize the units of measurement according to

the International System of Units (SI)

Certificate No. Q26004617

F3-011-05/12-23

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page 1 of 3



REPORT OF CALIBRATION

FOR

NOMENCLATURE : PRIMARY FLOW CALIBRATOR
MANUFACTURER : BIOS INTERNATIONAL
MODEL / TYPE : DEFENDER 510-L
SERIAL NO. : 110619
DATE OF CALIBRATION : 14 January 2026

ENVIRONMENT CONDITIONS :

Temperature : $(23 \pm 2) ^\circ\text{C}$

Relative Humidity : $(55 \pm 10) \% \text{ RH}$

PROCEDURE USED :

This instrument was calibrated under procedure No. CLC-CPPF-03. The calibration was performed by comparison with Gas Flow Meter which refers to the standard condition of 101.325 kPa and 0 $^\circ\text{C}$.

REFERENCE STANDARD USED :

Gas Flow Meter, Alicat Scientific Model M-500SCCM-D-DB15 S/N: 261329.

TRACEABILITY :

The measurements are traceable to International System of Units (SI), through Chell Instrument Ltd.

Certificate No. N039746. Due Date 02 April 2026.

UNCERTAINTY :

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor $k = 2$ which for a normal distribution corresponds to a coverage probability of approximately 95 %.

It has been evaluated according to the "Evaluation of the Uncertainty of Measurement in Calibration (EA-4/02:2022)".

Certificate No. Q26004617

F3-011-05/12-23

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ANAB

MEASUREMENT RESULTS: (X) without adjustment () adjustment

CALIBRATION DATA

Nominal Value (cc/min)	STD Applied (cc/min)	DUC Reading (cc/min)	Correction (cc/min)	Uncertainty $\pm$ (cc/min)
0	0.000	0.000	0.000	-
50	50.000	49.521	+0.479	0.300
100	100.000	98.397	+1.603	0.300
200	200.00	196.57	+3.43	0.58
300	300.00	295.49	+4.51	0.86
400	400.00	392.74	+7.26	1.14
500	500.00	491.64	+8.36	1.43

Setting Temperature 0 °C ; Pressure 101.3 kPa

Note: The Scope of Accredited ANAB Certificate No. ACDM-2814 Version 018 Page 52 of 73

This report is valid for the above stated instrument/s only.

End of Certificate

Certificate No. Q26004617

F3-011-05/12-23

page 3 of 3



2000



Accredited
ISO 9001:2015

CERTIFICATE OF CALIBRATION

FOR

NOMENCLATURE : PRIMARY FLOW CALIBRATOR
MANUFACTURER : MESALABS
MODEL / TYPE : DEFENDER 510-M
SERIAL NO. : 207510
CLID. NO. : 212500237
JOB CONTROL NO. : 260113004618
CALIBRATION SERVICE : ☒ IN-LABORATORY ☐ ON-SITE

CUSTOMER : EASTERN THAI CONSULTING 1992 CO., LTD.
683 MOO 11, SUKHAPIBARN 8 RD,
NONGKHAM, SRIRACHA, CHONBURI 20230

DATE OF RECEIVED : 13 January 2026

DATE OF ISSUED : 15 January 2026

The report of calibration shall not be reproduced except in full without approval of the Calibration Laboratory Co., Ltd.

Calibrated By : Supphakit Sakuntaharn
Calibration Engineer



Approved By : Mongkol Yotsoontorn
Authorized Signatory
15 January 2026

(Signature)

This Calibration Certificate documents the traceability to national standards, which realize the units of measurement according to the International System of Units (SI)

Certificate No. Q26004618

F3-011-05/12-23

page 1 of 3



REPORT OF CALIBRATION

FOR

NOMENCLATURE : PRIMARY FLOW CALIBRATOR
MANUFACTURER : MESALABS
MODEL / TYPE : DEFENDER 510-M
SERIAL NO. : 207510
DATE OF CALIBRATION : 14 January 2026

ENVIRONMENT CONDITIONS :

Temperature : (23 ± 2) °C

Relative Humidity : (55 ± 10) % RH

PROCEDURE USED :

This instrument was calibrated under procedure No. CLC-CPPF-03. The calibration was performed by comparison with Gas Flow Meter which refers to the standard condition of 101.325 kPa and 0 °C.

REFERENCE STANDARD USED :

Gas Flow Meter, Alicat Scientific Model M-5SLPM-D-DB15 S/N. 261330.

TRACEABILITY :

The measurements are traceable to International System of Units (SI), through Chell Instrument Ltd. Certificate No. N039747. Due Date 02 April 2026.

UNCERTAINTY :

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor $k = 2$ which for a normal distribution corresponds to a coverage probability of approximately 95 %. It has been evaluated according to the "Evaluation of the Uncertainty of Measurement (EA-4/02 M:2022)"

Certificate No. Q26004618

F3-011-05/12-23

page 2 of 3

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CONDITION OF CALIBRATION ITEM : RECEIVED IN GOOD OPERATIONAL CONDITION

MEASUREMENT RESULTS : (X) without adjustment () adjustment

The table in the following gives the calibration results and associated measurement uncertainties of the measuring primary flow calibrator.

CALIBRATION DATA

PRIMARY FLOW CALIBRATOR RESULT

Nominal Value (cc/min)	STD Applied (cc/min)	DUC Reading (cc/min)	Correction (cc/min)	Uncertainty $\pm$ (cc/min)
0	0.000	0.000	0.000	
50	50.000	49.508	+0.492	0.300
100	100.000	98.897	+1.103	0.300
200	200.00	197.81	+2.19	0.58
500	500.00	495.09	+4.91	1.43
1000	1000.00	991.68	+8.32	2.87
2000	2000.0	1987.2	+12.8	5.7
3000	3000.0	2985.5	-14.5	8.6
4000	4000.0	3983.1	+16.9	11.5
5000	5000.0	4981.3	+18.7	14.4

Technical Note. Media of Gas : Air

Setting Temperature 0 ° C ; Pressure 101.3 kPa

Note. The Scope of Accredited ANAB Certificate No. ACDM-2814 Version 018 Page 52 of 73

This report is valid for the above stated instrument/s only.

End of Certificate

Certificate No. Q26004618

F3-011-05/12-23



Page 3 of 3

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THERMO-HYGROMETER

Model : 608-H1

Serial No. : 45106737

NSC-TIS-TIS 17025
CALIBRATION 0152

Page 1 of 2

CERTIFICATE OF CALIBRATION

Certificate No. : 26-072409
Sample Code : 26-030912.002

Customer : EASTERN THAI CONSULTING 1992 CO., LTD.

683 Moo 11, Sukhaphiban 8 Rd., Nongkham,

Sirachua, Chonburi 20230

Location of Calibration : Asia Medical and Agricultural Laboratory and Research Center, Public Company Limited

(Calibration laboratory)

Equipment : Digital thermo-hygrometer

Manufacturer : testo Model : 608-H1

Serial No. : 45106737 ID No. : LABE 09/7

Date of Receipt : 30 April 2026 Date of Calibration : 06 May 2026

Condition of Calibration

1. Environment 1.1 Ambient temperature : 23.0 °C ± 3.0 °C

1.2 Relative humidity : 55.0 % ± 15.0 %

2. Calibration method

2.1 In-house method: WI-CL-045 By comparison with thermometer standard / chilled mirror hygrometer in controlled chamber.

2.2 The calibration by comparison unit under calibration (UUC) to the thermometer standard / chilled mirror hygrometer in a chamber at the controlled temperature / relative humidity.

3. Reference standard instrument

Instrument	Model	ID No.	Certificate No.	Due Date
3.1 Chilled Mirror	Optidew 401	LB-DP-04 & LB-DP-04 (DP)	TH-0045-25	22 July 2026
3.2 Digital Thermometer	Optidew 401	LB-DP-04 & LB-DP-04 (Temp.)	25-157165	19 August 2026
3.3 Digital Thermometer	34972A	LB-DA-07 with RTD-89	25-115069	18 August 2026

4. This certificate is traceable to the international system of unit (SI Unit).

4.1 Instrument No. 3.1 through National Institute of Metrology (Thailand).

4.2 Instrument No. 3.2 and 3.3 through Asia Medical and Agricultural Laboratory and Research Center Public Company Limited.

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

6. Condition of calibration item : Normal

Calibrated by

Miss Pornsuda Lohabai

Approved by

(Mr. Nuttaput Timula)

Signed for Director

Issue date

08 May 2026

The uncertainties are for a confidence probability of approximately 95%.
The calibration result is applied only to the above calibrated item and was found accurate as shown on date and place of calibration only.

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 unit of measurement realized at the corresponding national standards laboratory. This certificate may not be reproduced other than in full extent with the prior written approval of the Asia Medical and Agricultural Laboratory and Research Center Public Company Limited (AMARC)

361 Soi Ladprao 122, Ladprao Road,
Phialapha, Wang Thonglang, Bangkok 10310TEL 02-516-2422
FAX 02-516-6949

FM CL 114

CONTACT@AMARC.CO.TH
WWW.AMARC.CO.TH
Effective Date: 16/03/26NSC-TIS-TIS 17025
CALIBRATION 0152

Page 2 of 2

REPORT OF CALIBRATION

Certificate No. : 26-072409
Sample Code : 26-030912.002

Results of Calibration

Temperature measurement

Resolution : 0.1 °C
Range : 0 °C to 50 °C

Calibration point °C	Average of standard reading		Unit under calibration		uncertainty °C
	Controlled humidity %RH	Temperature °C	Average reading °C	Correction value °C	
20	50	20.00	19.9	+ 0.10	± 0.39
25	50	25.00	24.9	+ 0.10	± 0.39
30	50	30.02	29.8	+ 0.22	± 0.39

Humidity measurement

Resolution : 0.1 %RH
Range : 10 %RH to 95 %RH

Calibration point %RH	Average of standard reading		Unit under calibration		uncertainty %RH
	Air temperature °C	Calculated humidity %RH	Average reading %RH	Correction value %RH	
45	25.00	45.04	50.2	- 5.16	± 1.3
60	25.00	60.10	65.1	- 5.00	± 1.5
75	25.01	75.06	85.7	- 10.64	± 1.7

Notes

Calibration results without adjustment.

The result recorded uncertainty of measurement U₉₅ stated as the standard uncertainty of measurement multiplied by the coverage factor k=2.02, which for a normal distribution corresponds to a coverage probability of approximately 95%. the standard uncertainty of measurement has been determined in accordance with GUM 2008

- End of Report -

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SOUND LEVEL CALIBRATOR

MODEL : NC-75

SERIAL No. : 34802645

Cert. No. : ACC25065
Pages : 1 of 3

Cert. No. : ACC25065
Job No. : VC68AC0181
Pages : 2 of 3

Calibration Certificate

Equipment : SOUND CALIBRATOR

Manufacturer : RION

Model : NC-75

Serial No. : 34802645

IED No. : -

Condition As Found : GOOD

Customer :
EASTERN THAI CONSULTING 1992 CO., LTD.
SAHA GROUP INDUSTRIAL PARK, 683 MOO 11,
NONGKHAM, SIRACHA, CHONBURI 20230 THAILAND.

Location :
Ambient Temperature : (23.0 ± 3) °C
Pressure : (101.3 ± 3) kPa
Relative Humidity : (50.0 ± 20) %

Received Date : 08 SEPTEMBER 2025
Calibration Date : 10 OCTOBER 2025
Date of Issue : 10 OCTOBER 2025

Calibrated by : Nathakorn Pisutpaisan

Approved by :
(Nitinun Srihawan)

Calibration Procedure : CP-AC-03

Calibration Method :

This equipment was calibrated by follow on IEC-60942-2003 Standard.

The sound pressure level, frequency and total distortion of the sound calibrator was measured using the reference microphone.

Condition of this result of calibration :

1. Reference Standard Instruments :

Instrument	Model	Serial No.	Cert. No.	Due Date
Waveform Generator	33511B	MY52302742	EF-0012-25	11-FEB-26
Digital Multimeter	33461A	MY53220104	EEL-BP 24/0268	22-APR-26
Digital Multimeter	33461A	MY53220076	EEL-BP 23/0268	22-APR-26
Digital Multimeter	33461A	MY60024273	CA20251201A	18-MAR-26
Programmable Attenuator	MAT-1070	62100114	EF-0006-25	11-FEB-26
Condenser Microphone	4180	2977900	AA-1002-25	19-FEB-26
Measuring Amplifier	NA-12KAI	34560495	AA-3002-25	19-FEB-26
Audio Analyzer	AVR-3360A	V744136069	EF-0013-25	14-FEB-26

2. This result of calibration was found accurate as shown on date and place of calibration for this calibrated item only.
3. This certificate is traceable to the international system of unit maintained at :

- 3.1 National Institute of Metrology (Thailand).
- 3.2 Thailand Institute of Scientific and Technological Research (TISTR).
- 3.3 Electrical And Electronics Institute (EEI).

Cert. No. : ACC25065

Job No. : VC68AC0181

Pages : 3 of 3

Result of calibration :**1. Sound pressure level**

Specified sound pressure level (dB)	Measured value (dB)	Deviated value (dB)	Uncertainty (dB)	Acceptance limit (dB)
94	93.98	-0.02	0.15	0.40

2. Frequency

Specified Frequency (Hz)	Measured value (Hz)	Deviated value (%)	Uncertainty (%)	Acceptance limit (%)
1000	1000.0	0.0	0.1	1.0

3. Total distortion

Measured value (%)	Uncertainty (%)	Acceptance limit (%)
0.46	0.10	3.0

The reported uncertainty is based on a standard uncertainty multiplied by coverage factor $k = 2$ or any value following calculation, providing a level of confidence of approximately 95 %

End of Calibration Certificate**COPY**

SOUND LEVEL METER

MODEL : NL-52A

SERIAL No. : 00230993



Cert. No. : ACL26025
Pages : 1 of 8

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-52A / Microphone UC-59 / Preamplifier NH-25
Serial No.: 00230993 / 22776 / 22429
ID No.: -

Condition As Found : GOOD

Customer : EASTERN THAI CONSULTING 1992 CO., LTD.
SAHA GROUP INDUSTRIAL PARK, 683 MOO 11,
NONGKHAM, SIRACHA, CHONBURI 20230 THAILAND.

Location : -
Ambient Temperature : (23.0 ± 3) °C
Pressure : (101.3 ± 3) kPa
Relative Humidity : (50.0 ± 20) %

Received Date : 26 DECEMBER 2025
Calibration Date : 05 - 07 JANUARY 2026
Date of Issue : 07 JANUARY 2026

Calibrated by : Nathakorn Pisutpaisan

Approved by :

(Nitinun Srihawan)

This certificate is issued in accordance with the requirements of ISO/IEC 17025 standard, may not be reproduced other than in full, except with the prior written approval of the head of Calibration Laboratory.

Cert. No. : ACL26025
Job No. : VC69AC0048
Pages : 2 of 8

Calibration Procedure : CP-AC-02

Calibration Method :

This equipment was calibrated by follow on IEC-61672-3 (2013) Standard for sound level meter (SLM).
The SLM had tests to Acoustical and Electrical signal tests of frequency weighting with Anechoic chamber and Reference Standard Instruments.

For tests results of each items were made by observation of each Instruments display and also with SLM's display.

Condition of this result of calibration :

1. Reference Standard Instruments :

Instrument	Model	Serial No.	Cert. No.	Due Date
Waveform Generator	33210A	MY48017076	EF-0011-25	11-FEB-26
Waveform Generator	33511B	MY52302742	EF-0012-25	11-FEB-26
Digital Multimeter	33461A	MY53220104	EEL-BP 24/0268	22-APR-26
Digital Multimeter	33461A	MY53220076	EEL-BP 23/0268	22-APR-26
Digital Multimeter	34461A	MY60024273	CA20031205A	18-MAR-26
Programmable Attenuator	MAI-1070	62100114	EF-0006-25	11-FEB-26
Condenser Microphone	4180	2977900	AA-1002-25	19-FEB-26
Measuring Amplifier	NA-42KAI	34560495	AA-3002-25	19-FEB-26

2. This result of calibration was found accurate as shown on date and place of calibration for this calibrated item only.

3. This certificate is traceable to the international system of unit maintained at :

- 3.1 National Institute of Metrology (Thailand).
- 3.2 Thailand Institute of Scientific and Technological Research (TISTR).
- 3.3 Electrical And Electronics Institute (EEI).

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Cert. No. : ACL26025
Job No. : VC69AC0948
Pages : 3 of 8

Summary of Measurement Result :

Parameter	Uncertainty (dB)	Maximum-permitted uncertainty of measurement (dB)
1. Absolute sensitivity	0.2	N/A
2. Self-generated noise	0.2	N/A
3. Acoustical signal tests of frequency weightings		
125 Hz	0.3	0.6
1000 Hz	0.3	0.6
8000 Hz	0.3	0.7
4. Electrical signal tests of frequency weightings		
For 10 Hz to 4 kHz	0.3	0.6
For > 4 kHz to 10 kHz	0.3	0.7
For > 10 kHz to 20 kHz	0.3	1.0
5. Frequency and time weightings at 1 kHz	0.2	0.2
6. Long - term stability	0.1	0.1
7. Level linearity on the reference level range	0.2	0.3
8. Level linearity including the level range control	0.2	0.3
9. Tone burst response	0.2	0.3
10. Peak C sound level	0.2	0.35
11. Overload indication	0.2	0.25
12. High level stability	0.1	0.1

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Cert. No. : ACL26025
Job No. : VC69AC0948
Page : 4 of 8

Result of calibration :

1. Absolute sensitivity

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limit (dB)
93.9 (93.94)	94.0	0.0	+0.3

2. Self-generated noise

2.1 Normal test

Measured Value (dB)
17.2

2.2 The microphone of the sound level meter was replaced by electrical signal input device.

Frequency Weighting	Weighting (dB)
A - weight	12.0
C - weight	15.2
Flat	22.2

3. Acoustical signal tests of frequency weightings

Meter free-field acoustic response at a level of 84 dB

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)		
	Flat	C-weight	A-weight
125	0.2	0.2	0.3
1000	0.3	0.3	0.3
8000	0.6	0.5	0.6

Acceptance
Limits
±1.0
±0.7
±1.5, ±2.5

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Cert. No. : ACL26025
Job No. : VC69AC0043
Pages : 5 of 8

Cert. No. : ACL26025
Job No. : VC69AC0048
Pages : 6 of 8

4. Electrical signal tests of frequency weightings
Weighting network response with relative to 1 kHz.

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)		
	Flat	C-weight	A-weight
63	0.1	0.0	0.0
125	0.0	0.0	0.0
250	0.0	0.0	0.0
500	0.0	0.0	0.0
1000	0.0	0.0	0.0
2000	0.0	0.0	0.0
4000	0.0	0.0	0.0
8000	0.0	0.1	0.1
16000	0.0	-1.2	-1.2

5. Frequency and time weightings at 1 kHz

5.1 Frequency weightings at 1 kHz

Frequency Weighting	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A - weight	94.0	94.0	0.0	± 0.2
C - weight	94.0	94.0	0.0	± 0.2
Flat	94.0	94.0	0.0	± 0.2

5.2 Time weighting at 1 kHz

Frequency Weighting	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	94.0	94.0	0.0	± 0.1
Slow	94.0	94.0	0.0	± 0.1
Leq	94.0	94.0	0.0	± 0.1

6. Long - term stability

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A - weight	94.0	94.0	0.0	± 0.1

7. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
137.0	137.0	0.0	± 0.8
136.0	136.0	0.0	± 0.8
135.0	135.0	0.0	± 0.8
134.0	134.0	0.0	± 0.8
133.0	133.0	0.0	± 0.8
132.0	132.0	0.0	± 0.8
131.0	131.0	0.0	± 0.8
129.0	129.0	0.0	± 0.8
124.0	124.0	0.0	± 0.8
119.0	119.0	0.0	± 0.8
114.0	114.0	0.0	± 0.8
109.0	109.0	0.0	± 0.8
104.0	104.0	0.0	± 0.8
99.0	99.0	0.0	± 0.8
94.0	94.0	0.0	± 0.8
89.0	89.0	0.0	± 0.8
84.0	84.0	0.0	± 0.8
79.0	79.0	0.0	± 0.8
74.0	74.0	0.0	± 0.8
69.0	69.0	0.0	± 0.8
64.0	64.0	0.0	± 0.8
59.0	59.0	0.0	± 0.8
54.0	53.9	-0.1	± 0.8
49.0	49.0	0.0	± 0.8
44.0	43.9	-0.1	± 0.8
39.0	38.9	-0.1	± 0.8
34.0	34.0	0.0	± 0.8
30.0	30.0	0.0	± 0.8
29.0	29.0	0.0	± 0.8
28.0	28.0	0.0	± 0.8
27.0	26.9	-0.1	± 0.8
26.0	26.0	0.0	± 0.8
25.0	24.9	-0.1	± 0.8

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Cert. No. : ACL26025
Job No. : VC69AC0048
Pages : 7 of 8

8. Level linearity including the level range control

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
130	94.0	94.0	0.0	±0.8

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
130	29.0	29.0	0.0	±0.8

9. Tone burst response

Time Weighting	Tone burst duration, Tb (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	108.0	107.9	-0.1	1.0 ; -3.0
	2	8	117.0	117.0	0.0	1.0 ; -1.5
	200	800	134.0	134.0	0.0	±0.5
Slow	2	8	108.0	108.0	0.0	1.0 ; -3.0
	200	800	127.6	127.6	0.0	±0.5
SEL	0.25	1	99.0	98.9	-0.1	1.0 ; -3.0
	2	8	108.0	108.0	0.0	1.0 ; -1.5
	200	800	128.0	128.0	0.0	±0.5

Cert. No. : ACL26025
Job No. : VC69AC0048
Pages : 8 of 8

10. Peak C sound level

Number of cycle in test signal	Anticipated Value (dB)	Measured Value, Lepeak (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	130.0	130.0	0.0	±2.0
One	133.4	133.3	-0.1	±2.0

Number of cycle in test signal	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	135.0	135.0	0.0	±1.0
Positive half cycle	135.4	135.2	-0.2	±1.0
Negative half cycle	135.4	135.2	-0.2	±1.0

11. Overload indication

Measured value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Positive one-half cycle	89.6	±1.5
Negative one-half cycle		
89.6	0.0	±1.5

12. High level stability

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A - weight	137.0	137.0	0.0	±0.1

The reported uncertainty is based on a standard uncertainty multiplied by coverage factor $k = 2$
or any value following calculation, providing a level of confidence of approximately 95 %

End of Calibration Certificate

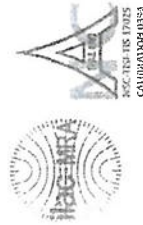
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SOUND LEVEL METER

MODEL : NL-52A

SERIAL No. : 01120952



Cert. No. : AC126070
Pages : 1 of 8

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-52A / Microphone UC-59 / Preamplifier NH-25
Serial No.: 01120952 / 22709 / 22427
ID No.: -

Condition As Found : GOOD

Customer : EASTERN THAI CONSULTING 1992 CO., LTD.
SAHA GROUP INDUSTRIAL PARK, 683 MOO 11,
NONGKHAM, SIRACHA, CHONBURI 20230 THAILAND.

Location : -
Ambient Temperature : (23.0 ± 3) °C
Pressure : (101.3 ± 3) kPa
Relative Humidity : (50.0 ± 20) %

Received Date : 26 DECEMBER 2025
Calibration Date : 05 - 07 JANUARY 2026
Date of Issue : 07 JANUARY 2026

Calibrated by : Nathakorn Pisutpaisan

Approved by :

(Nitinun Srihawan)

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Cert. No. : ACL26029
Job No. : VC69AC0048
Pages : 2 of 8

Calibration Procedure : CP-AC-02

Calibration Method :

This equipment was calibrated by follow on IEC-61672-3 (2013) Standard for sound level meter (SLM).
The SLM had tests to Acoustical and Electrical signal tests of frequency weighting with Anechoic chamber and Reference Standard Instruments.

For tests results of each items were made by observation of each Instruments display and also with SLM's display.

Condition of this result of calibration :

1. Reference Standard Instruments :

Instrument	Model	Serial No.	Cert. No.	Due Date
Waveform Generator	33210A	MY48017076	EF-0011-25	11-FEB-26
Waveform Generator	33511B	MY52302742	EF-0012-25	11-FEB-26
Digital Multimeter	33461A	MY53220104	EEL-BP 24/0268	22-APR-26
Digital Multimeter	33461A	MY53220076	EEL-BP 23/0268	22-APR-26
Digital Multimeter	34461A	MY60024273	CA2025120FA	18-MAR-26
Programmable Attenuator	MAT-1070	62100114	EF-0006-25	11-FEB-26
Condenser Microphone	4180	2977900	AA-1002-25	19-FEB-26
Measuring Amplifier	NA-42KAJ	34560495	AA-1002-25	19-FEB-26

2. This result of calibration was found accurate as shown on date and place of calibration for this calibrated item only.
3. This certificate is traceable to the international system of unit maintained at :

- 3.1 National Institute of Metrology (Thailand).
- 3.2 Thailand Institute of Scientific and Technological Research (TISTR).
- 3.3 Electrical And Electronics Institute (EII).

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Cert. No. : ACL26020
Job No. : VC69AC0048
Pages : 3 of 8

Cert. No. : ACL26020
Job No. : VC69AC0048
Page : 4 of 8

Summary of Measurement Result :

Parameter	Uncertainty (dB)	Maximum permitted uncertainty of measurement (dB)
1. Absolute sensitivity	0.2	N/A
2. Self-generated noise	0.2	N/A
3. Acoustical signal tests of frequency weightings		
125 Hz	0.3	0.6
1000 Hz	0.3	0.6
8000 Hz	0.3	0.7
4. Electrical signal tests of frequency weightings		
For 10 Hz to 4 kHz	0.3	0.6
For > 4 kHz to 10 kHz	0.3	0.7
For > 10 kHz to 20 kHz	0.3	1.0
5. Frequency and time weightings at 1 kHz	0.2	0.7
6. Long-term stability	0.1	0.1
7. Level linearity on the reference level range	0.2	0.3
8. Level linearity including the level range control	0.2	0.3
9. Tone burst response	0.2	0.3
10. Peak C sound level	0.2	0.85
11. Overload indication	0.2	0.25
12. High level stability	0.1	0.1

Result of calibration :

1. Absolute sensitivity

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limit (dB)
93.9 (91.94)	94.0	0.6	± 0.3

2. Self-generated noise

2.1 Normal test

Measured Value (dB)
14.8

2.2 The microphone of the sound level meter was replaced by electrical signal input device.

Frequency Weighting	Weighting (dB)
A-weight	9.9
C-weight	14.7
Flat	20.0

3. Acoustical signal tests of frequency weightings

Meter free-field acoustic response at a level of 84 dB

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)		
	Flat	C-weight	A-weight
125	0.1	0.1	0.1
1000	0.1	0.1	0.1
8000	0.3	0.4	0.4
			± 1.5, -2.5

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Cert. No. : ACL26020
Job No. : VC69AC0048
Pages : 5 of 8

4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 kHz.

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
63	0.0	0.0	0.1	±1.0
125	0.0	0.0	0.0	±1.0
250	0.0	0.0	0.0	±1.0
500	0.0	0.0	0.0	±1.0
1000	0.0	0.0	0.0	±1.0
2000	0.0	0.0	0.0	±1.0
4000	0.0	0.0	0.0	±1.0
8000	0.0	0.1	0.1	+ 1.5, - 2.5
16000	0.0	-1.2	-1.2	+ 2.5, -16.0

5. Frequency and time weightings at 1 kHz

5.1 Frequency weightings at 1 kHz

Frequency Weighting	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A - weight	94.0	94.0	0.0	± 0.2
C - weight	94.0	94.0	0.0	± 0.2
Flat	94.0	94.0	0.0	± 0.2

5.2 Time weighting at 1 kHz

Frequency Weighting	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	94.0	94.0	0.0	± 0.1
Slow	94.0	94.0	0.0	± 0.1
Leq	94.0	94.0	0.0	± 0.1

6. Long - term stability

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A - weight	94.0	94.0	0.0	± 0.1

7. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
137.0	137.0	0.0	±0.8
136.0	136.0	0.0	±0.8
135.0	135.0	0.0	±0.8
134.0	134.0	0.0	±0.8
133.0	133.0	0.0	±0.8
132.0	132.0	0.0	±0.8
131.0	131.0	0.0	±0.8
129.0	129.0	0.0	±0.8
124.0	124.0	0.0	±0.8
119.0	119.0	0.0	±0.8
114.0	114.0	0.0	±0.8
109.0	109.0	0.0	±0.8
104.0	104.0	0.0	±0.8
99.0	99.0	0.0	±0.8
94.0	94.0	0.0	±0.8
89.0	89.0	0.0	±0.8
84.0	84.0	0.0	±0.8
79.0	79.0	0.0	±0.8
74.0	74.0	0.0	±0.8
69.0	69.0	0.0	±0.8
64.0	64.0	0.0	±0.8
59.0	59.0	0.0	±0.8
54.0	53.9	-0.1	±0.8
49.0	49.0	0.0	±0.8
44.0	43.9	-0.1	±0.8
39.0	38.9	-0.1	±0.8
34.0	33.9	-0.1	±0.8
30.0	30.0	0.0	±0.8
29.0	28.9	-0.1	±0.8
28.0	28.0	0.0	±0.8
27.0	27.0	0.0	±0.8
26.0	26.0	0.0	±0.8
25.0	25.0	0.0	±0.8

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Cert. No. : ACL26020
Job No. : VC69AC0048
Pages : 7 of 8

8. Level linearity including the level range control

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
130	94.0	94.0	0.0	± 0.8

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
130	29.0	28.9	-0.1	± 0.8

9. Tone burst response

Time Weighting	Tone burst duration, Tb (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	108.0	107.9	-0.1	1.0 ; -3.0
	2	8	117.0	117.0	0.0	1.0 ; -1.5
	200	800	134.0	134.0	0.0	± 0.5
Slow	2	8	108.0	108.0	0.0	1.0 ; -3.0
	200	800	127.6	127.6	0.0	± 0.5
	0.25	1	99.0	98.9	-0.1	1.0 ; -3.0
SEL	2	8	108.0	108.0	0.0	1.0 ; -1.5
	200	800	128.0	128.0	0.0	± 0.5

10. Peak C₁ sound level

Number of cycle in test signal	Anticipated Value (dB)	Measured Value, f _{peak} (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	130.0	130.0	0.0	± 2.0
One	133.4	133.3	-0.1	± 2.0

Number of cycle in test signal	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	± 1.0
Positive half cycle	135.4	135.2	-0.2	± 1.0
Negative half cycle	135.4	135.2	-0.2	± 1.0

11. Overload indication

Measured value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Positive one half cycle		
89.6	-0.1	± 1.5
Negative one-half cycle		
89.5	-0.1	± 1.5

12. High level stability

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A - weight	137.0	137.0	0.0	± 0.1

The reported uncertainty is based on a standard uncertainty multiplied by coverage factor $k = 2$ or any value following calculation, providing a level of confidence of approximately 95 %

End of Calibration Certificate

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SOUND LEVEL METER

MODEL : NL-52A

SERIAL No. : 00230995

Calibration Certificate

Cert. No. : ACL26066
Pages : 1 of 8

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-52A / Microphone UC-59 / Preamplifier NH-25
Serial No. : 00230995 / 21947 / 22332
ID No. : -

Condition As Found : GOOD

Customer : EASTERN THAI CONSULTING 1992 CO., LTD.
SAHA GROUP INDUSTRIAL PARK, 683 MOO 11,
NONGKHAM, SIRACHA, CHONBURI 20230 THAILAND.

Location :
Ambient Temperature : (23.0 ± 3) °C
Pressure : (101.3 ± 3) kPa
Relative Humidity : (50.0 ± 20) %

Received Date : 26 DECEMBER 2025
Calibration Date : 19 - 21 JANUARY 2026
Date of Issue : 22 JANUARY 2026

Calibrated by : Nathakorn Pisutpaisan

Approved by :

(Nitinun Srihawan)

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Cert. No. : ACL26066
Job No. : VC39ACR049
Pages : 2 of 8

Calibration Procedure : CP-AC-02

Calibration Method :

This equipment was calibrated by follow on IEC-61672-3 (2013) Standard for sound level meter (SLM).
The SLM had tests to Acoustical and Electrical signal tests of frequency weighting with A-weighting and Reference Standard Instruments.

For tests results of each item were made by observation of each Instrument's display and also with SLM's display.

Condition of this result of calibration :

1. Reference Standard Instruments :

Instrument	Model	Serial No.	Cert. No.	Due Date
Waveform Generator	13210A	MY48017076	EP-0011-25	11-FEB-26
Waveform Generator	33511B	MY53202742	EP-0012-25	11-FEB-26
Digital Multimeter	33461A	MY53220104	EP-LBP 24/0268	22-APR-26
Digital Multimeter	33461A	MY53220076	EP-LBP 23/0268	22-APR-26
Digital Multimeter	34461A	MY60024273	CA20251201A	18-MAR-26
Programmable Attenuator	MAJ-1070	62100114	EP-0006-25	11-FEB-26
Condenser Microphone	4180	2977900	AA 1002-25	19-FEB-26
Measuring Amplifier	NA-42KAI	34560495	AA-3002-25	19-FEB-26

2. This result of calibration was found accurate as shown on date and place of calibration for this calibrated item only.

3. This certificate is traceable to the international system of unit maintained at :

- 3.1 National Institute of Metrology (Thailand).
- 3.2 Thailand Institute of Scientific and Technological Research (TISTR).
- 3.3 Electrical And Electronics Institute (IEI).

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Cert. No. : ACL26066
Job No. : VC69AC0048
Pages : 3 of 8

Cert. No. : ACL26066
Job No. : VC69AC0048
Page : 4 of 8

Summary of Measurement Result :

Parameter	Uncertainty (dB)	Maximum-permitted uncertainty of measurement (dB)
1. Absolute sensitivity	0.2	N/A
2. Self-generated noise	0.2	N/A
3. Acoustical signal tests of frequency weightings		
125 Hz	0.3	0.6
1000 Hz	0.3	0.6
8000 Hz	0.3	0.7
4. Electrical signal tests of frequency weightings		
For 10 Hz to 4 kHz	0.3	0.6
For > 4 kHz to 10 kHz	0.3	0.7
For > 10 kHz to 20 kHz	0.3	1.0
5. Frequency and time weightings at 1 kHz	0.2	0.2
6. Long - term stability	0.1	0.1
7. Level linearity on the reference level range	0.2	0.3
8. Level linearity including the level range control	0.2	0.3
9. Tone burst response	0.2	0.3
10. Peak C sound level	0.2	0.35
11. Overload indication	0.2	0.25
12. High level stability	0.1	0.1

Result of calibration :**1. Absolute sensitivity**

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limit (dB)
93.9 (93.94)	94.0	0.0	+0.3

2. Self-generated noise**2.1 Normal test**

Measured Value (dB)
16.9

2.2 The microphone of the sound level meter was replaced by electrical signal input device.

Frequency Weighting	Weighting (dB)
A - weight	13.4
C - weight	18.8
Flat	23.7

3. Acoustical signal tests of frequency weightings

Meter free-field acoustic response at a level of 84 dB

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)		
	Flat	C-weight	A-weight Acceptance Limits
125	0.3	0.3	0.4
1000	0.1	0.2	0.2
8000	1.4	1.4	1.2
			+ 1.5, - 2.5

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Cert. No. : ACL26066
Job No. : VC69AC0048
Pages : 5 of 8

Cert. No. : ACL26066
Job No. : VC69AC0048
Pages : 6 of 8

4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 kHz.

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)		
	Flat	C-weight	A-weight Acceptance Limits
63	0.0	0.0	-0.1 ±1.0
125	-0.1	0.1	-0.1 ±1.0
250	-0.1	0.0	-0.1 ±1.0
500	-0.1	0.1	-0.1 ±1.0
1000	-0.1	0.0	0.0 ±1.0
2000	0.0	0.1	0.0 ±1.0
4000	0.0	0.1	0.0 ±1.0
8000	0.0	0.1	0.1 + 1.5, - 2.5
16000	0.0	-1.1	-1.2 + 2.5, -16.0

5. Frequency and time weightings at 1 kHz

5.1 Frequency weightings at 1 kHz

Frequency Weighting	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A - weight	94.0	94.0	0.0	± 0.2
C - weight	94.0	94.0	0.0	± 0.2
Flat	94.0	94.0	0.0	± 0.2

5.2 Time weighting at 1 kHz

Frequency Weighting	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	94.0	94.0	0.0	± 0.1
Slow	94.0	94.0	0.0	± 0.1
Leq	94.0	94.0	0.0	± 0.1

6. Long - term stability

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A - weight	94.0	94.0	0.0	± 0.1

7. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
137.0	137.1	0.1	±0.8
136.0	136.1	0.1	±0.8
135.0	135.1	0.1	±0.8
134.0	134.1	0.1	±0.8
133.0	133.1	0.1	±0.8
132.0	132.0	0.0	±0.8
131.0	131.0	0.0	±0.8
129.0	129.1	0.1	±0.8
124.0	124.1	0.1	±0.8
119.0	119.1	0.1	±0.8
114.0	114.1	0.1	±0.8
109.0	109.1	0.1	±0.8
104.0	104.1	0.1	±0.8
99.0	99.1	0.1	±0.8
94.0	94.0	0.0	±0.8
89.0	89.0	0.0	±0.8
84.0	84.0	0.0	±0.8
79.0	79.0	0.0	±0.8
74.0	74.0	0.0	±0.8
69.0	69.0	0.0	±0.8
64.0	64.0	0.0	±0.8
59.0	59.0	0.0	±0.8
54.0	54.0	0.0	±0.8
49.0	49.0	0.0	±0.8
44.0	44.0	0.0	±0.8
39.0	39.0	0.0	±0.8
34.0	34.1	0.1	±0.8
30.0	30.1	0.1	±0.8
29.0	29.1	0.1	±0.8
28.0	28.2	0.2	±0.8
27.0	27.1	0.1	±0.8
26.0	26.2	0.2	±0.8
25.0	25.2	0.2	±0.8

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Cert. No. : ACL26066
Job No. : VC69AC0048
Pages : 7 of 8

8. Level linearity including the level range control

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
130	94.0	94.0	0.0	±0.8

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
130	29.0	29.1	0.1	±0.8

9. Tone burst response

Time Weighting	Tone burst duration, Tb (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	108.0	107.9	-0.1	1.0 ; -3.0
	2	8	117.0	116.9	-0.1	1.0 ; -1.5
	200	800	134.0	134.0	0.0	±0.5
Slow	2	8	108.0	108.0	0.0	1.0 ; -3.0
	200	800	127.6	127.6	0.0	±0.5
	0.25	1	99.0	98.8	-0.2	1.0 ; -3.0
SEL	2	8	108.0	107.9	-0.1	1.0 ; -1.5
	200	800	128.0	128.0	0.0	±0.5

Cert. No. : ACL26066
Job No. : VC69AC0048
Pages : 8 of 8

10. Peak C sound level

Number of cycle in test signal	Anticipated Value (dB)	Measured Value, L _{peak} (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	130.0	130.0	0.0	±2.0
One	133.4	133.4	0.0	±2.0

Number of cycle in test signal	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	±1.0
Positive half cycle	135.4	135.1	-0.3	±1.0
Negative half cycle	135.4	135.1	-0.3	±1.0

11. Overload indication

Measured value (dB)		Deviated Value (dB)	Acceptance Limits (dB)
Positive one-half cycle	Negative one-half cycle	-0.1	±1.5
89.6	89.5		

12. High level stability

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A - weight	137.0	137.0	0.0	±0.1

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

COPY**End of Calibration Certificate****COPY**

SOUND LEVEL METER

MODEL : NL-52A

SERIAL No. : 01120949

Cert. No. : ACL26019
Pages : 1 of 8

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-52A / Microphone UC-59 / Preamplifier NH-25
Serial No. : 01120949 / 22118 / 22421
ID No. : -

Condition As Found : GOOD

Customer : EASTERN THAI CONSULTING 1992 CO., LTD.
SAHA GROUP INDUSTRIAL PARK, 683 MOO 11,
NONGKHAM, SIRACHA, CHONBURI 20230 THAILAND.

Location : -
Ambient Temperature : (23.0 ± 3) °C
Pressure : (101.3 ± 3) kPa
Relative Humidity : (50.0 ± 20) %

Received Date : 26 DECEMBER 2025
Calibration Date : 05 - 07 JANUARY 2026
Date of Issue : 07 JANUARY 2026

Calibrated by : Nathakorn Pisutpaisan

Approved by :

(Nitinun Srihawan)

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Cert. No. : ACL26019
Job No. : VC69AC0048
Pages : 2 of 8

Calibration Procedure : CP-AC-02

Calibration Method :

This equipment was calibrated by follow on IEC-61672-3 (2013) Standard for sound level meter (SLM).
The SLM had tests to Acoustical and Electrical signal tests of frequency weighting with Anechoic chamber and Reference Standard Instruments.

For tests results of each items were made by observation of each Instruments display and also with SLM's display.

Condition of this result of calibration :

1. Refer to Standard Instruments

Instrument	Model	Serial No.	Cert. No.	Due Date
Waveform Generator	33210A	MY48017076	EF-0011-25	11-FEB-26
Waveform Generator	33511B	MY52302742	11-0012-25	11-FEB-26
Digital Multimeter	33461A	MY53220104	EEI-BP 24/0268	22-APR-26
Digital Multimeter	33461A	MY53220076	EEI-BP 23/0268	22-APR-26
Digital Multimeter	34461A	MY60024273	CA2025120EA	18-MAR-26
Programmable Attenuator	MAT-1070	62100114	EEI-0006-25	11-FEB-26
Condenser Microphone	4189	2977900	AA 1002-25	19-FEB-26
Measuring Amplifier	N/A-42/KAI	34560495	AA 1002-25	19-FEB-26

2. This result of calibration was found accurate as shown on date and place of calibration for this calibrated item only.

3. This certificate is traceable to the international system of unit maintained at :

- 3.1 National Institute of Metrology (Thailand).
- 3.2 Thailand Institute of Scientific and Technological Research (TISTR).
- 3.3 Electrical And Electronics Institute (EEI).

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Cert. No. : ACL26019
Job No. : VC69AC0048
Pages : 3 of 8

Cert. No. : ACL26019
Job No. : VC69AC0048
Page : 4 of 8

Summary of Measurement Result :

Parameter	Uncertainty (dB)	Maximum-permitted uncertainty of measurement (dB)
1. Absolute sensitivity	0.2	N/A
2. Self-generated noise	0.2	N/A
3. Acoustical signal tests of frequency weightings		
125 Hz	0.3	0.6
1000 Hz	0.3	0.6
8000 Hz	0.3	0.7
4. Electrical signal tests of frequency weightings		
For 10 Hz to 4 kHz	0.3	0.6
For > 4 kHz to 10 kHz	0.3	0.7
For > 10 kHz to 20 kHz	0.3	1.0
5. Frequency and time weightings at 1 kHz	0.2	0.2
6. Long - term stability	0.1	0.1
7. Level linearity on the reference level range	0.2	0.3
8. Level linearity including the level range control	0.2	0.3
9. Tone burst response	0.2	0.3
10. Peak C sound level	0.2	0.35
11. Overload indication	0.2	0.25
12. High level stability	0.1	0.1

Result of calibration :**1. Absolute sensitivity**

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limit (dB)
93.9 (93.94)	94.0	0.0	+0.3

2. Self-generated noise**2.1 Normal test**

Measured Value (dB)
14.8

2.2 The microphone of the sound level meter was replaced by electrical signal input device.

Frequency Weighting	Weighting (dB)
A - weight	9.9
C - weight	14.6
Flat	20.1

3. Acoustical signal tests of frequency weightings

Meter free-field acoustic response at a level of 84 dB

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)		
	Flat	C-weight	A-weight
125	0.0	0.1	0.1
1000	0.1	0.1	0.1
8000	0.3	0.4	0.4
Acceptance Limits			+1.0 -1.0 +0.7 -1.5, -2.5

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Job No. : VC69AC0048

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4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 kHz.

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)		
	Flat	C-weight	A-weight
63	0.0	0.0	0.0
125	0.0	0.0	0.0
250	0.0	0.0	0.0
500	0.0	0.0	0.0
1000	0.0	0.0	0.0
2000	0.0	0.0	0.0
4000	0.0	0.0	0.0
8000	0.0	0.1	0.1
16000	0.0	-1.2	-1.2
Acceptance Limits			±1.0
			±1.0
			±1.0
			±1.0
			±1.0
			±1.0
			+1.5, -2.5
			+2.5, -16.0

5. Frequency and time weightings at 1 kHz**5.1 Frequency weightings at 1 kHz**

Frequency Weighting	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A - weight	94.0	94.0	0.0	±0.2
C - weight	94.0	94.0	0.0	±0.2
Flat	94.0	94.0	0.0	±0.2

5.2 Time weighting at 1 kHz

Frequency Weighting	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	94.0	94.0	0.0	±0.1
Slow	94.0	94.0	0.0	±0.1
Leq	94.0	94.0	0.0	±0.1

6. Long - term stability

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A - weight	94.0	94.0	0.0	±0.1

7. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
137.0	137.0	0.0	±0.8
136.0	136.0	0.0	±0.8
135.0	135.0	0.0	±0.8
134.0	134.0	0.0	±0.8
133.0	133.0	0.0	±0.8
132.0	132.0	0.0	±0.8
131.0	131.0	0.0	±0.8
129.0	129.0	0.0	±0.8
124.0	124.0	0.0	±0.8
119.0	119.0	0.0	±0.8
114.0	114.0	0.0	±0.8
109.0	109.0	0.0	±0.8
104.0	104.0	0.0	±0.8
99.0	99.0	0.0	±0.8
94.0	94.0	0.0	±0.8
89.0	89.0	0.0	±0.8
84.0	84.0	0.0	±0.8
79.0	78.9	-0.1	±0.8
74.0	74.0	0.0	±0.8
69.0	69.0	0.0	±0.8
64.0	63.9	-0.1	±0.8
59.0	59.0	0.0	±0.8
54.0	53.9	-0.1	±0.8
49.0	48.9	-0.1	±0.8
44.0	43.9	-0.1	±0.8
39.0	38.9	-0.1	±0.8
34.0	33.9	-0.1	±0.8
30.0	29.9	-0.1	±0.8
25.0	24.9	-0.1	±0.8

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8. Level linearity including the level range control

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
130	94.0	94.0	0.0	±0.8

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
130	29.0	28.9	-0.1	±0.8

9. Tone burst response

Time Weighting	Tone burst duration, T _b (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	108.0	107.9	-0.1	1.0 ; -3.0
	2	8	117.0	117.0	0.0	1.0 ; -1.5
	200	800	134.0	134.0	0.0	±0.5
Slow	2	8	108.0	108.0	0.0	1.0 ; -3.0
	200	800	127.6	127.6	0.0	±0.5
SEL	0.25	1	99.0	98.9	-0.1	1.0 ; -3.0
	2	8	108.0	108.0	0.0	1.0 ; -1.5
	200	800	128.0	128.0	0.0	±0.5

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10. Peak C sound level

Number of cycle in test signal	Anticipated Value (dB)	Measured Value, Lepeak (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	130.0	130.0	0.0	±2.0
One	133.4	133.3	-0.1	±2.0

Number of cycle in test signal	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	±1.0
Positive half cycle	135.4	135.2	-0.2	±1.0
Negative half cycle	135.4	135.2	-0.2	±1.0

11. Overload indication

Measured value (dB)		Deviated Value (dB)	Acceptance Limits (dB)
Positive one half cycle	Negative one-half cycle	0.0	±1.5
89.5	85.5		

12. High level stability

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A - weight	137.0	137.0	0.0	±0.1

The reported uncertainty is based on a standard uncertainty multiplied by coverage factor $k = 2$ or any value following calculation, providing a level of confidence of approximately 95 %

End of Calibration Certificate

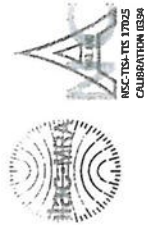
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SOUND LEVEL METER

MODEL : NL-52A

SERIAL No. : 01120945



Cert. No. : ACL26017
Pages : 1 of 8

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-52A / Microphone UC-59 / Preamplifier NF-25
Serial No. : 01120945 / 22210 / 22422
ID No. : -

Condition As Found : GOOD

Customer : EASTERN THAI CONSULTING 1992 CO., LTD.
SAHA GROUP INDUSTRIAL PARK, 683 MOO 11,
NONGKHAM, SIRACHA, CHONBURI 20230 THAILAND.

Location : -
Ambient Temperature : (23.0 ± 3) °C
Pressure : (101.3 ± 3) kPa
Relative Humidity : (50.0 ± 20) %

Received Date : 26 DECEMBER 2025
Calibration Date : 05 - 07 JANUARY 2026
Date of Issue : 07 JANUARY 2026

Calibrated by : Nathakorn Pisutpaisan

Approved by :

(Nitinun Srihavan)

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Cert. No. : ACL26017
Job No. : VC69AC0048
Pages : 2 of 8

Calibration Procedure : CP-AC-02

Calibration Method :

This equipment was calibrated by follow on IEC-61672-3 (2013) Standard for sound level meter (SLM).
The SLM had tests to Acoustical and Electrical signal tests of frequency weighting with Anechoic chamber and Reference Standard Instruments.

For tests results of each items were made by observation of each Instruments display and also with SLM's display.

Condition of this result of calibration :

1. Reference Standard Instruments :

Instrument	Model	Serial No.	Cert. No.	Due Date
Waveform Generator	33210A	MY48017076	EF-0011-25	11-FEB-26
Waveform Generator	33511B	MY52302742	EF-0012-25	11-FEB-26
Digital Multimeter	33461A	MY53220104	EEL-BP 24/0268	22-APR-26
Digital Multimeter	33461A	MY53220076	EEL-BP 23/0268	22-APR-26
Digital Multimeter	34461A	MY60024273	CA2025120EA	18-MAR-26
Programmable Attenuator	MAT-1070	62100114	EF-0006-25	11-FEB-26
Condenser Microphone	4180	2977900	AA-1002-25	19-FEB-26
Measuring Amplifier	NA 42KA1	34560495	AA-3002-25	19-FEB-26

2. This result of calibration was found accurate as shown on date and place of calibration for this calibrated item only.

3. This certificate is traceable to the international system of unit maintained at :

- 3.1 National Institute of Metrology (Thailand).
- 3.2 Thailand Institute of Scientific and Technological Research (TISTR).
- 3.3 Electrical And Electronics Institute (EEL).

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Cert. No. : ACL26017
Job No. : VC69AC0048
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Cert. No. : ACL26017
Job No. : VC69AC0048
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Summary of Measurement Result :

Parameter	Uncertainty (dB)	Maximum-permitted uncertainty of measurement (dB)
1. Absolute sensitivity	0.2	N/A
2. Self-generated noise	0.2	N/A
3. Acoustical signal tests of frequency weightings		
125 Hz	0.3	0.6
1000 Hz	0.3	0.6
8000 Hz	0.3	0.7
4. Electrical signal tests of frequency weightings		
For 10 Hz to 4 kHz	0.3	0.6
For > 4 kHz to 10 kHz	0.3	0.7
For > 10 kHz to 20 kHz	0.3	1.0
5. Frequency and time weightings at 1 kHz	0.2	0.7
6. Long-term stability	0.1	0.1
7. Level linearity on the reference level range	0.2	0.3
8. Level linearity including the level range control	0.2	0.3
9. Tone burst response	0.2	0.3
10. Peak C sound level	0.2	0.35
11. Overload indication	0.2	0.25
12. High level stability	0.1	0.1

Result of calibration :**1. Absolute sensitivity**

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limit (dB)
93.9 (93.94)	94.0	0.0	±0.3

2. Self-generated noise**2.1 Normal test**

Measured Value (dB)
13.8

2.2 The microphone of the sound level meter was replaced by electrical signal input device.

Frequency Weighting	Weighting (dB)
A-weight	8.7
C-weight	14.1
Flat	10.9

3. Acoustical signal tests of frequency weightings

Meter free-field acoustic response at a level of 84 dB

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)		
	Flat	C-weight	A-weight
125	1.0	1.0	1.0
1000	0.3	0.3	0.3
8000	0.5	0.6	0.6
			Acceptance Limits
			± 1.0
			± 0.7
			+ 1.5, - 2.5

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4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 kHz.

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)		
	Flat	C-weight	A-weight
63	0.0	0.0	0.0
125	0.0	0.0	0.0
250	0.0	0.0	0.0
500	0.0	0.0	0.0
1000	0.0	0.0	0.0
2000	0.0	0.0	0.0
4000	0.0	0.0	0.0
8000	0.0	0.1	0.1
16000	0.0	-1.2	-1.2

5. Frequency and time weightings at 1 kHz

5.1 Frequency weightings at 1 kHz

Frequency Weighting	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A - weight	94.0	94.0	0.0	± 0.2
C - weight	94.0	94.0	0.0	± 0.2
Flat	94.0	94.0	0.0	± 0.2

5.2 Time weighting at 1 kHz

Frequency Weighting	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	94.0	94.0	0.0	± 0.1
Slow	94.0	94.0	0.0	± 0.1
Leq	94.0	94.0	0.0	± 0.1

6. Long - term stability

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A - weight	94.0	94.0	0.0	± 0.1

7. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
137.0	137.0	0.0	± 0.8
136.0	136.0	0.0	± 0.8
135.0	135.0	0.0	± 0.8
134.0	134.0	0.0	± 0.8
133.0	133.0	0.0	± 0.8
132.0	132.0	0.0	± 0.8
131.0	131.0	0.0	± 0.8
129.0	129.0	0.0	± 0.8
124.0	124.0	0.0	± 0.8
119.0	119.0	0.0	± 0.8
114.0	114.0	0.0	± 0.8
109.0	109.0	0.0	± 0.8
104.0	104.0	0.0	± 0.8
99.0	99.0	0.0	± 0.8
94.0	94.0	0.0	± 0.8
89.0	89.0	0.0	± 0.8
84.0	83.9	-0.1	± 0.8
79.0	78.9	-0.1	± 0.8
74.0	74.0	0.0	± 0.8
69.0	68.9	-0.1	± 0.8
64.0	63.9	-0.1	± 0.8
59.0	58.9	-0.1	± 0.8
54.0	53.9	-0.1	± 0.8
49.0	48.9	-0.1	± 0.8
44.0	43.9	-0.1	± 0.8
39.0	38.9	-0.1	± 0.8
34.0	33.9	-0.1	± 0.8
30.0	29.9	-0.1	± 0.8
29.0	28.9	-0.1	± 0.8
28.0	27.9	-0.1	± 0.8
27.0	26.9	-0.1	± 0.8
26.0	25.9	-0.1	± 0.8
25.0	24.9	-0.1	± 0.8

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8. Level linearity including the level range control

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
130	94.0	94.0	0.0	±0.3

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
130	29.0	29.0	0.0	±0.8

9. Tone burst response

Time Weighting	Tone burst duration, Tb (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	108.0	107.9	-0.1	±0.3
	2	8	117.0	117.0	0.0	±0.5
	200	800	134.0	134.0	0.0	±0.5
Slow	2	8	108.0	108.0	0.0	±0.3
	200	800	127.6	127.5	0.0	±0.5
	0.25	1	99.0	98.9	-0.1	±0.3
SEL	2	8	108.0	108.0	0.0	±0.5
	200	800	128.0	128.0	0.0	±0.5

10. Peak C sound level

Number of cycle in test signal	Anticipated Value (dB)	Measured Value, L _{peak} (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	130.0	130.0	0.0	±2.0
One	133.4	133.3	-0.1	±2.0

Number of cycle in test signal	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	132.9	-0.1	±1.0
Positive half cycle	135.4	135.1	-0.3	±1.0
Negative half cycle	135.4	135.1	-0.3	±1.0

11. Overload indication

Measured value (dB)		Deviated Value (dB)	Acceptance Limits (dB)
Positive one-half cycle	Negative one-half cycle	0.1	±1.5
89.5	89.6		

12. High level stability

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A - weight	137.0	137.0	0.0	±0.1

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

End of Calibration Certificate

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SOUND LEVEL METER

MODEL : NL-42A

SERIAL No. : 00322749



Cert. No. : ACL26010
Pages : 1 of 8

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-42A / Microphone UC-52 / Preamplifier NH-24
Serial No. : 00322749 / 196472 / 15481
ID No. : -

Condition As Found : GOOD

Customer : EASTERN THAI CONSULTING 1992 CO., LTD.
SAHA GROUP INDUSTRIAL PARK, 683 MOO 11,
NONGKHAM, SIRACHA, CHONBURI 20230 THAILAND.

Location : -
Ambient Temperature : (23.0 $\pm$ 3) °C
Pressure : (101.3 $\pm$ 3) kPa
Relative Humidity : (50.0 $\pm$ 20) %

Received Date : 26 DECEMBER 2025
Calibration Date : 05 - 07 JANUARY 2026
Date of Issue : 07 JANUARY 2026

Calibrated by : Nithakorn Pisulpaisan

Approved by : (Nitinun Srihawan)

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Cert. No. : ACL26019
Job No. : VC69AC0048
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Calibration Procedure : CP-AC-01

Calibration Method :

This equipment was calibrated by follow on IEC 61677-3 (2013) Standard for General Low Frequency (0.1 kHz) The SI M had tests to Acoustical and Electrical signal tests of frequency weighting, Acoustic elements and Reference standard Instruments.
For test results of each device were made by observation of each instruments display and also with SI M - display.

Condition of this result of calibration :

1. Reference Standard Instruments :

Instrument	Model	Serial No.	Cert. No.	Due Date
Waveform Generator	33210A	MY48010176	LI-001176	11 FEB 26
Waveform Generator	33511B	MY52302742	LI-001225	11 FEB 26
Digital Multimeter	33461A	MY52320104	LI-001225	11 FEB 26
Digital Multimeter	33461A	MY52320076	LI-001225	11 FEB 26
Digital Multimeter	34461A	MY60074173	LI-001225	11 FEB 26
Programmable Attenuator	MA1-1070	62100114	LI-001225	11 FEB 26
Condenser Microphone	4180	2977903	AA-100225	19 FEB 26
Measuring Amplifier	NA-02KAL	74560495	AA-100225	19 FEB 26

2. This result of calibration was found accurate as shown on date and place of calibration for this calibrated item only.

3. This certificate is traceable to the international system of unit maintained at :

- 3.1 National Institute of Metrology (Thailand).
- 3.2 Thailand Institute of Scientific and Technological Research (TISTR).
- 3.3 Electrical And Electronics Institute (EEI).

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Summary of Measurement Result :

Parameter	Uncertainty (dB)	Maximum-permitted uncertainty of measurement (dB)
1. Absolute sensitivity	0.2	N/A
2. Self-generated noise	0.2	N/A
3. Acoustical signal tests of frequency weightings		
125 Hz	0.3	0.6
1000 Hz	0.3	0.6
8000 Hz	0.3	0.7
4. Electrical signal tests of frequency weightings		
For 10 Hz to 4 kHz	0.3	0.6
For > 4 kHz to 10 kHz	0.3	0.7
For > 10 kHz to 20 kHz	0.3	1.0
5. Frequency and time weightings at 1 kHz	0.2	0.2
6. Long - term stability	0.1	0.1
7. Level linearity on the reference level range	0.2	0.3
8. Level linearity including the level range control	0.2	0.3
9. Tone burst response	0.2	0.3
10. Peak C sound level	0.2	0.35
11. Overload indication	0.2	0.25
12. High level stability	0.1	0.1

Result of calibration :**1. Absolute sensitivity**

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limit (dB)
93.9 (93.94)	93.9	0.0	±0.3

2. Self-generated noise**2.1 Normal test**

Measured Value (dB)
13.8

2.2 The microphone of the sound level meter was replaced by electrical signal input device.

Frequency Weighting	Weighting (dB)
A - weight	10.8
C - weight	16.8
Flat	22.3

3. Acoustical signal tests of frequency weightings

Meter free-field acoustic response at a level of 84 dB

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			Acceptance Limits
	Flat	C-weight	A-weight	
125	0.3	0.3	0.3	± 1.5
1000	0.1	0.1	0.1	± 1.0
8000	0.5	0.6	0.6	±5.0

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Job No. : VC69AC0048
Pages : 6 of 8

4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 kHz.

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)		
	Flat	C-weight	A-weight
63	-0.1	-0.1	0.0
125	0.0	0.0	0.0
250	0.0	0.0	-0.1
500	0.0	0.0	0.0
1000	0.0	0.0	0.0
2000	0.0	0.0	0.0
4000	0.0	0.0	0.0
8000	0.0	0.1	0.1

5. Frequency and time weightings at 1 kHz

5.1 Frequency weightings at 1 kHz

Frequency Weighting	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A - weight	94.0	94.0	0.0	± 0.2
C - weight	94.0	94.0	0.0	± 0.2
Flat	94.0	94.0	0.0	± 0.2

5.2 Time weighting at 1 kHz

Frequency Weighting	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	94.0	94.0	0.0	± 0.1
Slow	94.0	94.0	0.0	± 0.1
1 eq	94.0	94.0	0.0	± 0.1

6. Long - term stability

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A - weight	94.0	94.0	0.0	± 0.3

7. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
137.0	137.0	0.0	± 1.1
136.0	136.0	0.0	± 1.1
135.0	135.0	0.0	± 1.1
134.0	134.0	0.0	± 1.1
133.0	133.0	0.0	± 1.1
132.0	132.0	0.0	± 1.1
131.0	131.0	0.0	± 1.1
129.0	129.0	0.0	± 1.1
124.0	124.0	0.0	± 1.1
119.0	119.0	0.0	± 1.1
114.0	114.0	0.0	± 1.1
109.0	109.0	0.0	± 1.1
104.0	104.0	0.0	± 1.1
99.0	99.0	0.0	± 1.1
94.0	94.0	0.0	± 1.1
89.0	89.0	0.0	± 1.1
84.0	84.0	0.0	± 1.1
79.0	79.0	0.0	± 1.1
74.0	74.0	0.0	± 1.1
69.0	69.0	0.0	± 1.1
64.0	64.0	0.0	± 1.1
59.0	59.0	0.0	± 1.1
54.0	54.0	0.0	± 1.1
49.0	49.0	0.0	± 1.1
44.0	44.0	0.0	± 1.1
39.0	39.0	0.0	± 1.1
34.0	34.0	0.1	± 1.1
30.0	30.1	0.1	± 1.1
29.0	29.0	0.0	± 1.1
28.0	28.1	0.1	± 1.1
27.0	27.1	0.1	± 1.1
26.0	26.1	0.1	± 1.1
25.0	25.1	0.1	± 1.1

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Cert. No. : ACL26010
Job No. : VC69AC0048
Pages : 7 of 8

8. Level linearity including the level range control

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
130	94.0	94.0	0.0	±1.1

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
130	29.0	28.9	-0.1	±1.1

9. Tone burst response

Time Weighting	Tone burst duration, Tb (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	108.0	107.9	-0.1	1.5 ; -5.0
	2	8	117.0	117.0	0.0	1.0 ; -2.5
	200	800	134.0	134.0	0.0	±1.0
Slow	2	8	108.0	108.0	0.0	1.0 ; -5.0
	200	800	127.6	127.6	0.0	±1.0
	0.25	1	99.0	98.9	-0.1	1.5 ; -5.0
SFL	2	8	108.0	108.0	0.0	1.0 ; -2.5
	200	800	128.0	128.0	0.0	±1.0

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Cert. No. : ACL26010
Job No. : VC69AC0048
Pages : 8 of 8

10. Peak / Sound level

Number of cycle in test signal continuous type	Anticipated Value (dB)	Measured Value, 1 cycle (dB)	Deviated Value (dB)	Acceptance Limits (dB)
	130.0	130.0	0.0	±2.0
	133.4	133.4	0.0	±3.0

Number of cycle in test signal continuous Positive half cycle negative half cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
	133.0	133.0	0.0	±2.0
	135.4	135.2	-0.2	±2.0
	135.4	135.2	-0.2	±2.0

11. Overload indication

Measured value (dB)		Deviated Value (dB)	Acceptance Limits (dB)
Positive one half cycle	Negative one half cycle		
89.5	89.5	0.0	±1.5

12. High level stability

Frequency Weighting A - weight	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
	137.0	137.0	0.0	±0.3

The reported uncertainty is based on a standard uncertainty multiplied by coverage factor k
on any value following calculation providing a level of confidence of approximately 95 %

End of Calibration Certificate

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SOUND LEVEL METER

MODEL : NL-42A

SERIAL No. : 00322754



Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-42A / Microphone UC-52 / Preamplifier NH-24
Serial No.: 00322754 / 196477 / 15486
ID No.:

Condition As Found : GOOD

Customer : EASTERN THAI CONSULTING 1992 CO., LTD.
SAHA GROUP INDUSTRIAL PARK, 683 MOO 11,
NONGKHAM, SIRACHA, CHONBURI 20230 THAILAND.

Location :
Ambient Temperature : (23.0 ± 3) °C
Pressure : (101.3 ± 3) kPa
Relative Humidity : (50.0 ± 20) %

Received Date : 26 JUNE 2025
Calibration Date : 08 JULY 2025
Date of Issue : 09 JULY 2025

Calibrated by : Nathakorn Pisutpaisan

Approved by : *Nichon B.*
(Wichok Ekpongpradit)

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Calibration Procedure : CP-AC-01

Calibration Method :

This equipment was calibrated by follow on IEC-61672-3 (2013) Standard for sound level meter (SLM).
The SLM had tests to Acoustical and Electrical signal tests of frequency weighting with Anchoic chamber and Reference Standard Instruments.
For tests results of each items were made by observation of each Instruments display and also with SLM's display.

Condition of this result of calibration :

1. Reference Standard Instruments :

Instrument	Model	Serial No.	Cert. No.	Due Date
Waveform Generator	33210A	MY48017076	EF-0011-25	11-FEB-26
Waveform Generator	33511B	MY52302742	EF-0012-25	11-FEB-26
Digital Multimeter	33461A	MY53220104	EEL_BP 24/0268	22-APR-26
Digital Multimeter	33461A	MY53220076	EEL_BP 23/0268	22-APR-26
Digital Multimeter	34461A	MY60024273	CA2025120EA	18-MAR-26
Programmable Attenuator	MAT-1070	62100114	EF-0006-25	11-FEB-26
Condenser Microphone	4180	2977900	AA-1002-25	19-FEB-26
Measuring Amplifier	NA-42KAI	34560495	AA-3002-25	19-FEB-26

2. This result of calibration was found accurate as shown on date and place of calibration for this calibrated item only.
3. This certificate is traceable to the international system of unit maintained at :
3.1 National Institute of Metrology (Thailand).
3.2 Thailand Institute of Scientific and Technological Research (TISTR).
3.3 Electrical And Electronics Institute (EEI).

Cert. No. : ACL25267
Job No. : VC68AC0090
Pages : 3 of 8

Summary of Measurement Result :

Parameter	Uncertainty (dB)	Maximum-permitted uncertainty of measurement (dB)
1. Absolute sensitivity	0.2	N/A
2. Self-generated noise	0.2	N/A
3. Acoustical signal tests of frequency weightings		
125 Hz	0.3	0.6
1000 Hz	0.3	0.6
8000 Hz	0.3	0.7
4. Electrical signal tests of frequency weightings		
For 10 Hz to 4 kHz	0.3	0.6
For > 4 kHz to 10 kHz	0.3	0.7
For > 10 kHz to 20 kHz	0.3	1.0
5. Frequency and time weightings at 1 kHz	0.2	0.2
6. Long - term stability	0.1	0.1
7. Level linearity on the reference level range	0.2	0.3
8. Level linearity including the level range control	0.2	0.3
9. Tone burst response	0.2	0.3
10. Peak C sound level	0.2	0.35
11. Overload indication	0.2	0.25
12. High level stability	0.1	0.1

Cert. No. : ACL25267
Job No. : VC68AC0096
Page : 4 of 8

Result of calibration :

1. Absolute sensitivity

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limit (dB)
93.9 (93.94)	93.9	0.0	± 0.3

2. Self-generated noise

2.1 Normal test

Measured Value (dB)	17.50000003
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2.2 The microphone of the sound level meter was replaced by electrical signal input device.

Frequency	Weighting
A - weight	12.7
C - weight	19.6
Flat	25.4

3. Acoustical signal tests of frequency weightings

Meter free-field acoustic response at a level of 84 dB

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)		
	Flat	C-weight	A-weight
125	0.0	0.1	0.1
1000	0.0	0.0	0.0
8000	0.6	0.6	0.6
			Acceptance Limits
			± 1.5
			± 1.0
			± 0.5

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Cert. No. : ACL25267
Job No. : VC68AC0091
Pages : 5 of 8

Cert. No. : ACL25267
Job No. : VC68AC0096
Pages : 6 of 8

4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 kHz.

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)		
	Flat	C-weight	A-weight Acceptance Limits
63	0.0	-0.1	-0.1 ±2.0
125	0.0	0.0	0.0 ±1.5
250	0.0	0.0	0.0 ±1.5
500	0.0	0.1	0.0 ±1.5
1000	0.0	0.0	0.0 ±1.0
2000	0.0	0.1	0.0 ±2.0
4000	0.0	0.0	0.0 ±3.0
8000	0.0	0.1	0.1 ±5.0

5. Frequency and time weightings at 1 kHz

5.1 Frequency weightings at 1 kHz

Frequency Weighting	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A - weight	94.0	94.0	0.0	± 0.2
C - weight	94.0	94.0	0.0	± 0.2
Flat	94.0	94.0	0.0	± 0.2

5.2 Time weighting at 1 kHz

Frequency Weighting	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	94.0	94.0	0.0	± 0.1
Slow	94.0	94.0	0.0	± 0.1
Leq	94.0	94.0	0.0	± 0.1

6. Long - term stability

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A - weight	94.0	94.0	0.0	± 0.3

7. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
137.0	137.0	0.0	± 1.1
136.0	136.0	0.0	± 1.1
135.0	135.0	0.0	± 1.1
134.0	134.0	0.0	± 1.1
133.0	133.0	0.0	± 1.1
132.0	132.0	0.0	± 1.1
131.0	131.0	0.0	± 1.1
129.0	129.0	0.0	± 1.1
124.0	124.0	0.0	± 1.1
119.0	119.0	0.0	± 1.1
114.0	114.0	0.0	± 1.1
109.0	109.0	0.0	± 1.1
104.0	104.0	0.0	± 1.1
99.0	99.0	0.0	± 1.1
94.0	94.0	0.0	± 1.1
89.0	89.0	0.0	± 1.1
84.0	84.0	0.0	± 1.1
79.0	79.0	0.0	± 1.1
74.0	74.0	0.0	± 1.1
69.0	69.0	0.0	± 1.1
64.0	64.0	0.0	± 1.1
59.0	59.0	0.0	± 1.1
54.0	54.0	0.0	± 1.1
49.0	49.0	0.0	± 1.1
44.0	44.0	0.0	± 1.1
39.0	39.0	0.0	± 1.1
34.0	34.0	0.0	± 1.1
30.0	30.1	0.1	± 1.1
29.0	29.1	0.1	± 1.1
28.0	28.1	0.1	± 1.1
27.0	27.2	0.2	± 1.1
26.0	26.2	0.2	± 1.1
25.0	25.3	0.3	± 1.1

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Cert. No. : ACL25267
Job No. : VC68AC009
Pages : 7 of 8

Cert. No. : ACL25267
Job No. : VC68AC009
Pages : 8 of 8

8. Level linearity including the level range control

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
130	94.0	94.0	0.0	±1.1

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
130	29.0	28.9	-0.1	±1.1

9. Tone burst response

Time Weighting	Tone burst duration, Tb (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	108.0	107.9	-0.1	1.5 ; -5.0
	2	8	117.0	117.0	0.0	1.0 ; -2.5
	200	800	134.0	134.1	0.1	±1.0
Slow	2	8	108.0	108.0	0.0	1.0 ; -5.0
	200	800	127.6	127.6	0.0	±1.0
	0.25	1	99.0	98.9	-0.1	1.5 ; -5.0
SEL	2	8	108.0	108.0	0.0	1.0 ; -2.5
	200	800	128.0	128.1	0.1	±1.0

10. Peak C sound level

Number of cycle in test signal	Anticipated Value (dB)	Measured Value, L _{peak} (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	130.0	130.0	0.0	±3.0
One	133.4	133.3	-0.1	±3.0

Number of cycle in test signal	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	±2.0
Positive half cycle	135.4	135.2	-0.2	±2.0
Negative half cycle	135.4	135.2	-0.2	±2.0

11. Overload indication

Measured value (dB)		Deviated Value (dB)	Acceptance Limits (dB)
Positive one-half cycle	Negative one-half cycle	0.0	±1.5
89.6	89.6		

12. High level stability

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A - weight	137.0	137.0	0.0	±0.3

The reported uncertainty is based on a standard uncertainty multiplied by coverage factor $k = 2$ or any value following calculation, providing a level of confidence of approximately 95 %

End of Calibration Certificate

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SOUND LEVEL METER

MODEL : NL-42A

SERIAL No. : 00322745

Cert. No. : ACL26007
Pages : 1 of 8Cert. No. : ACL26007
Job No. : VC69AC6048
Pages : 2 of 8

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-42A / Microphone UC-52 / Preamplifier NH-24
Serial No.: 00322745 / 196468 / 15477
ID No.: -

Condition As Found : GOOD

Customer : EASTERN THAI CONSULTING 1992 CO., LTD.
SAHA GROUP INDUSTRIAL PARK, 683 MOO 11,
NONGKHAM, SIRACHA, CHONBURI 20230 THAILAND.

Location : -
Ambient Temperature : (23.0 ± 3) °C
Pressure : (101.3 ± 3) kPa
Relative Humidity : (50.0 ± 20) %

Received Date : 26 DECEMBER 2025
Calibration Date : 05 - 07 JANUARY 2026
Date of Issue : 07 JANUARY 2026

Calibrated by : Nathakorn Pisutpaisan**Approved by :** Nitinun Sribawan
(Nitinun Sribawan)

This certificate is issued in accordance with the requirements of ISO/IEC 17025 standard, may not be reproduced other than in full, except with the prior written approval of the head of Calibration Laboratory.

Calibration Procedure : CP-AC-01**Calibration Method :**

This equipment was calibrated by follow on IEC-61672-3 (2013) Standard for sound level meter (SLM).
The SLM had tests to Acoustical and Electrical signal tests of frequency weighting with Anechoic chamber and Reference Standard Instruments.

For test results of each items were made by observation of each Instruments display and also with SLM display.

Condition of this result of calibration :

1. Reference Standard Instruments :

Instrument	Model	Serial No.	Cert. No.	Due Date
Waveform Generator	33210A	MY48017076	EF-0011-25	11-FEB-26
Waveform Generator	33511B	MY53302742	EF-0012-25	11-FEB-26
Digital Multimeter	33461A	MY53220104	EEI-BP 24/0268	22-APR-26
Digital Multimeter	33461A	MY53220076	EEI-BP 23/0268	22-APR-26
Digital Multimeter	34461A	MY60024273	CA20251201A	18-MAR-26
Programmable Attenuator	MAT-1070	62100114	EF-0006-25	11-FEB-26
Condenser Microphone	4180	2977900	AA-1002-25	19-FEB-26
Measuring Amplifier	NA-42KAI	34560495	AA-3002-25	19-FEB-26

2. This result of calibration was found accurate as shown on date and place of calibration for this calibrated item only.

3. This certificate is traceable to the international system of unit maintained at :

- 3.1 National Institute of Metrology (Thailand).
- 3.2 Thailand Institute of Scientific and Technological Research (TISTR).
- 3.3 Electrical And Electronics Institute (EEL).

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Cert. No. : ACL26007
Job No. : VC69AC0048
Pages : 3 of 8

Cert. No. : ACL26007
Job No. : VC69AC0048
Page : 4 of 8

Summary of Measurement Result :

Parameter	Uncertainty (dB)	Maximum-permitted uncertainty of measurement (dB)
1. Absolute sensitivity	0.2	N/A
2. Self-generated noise	0.2	N/A
3. Acoustical signal tests of frequency weightings		
125 Hz	0.3	0.6
1000 Hz	0.3	0.6
8000 Hz	0.3	0.7
4. Electrical signal tests of frequency weightings		
For 10 Hz to 4 kHz	0.3	0.6
For > 4 kHz to 10 kHz	0.3	0.7
For > 10 kHz to 20 kHz	0.3	1.0
5. Frequency and time weightings at 1 kHz	0.2	0.2
6. Long - term stability	0.1	0.1
7. Level linearity on the reference level range	0.2	0.3
8. Level linearity including the level range control	0.2	0.3
9. Tone burst response	0.2	0.3
10. Peak C sound level	0.2	0.35
11. Overload indication	0.2	0.25
12. High level stability	0.1	0.1

Result of calibration :

1. Absolute sensitivity

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limit (dB)
93.9 (93.94)	93.9	0.1	±0.3

2. Self-generated noise

2.1 Normal test

Measured Value (dB)
14.2

2.2 The microphone of the sound level meter was replaced by electrical signal input device.

Frequency Weighting	Weighting (dB)
A - weight	10.8
C - weight	17.4
Flat	23.2

3. Acoustical signal tests of frequency weightings

Meter free-field acoustic response at a level of 84 dB

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)		
	Flat	C-weight	A-weight
125	0.2	0.3	0.2
1000	0.1	0.1	0.1
8000	0.3	0.3	0.3
			Acceptance limits
			±1.5
			±1.0
			±5.0

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Cert. No. : ACL26007

Job No. : VC69AC0048

Pages : 5 of 8

Cert. No. : ACL26007

Job No. : VC69AC0048

Pages : 6 of 8

4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 kHz.

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)		
	Flat	C-weight	A-weight
63	0.0	0.0	0.0
125	0.0	0.1	0.0
250	0.0	0.1	0.0
500	0.0	0.1	0.0
1000	0.0	0.0	0.0
2000	0.0	0.1	0.0
4000	0.0	0.0	0.0
8000	0.0	0.1	0.1

5. Frequency and time weightings at 1 kHz

5.1 Frequency weightings at 1 kHz

Frequency Weighting	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A - weight	94.0	94.0	0.0	± 0.2
C - weight	94.0	94.0	0.0	± 0.2
Flat	94.0	94.0	0.0	± 0.2

5.2 Time weighting at 1 kHz

Frequency Weighting	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	94.0	94.0	0.0	± 0.1
Slow	94.0	94.0	0.0	± 0.1
Leq	94.0	94.0	0.0	± 0.1

6. Long - term stability

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A - weight	94.0	94.1	0.1	± 0.3

7. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
137.0	137.0	0.0	± 1.1
136.0	136.0	0.0	± 1.1
135.0	135.0	0.0	± 1.1
134.0	134.0	0.0	± 1.1
133.0	133.0	0.0	± 1.1
132.0	132.0	0.0	± 1.1
131.0	131.0	0.0	± 1.1
129.0	129.0	0.0	± 1.1
124.0	124.0	0.0	± 1.1
119.0	119.0	0.0	± 1.1
114.0	114.0	0.0	± 1.1
109.0	109.0	0.0	± 1.1
104.0	104.0	0.0	± 1.1
99.0	99.0	0.0	± 1.1
94.0	94.0	0.0	± 1.1
89.0	89.0	0.0	± 1.1
84.0	84.0	0.0	± 1.1
79.0	79.0	0.0	± 1.1
74.0	74.0	0.0	± 1.1
69.0	69.0	0.0	± 1.1
64.0	64.0	0.0	± 1.1
59.0	59.0	0.0	± 1.1
54.0	54.0	0.0	± 1.1
49.0	49.0	0.0	± 1.1
44.0	44.0	0.0	± 1.1
39.0	39.0	0.0	± 1.1
34.0	34.0	0.0	± 1.1
30.0	30.0	0.0	± 1.1
29.0	29.0	0.0	± 1.1
28.0	28.0	0.0	± 1.1
27.0	27.0	0.0	± 1.1
26.0	26.0	0.0	± 1.1
25.0	25.1	0.1	± 1.1

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Cert. No. : ACL26007
Job No. : VC69AC0048
Pages : 7 of 8

8. Level linearity including the level range control

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
130	94.0	94.0	0.0	±1.1

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
130	29.0	29.0	0.0	±1.1

9. Tone burst response

Time Weighting	Tone burst duration, Tb (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	108.0	108.0	0.0	1.5 ; -5.0
	2	8	117.0	117.0	0.0	1.0 ; -2.5
	200	800	134.0	134.1	0.1	±1.0
Slow	2	8	108.0	108.0	0.0	1.0 ; -5.0
	200	800	127.6	127.6	0.0	±1.0
	0.25	1	99.0	98.9	-0.1	1.5 ; -5.0
SEL	2	8	108.0	108.0	0.0	1.0 ; -2.5
	200	800	128.0	128.1	0.1	±1.0

Cert. No. : ACL26007
Job No. : VC69AC0048
Pages : 8 of 8

10. Peak C sound level

Number of cycle in test signal	Anticipated Value (dB)	Measured Value, 1, peak (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	130.0	130.0	0.0	±3.0
One	133.4	133.4	0.0	±3.0

Number of cycle in test signal	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	±2.0
Positive half cycle	135.4	135.1	-0.3	±2.0
Negative half cycle	135.4	135.1	-0.3	±2.0

11. Overload indication

Measured value (dB)	Deviated Value (dB)		Acceptance Limits (dB)
	Positive one-half cycle	Negative one-half cycle	
89.5	89.5	0.0	±1.5

12. High level stability

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A - weight	137.0	137.0	0.0	±0.3

The reported uncertainty is based on a standard uncertainty multiplied by coverage factor $k = 2$ or any value following calculation, providing a level of confidence of approximately 95 %

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End of Calibration Certificate

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SOUND LEVEL METER

MODEL : NL-42A

SERIAL No. : 00322747

Cert. No. : ACL26008
Pages : 1 of 8

Cert. No. : ACL26008
Job No. : VC69AC0048
Pages : 2 of 8

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-42A / Microphone UC-52 / Preamplifier NH-24
Serial No.: 00322747 / 196470 / 15479
ID No.: -

Condition As Found : GOOD

Customer : EASTERN THAI CONSULTING 1992 CO., LTD.
SAHA GROUP INDUSTRIAL PARK, 683 MOO 11,
NONGKHAM, SIRACHA, CHONBURI 20230 THAILAND.

Location : -
Ambient Temperature : (23.0 ± 3) °C
Pressure : (101.3 ± 3) kPa
Relative Humidity : (50.0 ± 20) %

Received Date : 26 DECEMBER 2025
Calibration Date : 05 - 07 JANUARY 2026
Date of Issue : 07 JANUARY 2026

Calibrated by : Nathakorn Pisutpaisan

Approved by : (Nitinun Srihawan)

This certificate is issued in accordance with the requirements of ISO/IEC 17025 standard, may not be reproduced other than in full, except with the prior written approval of the head of Calibration Laboratory.

Calibration Procedure : CP-AC-01

Calibration Method :

This equipment was calibrated by follow on IEC-61672-3 (2013) Standard for sound level meter (SLM).
The SLM had tests to Acoustical and Electrical signal tests of frequency weighing with Anechoic chamber and Reference Standard Instruments.

For tests results of each items were made by observation of each Instruments display and also with SLM's display.

Condition of this result of calibration :

1. Reference Standard Instruments :

Instrument	Model	Serial No.	Cert. No.	Due Date
Waveform Generator	33210A	MY48017076	EF-0011-25	11-FEB-26
Waveform Generator	33511B	MY52302742	EF-0012-25	11-FEB-26
Digital Multimeter	33461A	MY53220104	EEL_BP 24/0268	22-APR-26
Digital Multimeter	33461A	MY53220076	EEL_BP 23/0268	22-APR-26
Digital Multimeter	34461A	MY60024273	CA2025120EA	18-MAR-26
Programmable Attenuator	MAT-1070	62100114	EF-0006-25	11-FEB-26
Condenser Microphone	4180	2977900	AA-1002-25	19-FEB-26
Measuring Amplifier	NA-42KA1	34560495	AA-3002-25	19-FEB-26

2. This result of calibration was found accurate as shown on date and place of calibration for this calibrated item only.

3. This certificate is traceable to the international system of unit maintained at :

- 3.1 National Institute of Metrology (Thailand).
- 3.2 Thailand Institute of Scientific and Technological Research (TISTR).
- 3.3 Electrical And Electronics Institute (UEI).

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Cert. No. : ACL26008
Job No. : VC69AC0048
Pages : 3 of 8

Summary of Measurement Result :

Parameter	Uncertainty (dB)	Maximum-permitted uncertainty of measurement (dB)
1. Absolute sensitivity	0.2	N/A
2. Self-generated noise	0.2	N/A
3. Acoustical signal tests of frequency weightings		
125 Hz	0.3	0.6
1000 Hz	0.3	0.6
8000 Hz	0.3	0.7
4. Electrical signal tests of frequency weightings		
For 10 Hz to 4 kHz	0.3	0.6
For > 4 kHz to 10 kHz	0.3	0.7
For > 10 kHz to 20 kHz	0.3	1.0
5. Frequency and time weightings at 1 kHz	0.2	0.2
6. Long - term stability	0.1	0.1
7. Level linearity on the reference level range	0.2	0.3
8. Level linearity including the level range control	0.2	0.3
9. Tone burst response	0.2	0.3
10. Peak C sound level	0.2	0.35
11. Overload indication	0.2	0.25
12. High level stability	0.1	0.1

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Result of calibration :

1. Absolute sensitivity

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limit (dB)
93.9 (93.94)	93.9	0.0	±0.3

2. Self-generated noise

2.1 Normal test

Measured Value (dB)
15.1

2.2 The microphone of the sound level meter was replaced by electrical signal input device.

Frequency Weighting	Weighting (dB)
A - weight	11.6
C - weight	18.1
Flat	23.6

3. Acoustical signal tests of frequency weightings

Meter free-field acoustic response at a level of 84 dB

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)		
	Flat	C-weight	A-weight
125	0.2	0.2	0.1
1000	0.0	0.0	0.0
8000	0.6	0.7	0.7
			Acceptance Limits
			±1.5
			±1.0
			±5.0

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Cert. No. : ACL26008
Job No. : VC69AC0048
Pages : 5 of 8

Cert. No. : ACL26008
Job No. : VC69AC0048
Pages : 6 of 8

4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 kHz.

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)		
	Flat	C-weight	A-weight
63	0.0	0.0	-0.1
125	0.0	0.0	0.0
250	0.0	0.0	0.0
500	0.0	0.1	0.0
1000	0.0	0.0	0.0
2000	0.0	0.0	0.0
4000	0.0	0.0	0.0
8000	0.0	0.1	0.1
Acceptance Limits			
±2.0			
±1.5			
±1.5			
±1.5			
±1.0			
±2.0			
±3.0			
±5.0			

5. Frequency and time weightings at 1 kHz

5.1 Frequency weightings at 1 kHz

Frequency Weighting	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A - weight	94.0	94.0	0.0	± 0.2
C - weight	94.0	94.0	0.0	± 0.2
Flat	94.0	94.0	0.0	± 0.2

5.2 Time weighting at 1 kHz

Frequency Weighting	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	94.0	94.0	0.0	± 0.1
Slow	94.0	94.0	0.0	± 0.1
Leq	94.0	94.0	0.0	± 0.1

6. Long - term stability

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A - weight	94.0	94.0	0.0	± 0.3

7. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
137.0	137.0	0.0	± 1.1
136.0	136.0	0.0	± 1.1
135.0	135.0	0.0	± 1.1
134.0	134.0	0.0	± 1.1
133.0	133.0	0.0	± 1.1
132.0	132.0	0.0	± 1.1
131.0	131.0	0.0	± 1.1
129.0	129.0	0.0	± 1.1
124.0	124.0	0.0	± 1.1
119.0	119.0	0.0	± 1.1
114.0	114.0	0.0	± 1.1
109.0	109.0	0.0	± 1.1
104.0	104.0	0.0	± 1.1
99.0	99.0	0.0	± 1.1
94.0	94.0	0.0	± 1.1
89.0	89.0	0.0	± 1.1
84.0	84.0	0.0	± 1.1
79.0	79.0	0.0	± 1.1
74.0	74.0	0.0	± 1.1
69.0	69.0	0.0	± 1.1
64.0	64.0	0.0	± 1.1
59.0	59.0	0.0	± 1.1
54.0	53.9	-0.1	± 1.1
49.0	49.0	0.0	± 1.1
44.0	44.0	0.0	± 1.1
39.0	38.9	-0.1	± 1.1
34.0	34.0	0.0	± 1.1
30.0	30.0	0.0	± 1.1
29.0	29.0	0.0	± 1.1
28.0	28.1	0.1	± 1.1
27.0	27.1	0.1	± 1.1
26.0	26.1	0.1	± 1.1
25.0	25.1	0.1	± 1.1

Cert. No. : ACL26008
Job No. : VC69AC0048
Pages : 7 of 8

Cert. No. : ACL26008
Job No. : VC69AC0048
Pages : 8 of 8

8. Level linearity including the level range control

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
130	94.0	94.0	0.0	±1.1
130	29.0	29.0	0.0	±1.1

9. Tone burst response

Time Weighting	Tone burst duration, Tb (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	108.0	107.9	-0.1	1.5 ; -5.0
	2	8	117.0	117.0	0.0	1.0 ; -2.5
	200	800	134.0	134.0	0.0	±1.0
Slow	2	8	108.0	108.0	0.0	1.0 ; -5.0
	200	800	127.6	127.6	0.0	±1.0
	0.25	1	99.0	98.9	-0.1	1.5 ; -5.0
SEL	2	8	108.0	108.0	0.0	1.0 ; -2.5
	200	800	128.0	128.0	0.0	±1.0

10. Peak C sound level

Number of cycle in test signal	Anticipated Value (dB)	Measured Value, L _{peak} (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	130.0	130.0	0.0	±3.0
One	133.4	133.3	-0.1	±3.0

Number of cycle in test signal	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	±2.0
Positive half cycle	135.4	135.2	-0.2	±2.0
Negative half cycle	135.4	135.2	-0.2	±2.0

11. Overload indication

Measured value (dB)		Deviated Value (dB)	Acceptance Limits (dB)
Positive one-half cycle	Negative one-half cycle	-0.1	±1.5
89.6	89.5		

12. High level stability

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A - weight	137.0	137.0	0.0	±0.3

The reported uncertainty is based on a standard uncertainty multiplied by coverage factor $k = 2$
or any value following calculation, providing a level of confidence of approximately 95 %

End of Calibration Certificate

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NOISE DOSI METER

MODEL : CR:110A

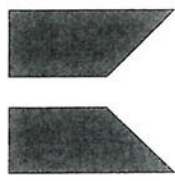
SERIAL No. : CB0640

CERTIFICATE OF CALIBRATION

ISSUED BY
Cirrus Research plc

DATE OF ISSUE
28 January 2026

CERTIFICATE NUMBER
257793



Cirrus Research plc
Acoustic House
Bridlington Road
Hunmanby
North Yorkshire
YO14 0PH
United Kingdom

Page 1 of 2

Approved signatory
N.Smith
Electronically signed:

Dosimeter : IEC 61252-1993+A1:2000

Instrument information
Manufacturer: Cirrus Research plc
Model: CR:110A
Serial number: CB0640
Firmware version: 5.4
Notes: Eastern Thai Consulting 1992 Co.,Ltd.
683 Moo 11, Sukaphiban 8 Rd.,
Nongkhham, Sriracha, Chonburi 20230

Test summary
Date of calibration: 28 January 2026
The calibration was performed respecting the requirements of ISO/IEC 17025:2017.
The dosimeter submitted for testing successfully completed the periodic tests of IEC 61252-1993+A1:2000.
The dosimeter submitted for testing conforms to the specifications in IEC 61252-1993+A1:2000.

Test equipment

Equipment	Manufacturer	Model	Serial number
Signal Generator	SIGLENT	SDG1032X	SDG1XDD07R6629
Attenuator	Cirrus Research	ZE:952	96919
Environmental Monitor	Comet	T7510	16966334
doseBadge Reader	Cirrus Research plc	RC:110A	79620

Notes

This certificate provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory. The results within this certificate relate only to the items calibrated. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a coverage probability of approximately 95%.

CERTIFICATE OF CALIBRATION

Certificate Number:
257793

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Environmental conditions
The following conditions were recorded at the time of the test:

Before	Pressure: 98,72 kPa	Temperature: 21,9 °C	Humidity: 39,6 %
After	Pressure: 98,75 kPa	Temperature: 22,0 °C	Humidity: 39,8 %

Test results summary

Test	Result
Absolute Acoustic Sensitivity 1995	Complies
Linearity 1995	Complies
Short Duration 1995	Complies
Overload Latching 1995	Complies
Frequency weighting 1995	Complies



NOISE DOSI METER

MODEL : CR:110A

SERIAL No. : CB0641

CERTIFICATE OF CALIBRATION

Cirrus Research plc

CERTIFICATE NUMBER 257816

Cirrus Research plc
Acoustic House
Bridlington Road
Hunmanby
North Yorkshire
YO14 0PH
United Kingdom

Page 1 of 2	Approved signatory N.Smith Electronically signed
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Dosemeter: IEC 61252-1993+A1:2000

Instrument information

Cirrus Research plc

Notes: Eastern Thai Consulting 1992 Co., Ltd.

CR:110A

663 Moo 11, Sukapinburi 6 Rd.,
Nongkham Sriracha, Chonburi 20230

CB0641

5.4

Test summary

28 January 2026

The calibration was performed respecting the requirements of ISO/IEC 17025:2017.

The dosimeter submitted for testing successfully completed the periodic tests of IEC 61252-1993+A1:2000.

The dosimeter submitted for testing conforms to the specifications in IEC 61252-1993+A1:2000.

Test equipment

Equipment	Manufacturer	Model	Serial number
Signal Generator	SIGLENT	SDG1032X	SDG1XDD07R6629
Attenuator	Cirrus Research	ZE:952	96919
Environmental Monitor	Comet	T7510	16966334
doseBadge Reader	Cirrus Research plc	RC:110A	79620

Notes

This certificate provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory. The results within this certificate relate only to the items calibrated. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor $k=2$, providing a coverage probability of approximately 95%.

Environmental conditions

The following conditions were recorded at the time of the test:

Before Pressure: 98.57 kPa Temperature: 20.7 °C Humidity: 35.4 %

After Pressure: 98.59 kPa Temperature: 20.9 °C Humidity: 36.5 %

Test results summary

Test	Result
Absolute Acoustic Sensitivity 1995	Complies
Linearity 1995	Complies
Short Duration 1995	Complies
Overload Latching 1995	Complies
Frequency weighting 1995	Complies

Certificate Number: **257816**

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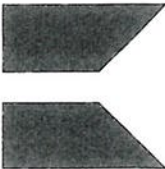
NOISE DOSI METER

MODEL : CR:110A

SERIAL No. : CB0642

CERTIFICATE OF CALIBRATION

ISSUED BY Cirrus Research plc
DATE OF ISSUE 28 January 2026 CERTIFICATE NUMBER 257796



Cirrus Research plc
Acoustic House
Bridlington Road
Hunmanby
North Yorkshire
YO14 0PH
United Kingdom

Page 1 of 2
Approved signatory
N.Smith
Electronically signed:

Dosimeter : IEC 61252-1993+A1:2000

Instrument information

Manufacturer: Cirrus Research plc Notes: Eastern Thai Consulting 1992 Co.,Ltd.
Model: CR:110A 683 Moo 11, Sukaphiban 8 Rd.,
Serial number: CB0642 Nongkham, Sriracha, Chonburi 20230
Firmware version: 5.4

Test summary

Date of calibration: 28 January 2026
The calibration was performed respecting the requirements of ISO/IEC 17025:2017.
The dosimeter submitted for testing successfully completed the periodic tests of IEC 61252-1993+A1:2000.
The dosimeter submitted for testing conforms to the specifications in IEC 61252-1993+A1:2000.

Test equipment

Equipment	Manufacturer	Model	Serial number
Signal Generator	SIGLENT	SDG1032X	SDG1XDDQ6R6307
Attenuator	Cirrus Research	ZE:952	101220
Environmental Monitor	Comet	T7510	16966334
doseBadge Reader	Cirrus Research plc	UNIDB4A	109292

Notes

This certificate provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory. The results within this certificate relate only to the items calibrated. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a coverage probability of approximately 95%.

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CERTIFICATE OF CALIBRATION

Environmental conditions

The following conditions were recorded at the time of the test:

Before Pressure: 98.66 kPa Temperature: 21.6 °C Humidity: 37.7 %
After Pressure: 98.69 kPa Temperature: 21.6 °C Humidity: 38.4 %

Test results summary

Test	Result
Absolute Acoustic Sensitivity 1995	Complies
Linearity 1995	Complies
Short Duration 1995	Complies
Overload Latching 1995	Complies
Frequency weighting 1995	Complies

Certificate Number:
257796

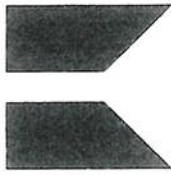
Page 2 of 2

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NOISE DOSI METER

MODEL : CR:110A

SERIAL No. : CB0644



Cirrus Research plc
Acoustic House
Bridlington Road
Hunmanby
North Yorkshire
YO14 0PH
United Kingdom

Page 1 of 2
Approved signatory N.Smith Electronically signed: 

Dosimeter : IEC 61252-1993+A1:2000

Instrument information

Manufacturer: Cirrus Research plc Notes: Eastern Thai Consulting 1992 Co.,Ltd.
Model: CR:110A 683 Moo 11, Sukaphiban 8 Rd.,
Serial number: CB0644 Nongkham, Sriracha, Chonburi 20230
Firmware version: 5.4

Test summary

Date of calibration: 28 January 2026
The calibration was performed respecting the requirements of ISO/IEC 17025:2017.
The dosimeter submitted for testing successfully completed the periodic tests of IEC 61252-1993+A1:2000.
The dosimeter submitted for testing conforms to the specifications in IEC 61252-1993+A1:2000.

Test equipment

Equipment	Manufacturer	Model	Serial number
Signal Generator	SIGLENT	SDG1032X	SDG1XDDC7R0315
Attenuator	Cirrus Research	ZE:952	101223
Environmental Monitor	Comet	T7510	16966334
doseBadge Reader	Cirrus Research plc	RC:110A	109288

Notes

This certificate provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory. The results within this certificate relate only to the items calibrated. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a coverage probability of approximately 95%.

CERTIFICATE OF CALIBRATION

Environmental conditions

The following conditions were recorded at the time of the test:

Before Pressure: 98.57 kPa Temperature: 20.6 °C Humidity: 35.0 %
After Pressure: 98.59 kPa Temperature: 20.9 °C Humidity: 36.5 %

Test results summary

Test	Result
Absolute Acoustic Sensitivity 1995	Complies
Linearity 1995	Complies
Short Duration 1995	Complies
Overload Latching 1995	Complies
Frequency weighting 1995	Complies

COPY

ANALYTICAL BALANCE (DU)

Model : XS205DU

Serial No. : B344940005



Certificate No. : 25-205716
Sample Code : 25-90375-006

CERTIFICATE OF CALIBRATION

Customer : EASTERN THAI CONSULTING 1992 CO., LTD.

683 Moo 11, Sukhapibarn 8 Rd, Nongkharn,
Sriracha, Chonburi 20230

Location of Calibration : EASTERN THAI CONSULTING 1992 CO., LTD.
(Analytical Balance Room)

Equipment : ELECTRONIC BALANCE

Manufacturer : METTLER TOLEDO

Model : XS205DU

Serial No. : B344940005

ID No. : LABE 05/3

Date of Receipt : 26 November 2025

Date of Calibration : 26 November 2025

Calibrated by : Mr. Thanadol Pholthep
Scientist
Approved by : (Mr. Somchai Neampunt)
Signed for Director

Issue date : 28 November 2025

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

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

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 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 Asia Medical and Agricultural Laboratory and Research Center Public Company Limited (AMARC).



Certificate No. : 25-205716
Sample Code : 25-90375-006

REPORT OF CALIBRATION

Equipment : ELECTRONIC BALANCE

Manufacturer : METTLER TOLEDO

Model : XS205DU

Capacity : Max 81 g / 200 g

Resolution : 0.00001 g / 0.0001 g

Serial No. : B344940005

ID No. : LABE 05/3

Result of Calibration

1. Test weight and repeatability of reading

Repeatability is a measure of the ability of a balance to supply the same result in repetitive weighings with one and the same load under the same measurement condition. The measurement of the repeatability must include both the balance specifications and the ambient (vibration, fluctuating air current/temperature/humidity, etc.) Operator handling of the balance is also included in the standard deviation.

Unit : g	Range : 81	Before adjustment	After adjustment
☒ No adjustment	Nominal value	40	80
☐ Adjustment	Standard weight	40.000087	80.000088
	Average reading of indicator	40.00004	80.00004
	Standard deviation	0.000007	0.000007

Unit : g	Range : 200	Before adjustment	After adjustment
☒ No adjustment	Nominal value	100	200
☐ Adjustment	Standard weight	99.999988	200.000015
	Average reading of indicator	99.99999	199.99997
	Standard deviation	0.000005	0.000005

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Certificate No. : 25-205716

Sample Code : 25-90375-006

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REPORT OF CALIBRATION

Result of Calibration

2. Sensitivity or value of a scale division

Change in the output variable of a measuring instrument divided by the associated change in the input variable.

Unit : g

Range : 81				Range : 200			
Test Point	Sensitivity, S	Test Point	Sensitivity, S	Test Point	Sensitivity, S	Test Point	Sensitivity, S
0	1.00000	0	1.00000	0	1.00000	0	1.00000
40	1.00000	100	1.00000	100	1.00000	100	1.00000
80	1.00000	200	1.00000	200	1.00000	200	1.00000

3. Departure of indication from nominal value, Linearity

Unit : g

Nominal Value	Standard Value	Average Reading of Indicator	Correction Value	Expanded Uncertainty	Coverage Factor (k)
Unload	0.000000	0.00000	0.00000	0.000011	2.04
0.01	0.0100016	0.010000	0.000000	0.000011	2.04
0.1	0.1000056	0.100000	0.000001	0.000012	2.02
1	1.0000110	1.000000	0.000001	0.000015	2.01
5	4.9999996	4.999998	0.000002	0.000020	2.00
10	9.9999994	9.999999	0.000000	0.000026	2.00
20	20.0000042	20.000000	0.000004	0.000037	2.00
50	50.0000052	50.000003	0.000002	0.000067	2.00
100	99.9999988	100.000000	0.000000	0.00016	2.00
150	150.0000040	150.000001	-0.000001	0.00022	2.00
200	200.0000015	200.000001	-0.000001	0.00027	2.00

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%. The standard uncertainty of measurement has been determined in accordance with UKAS M3003.

361 Soi Ladprao 122, Ladprao Road,
Phlabphla, Wang Thonglang, Bangkok 10310
FW-CL-004

TEL 02-516-2422
FAX 02-516-6949
Rev.05

CONTACT@AMARC.CO.TH
WWW.AMARC.CO.TH
Effective Date: 15/10/21



Certificate No. : 25-205716

Sample Code : 25-90375-006

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REPORT OF CALIBRATION

Result of Calibration :

4. Eccentric or off-centre loading

Deviation of the measurement value through off-center (eccentric) loading. The corner load increases with the weight of the load and its removal from the center of the pan support.

Weighing pan				Test weight : 50 and 100			
				Unit : g			
				81			
				200			
Range	Position	Reading of indicator	Reading of indicator	Range	Position	Reading of indicator	Reading of indicator
1	1	50.00000	100.00000	1	1	50.00000	100.00000
2	2	49.99997	100.00000	2	2	49.99997	100.00000
3	3	49.99993	99.99999	3	3	49.99993	99.99999
4	4	49.99999	100.00000	4	4	49.99999	100.00000
5	5	50.00003	99.99999	5	5	50.00003	99.99999
6	6	50.00000	100.00000	6	6	50.00000	100.00000
Maximum difference				0.00007			

Condition of Calibration

1. Calibration Method : Wt-CL-004 base on UKAS LAB 14: 2019

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

3. Condition of Calibration item: Normal

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

- Through the reference standard laboratory of Asia Medical and Agricultural Laboratory and Research Center Public

Company Limited (Instrument number 1).

5. Reference standard instrument :

Instrument : STANDARD WEIGHT 1 mg to 1 kg

Class : E2
ID.No. : LB-WE-78

Certificate No. : 25-134074

Due Date : 18 July 2026

- End of Report -



361 Soi Ladprao 122, Ladprao Road,
Phlabphla, Wang Thonglang, Bangkok 10310
FW-CL-004

TEL 02-516-2422
FAX 02-516-6949
Rev.05

CONTACT@AMARC.CO.TH
WWW.AMARC.CO.TH
Effective Date: 15/10/21

BAROMETER

Serial No. : N/A[S41020124]



CALIBRATION LABORATORY CO., LTD.
2/10-11,14,55 Soi Prasert Manukit 29 Yeak 4, Prasert Manukit Road, Ladphrao, Bangkok 10230
Tel.02-578-0353-4 Fax.02-578-2672 www.cal-laboratory.com E-mail: sale@cal-laboratory.com



CERTIFICATE OF CALIBRATION

FOR

NOMENCLATURE : BAROMETER
MANUFACTURER : BARIO
MODEL / TYPE : N/A
SERIAL NO. : N/A[S41020124]
CLID. NO. : 212500828
JOB CONTROL NO. : 260507056453
CALIBRATION SERVICE : ☒ IN-LABORATORY ☐ ON-SITE

CUSTOMER : EASTERN THAI CONSULTING 1992 CO., LTD.
683 MOO 11, SUKHAPIBARN 8 RD,
NONGKHAM, SRIRACHA, CHONBURI 20230

DATE OF RECEIVED : 07 May 2026

DATE OF ISSUED : 11 May 2026

The report of calibration shall not be reproduced except in full without approval of the Calibration Laboratory Co., Ltd.

Calibrated By :

Sitipong Pimdee
Calibration Engineer



Approved By :

Mongkol Yotsoontorn
Authorized Signatory
11 May 2026

This Calibration Certificate documents the traceability to national standards, which realize the units of measurement according to the International System of Units (SI)

Certificate No. Q26056453

F3-011-05/12-23

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page 1 of 3



@calibration



CALIBRATION LABORATORY CO., LTD.
2/10-11,14,55 Soi Prasert Manukit 29 Yeak 4, Prasert Manukit Road, Ladphrao, Bangkok 10230
Tel.02-578-0353-4 Fax.02-578-2672 www.cal-laboratory.com E-mail: sale@cal-laboratory.com



REPORT OF CALIBRATION

FOR

NOMENCLATURE : BAROMETER
MANUFACTURER : BARIO
MODEL / TYPE : N/A
SERIAL NO. : N/A[S41020124]
DATE OF CALIBRATION : 09 May 2026

ENVIRONMENT CONDITIONS :

Temperature : $(23 \pm 2) ^\circ\text{C}$

Relative Humidity : $(55 \pm 10) \% \text{RH}$

PROCEDURE USED :

This instrument was calibrated under procedure No. CLC-CPPP-08 according to DKD-R 6-1 as calibration guidelines.

The calibration was performed by direct measurement with Reference Pressure Monitor which maintained by the Calibration Laboratory Co., Ltd.

REFERENCE STANDARD USED :

Reference Pressure Monitor, Fluke Model RPM3 S/N. 829.

TRACEABILITY :

The measurements are traceable to International System of Units (SI), through National Institute of Metrology (Thailand).
Certificate No. MP-0284-25, Due Date 28 November 2026.

UNCERTAINTY :

The reported uncertainty is based on a standard uncertainty multiplied by coverage factor of $k = 2$. It has been evaluated according to the "Calibration of Pressure Gauges (DKD-R 6-1)" which provides a level of confidence approximately 95%.

Certificate No. Q26056453

F3-011-05/12-23

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page 2 of 3



@calibration



CALIBRATION LABORATORY Co., LTD.

2/10-11,14,55 Soi Prasert Manukit 29 Yaek 4, Prasert Manukit Road, Ladphrao, Bangkok 10230
Tel. 02-578-0353-4 Fax. 02-578-2672 www.cal-laboratory.com E-mail: sale@cal-laboratory.com



CONDITION OF CALIBRATION ITEM : RECEIVED IN GOOD OPERATIONAL CONDITION

MEASUREMENT RESULTS : (X) without adjustment () adjustment

The DUC was exercised by applying a known pressure from its zero to full scale 1 times. Then 2 series of known gauge pressure were applied. The STD reading were recorded and the means value were reported in the table below.

CALIBRATION DATA

CORRECTION OF PRESSURE

DUC Test point (hPa)	STD Reading (hPa)		Correction (hPa)	
	Up	Down	Up	Down
990	990.9	991.0	+0.9	+1.0
1000	1001.0	1001.1	+1.0	+1.1
1010	1011.2	1011.3	+1.2	+1.3
1020	1021.3	1021.4	+1.3	+1.4
1030	1031.4	1031.4	+1.4	+1.4

Uncertainty of measurement ± 0.9 hPa

Transmitting fluid : Air.

Note. The Scope of Accredited ANAB Certificate No. ACDM-2814 Version 018 Page 47 of 73

This report is valid for the above stated instrument/s only.

Certificate No. Q26056453

F3-01-05/12-23

End of Certificate

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page 3 of 3



@ccalibration

ICP-OES/Avio550

Serial No. : M81S221010

ICP-OES/Avio500 Preventive Maintenance (PM)

Company Name:	Eastern Thai Consulting 1992 Co.,Ltd		
Address (Instrument Location):	683 Moo 11, Nong Kham Subdistrict, Si Racha District, Chonburi		
Serial Number:	M815221010	PM Number:	1 of 2
Customer Name (if applicable):	Channarong	Telephone Number:	0968761232
Service Engineer Name:	Khwanchai	Service Order Number:	WO-11759162
Date PM Performed: (DD-MM-YYYY)	08-Apr-2026	Next PM Due Date: (DD-MM-YYYY)	08-Oct-2026
Standard Labor Hours to Complete PM :		4 hours	

Part Number	Release	Publication Date
TH09370188 Rev.1	B	July 2020



PerkinElmer®

Scope

The purpose of this PM is to ensure the continued functionality of the PerkinElmer / Avio500 by inspecting and replacing any worn or damaged parts. This service should only be performed by a trained representative of PerkinElmer. The customer should save their method before the PM begins.

General Instructions:

The customer must provide the engineer operational data to demonstrate recent instrument performance prior to starting the PM.

Always check with the customer before making any changes that may affect the customer's analysis or calibration, including a current back-up of system software and/or data files. The completed document should be signed by an authorized PerkinElmer and customer representative and left with the customer. Update the PM sticker and instrument logbook as required.

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Component List

Component / Specific Model	Serial #	Configuration Notes

Parts Lists

Parts Included with the PM		
Part Number (if applicable)	Description	Quantity
09995098	Air Filter-Spectrometer	1
N077520	Air Filter-RF Generator	1
09992731	Axial Window	1
B0810377	Radial Window	1
N0770438	O-ring kit, injector support adapter	1
N0780437	O-ring kit, torch	1

Additional Reagents and Standards Required for PM

Part Number (if applicable)	Description	Quality	Batch/Lot #	Expired Date (MM/YY)
N0691579	Multi-Element Standard	AR	64-247CRX1	Nov-2026
N9300221	DL Standard diluted 100 X	AR	65-009CRY1	Nov-2026
N0582152	Wave Cal Solution	AR	64-241CRX1	Jul-2026
N9302946	VIS Wavecal Solution	AR	62-183CRT1	Sep-2026

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Procedure Checklist

Use (✓) to check off those steps in the checklist that have been completed.

1. General:

- ☒ Ask customer about unit's performance since last visit.
- ☒ Check incoming AC line voltage under load for proper levels and grounding.
- ☒ Is the instrument operational? If not, please comment.

2. Mechanical:

- ☒ Inspect and clean all fans and filters.
- ☒ Inspect and replace torch components and necessary.
Torch Components Replaced: ☒ Yes ☐ No
- ☒ Inspect all tubing for signs of cracking or leaking and replace as necessary.
Tubing Replaced: ☐ Yes ☒ No
- ☒ Inspect the peristaltic pump for proper operation.
- ☒ Check and adjust if necessary, the external nitrogen, argon shear gas and water supply pressures.
- ☒ Check and adjust if necessary, the internal nitrogen, main argon, torch argon and shear gas pressures.

Regulator	Measured Pressure	Set Pressure
Nitrogen		NA (calibrated in Factory)
Main Argon	76	76 psig
Torch Argon	67	67 psig
Shear Gas	65	65 psig
Water	35	35 psig

- ☒ Check shear gas nozzle for blockages and proper, uniform flow.
- ☒ Inspect nitrogen Hi/Low purge and shear gas solenoids for proper function.
- ☒ Inspect the function of all spectrometer motors. Drive the motors from the Spectrometer DCM. (slits, XY motor)
- ☒ Inspect the function of the pneumatic shutter for proper operation.
- ☒ Perform preventative maintenance on the chiller as required. Make the customer aware of the importance of maintaining the chiller fluid level and filter replacement.
- ☒ Drain air compressor surge tank.
- ☒ Clean exterior of instrument.
- ☒ Visually inspect all PC boards for cleanliness and signs of corrosion.

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3. Electrical

- ☒ Check all RF generator and spectrometer power supply voltages.
- ☒ Run instrument diagnostic checks from the appropriate Device Control Module.

RF Generator:

- ☒ Check the RF generator status screens.
- ☒ Check the function of all interlocks.

Spectrometer:

- ☒ Check the spectrometer status screens. Ensure Ready mode with no fetal errors.
- ☒ Check the spectrometer optical tub temperatures (top, bottom, fin, optical base).
- ☒ Check detector temperatures.
- ☒ Check TEC voltages (6.5VDC)

4. Optical:

- ☒ Clean or replace the axial and radial view windows as necessary.
Axial Window Replaced: ☒ Yes ☐ No
Radial Window Replaced: ☒ Yes ☐ No

5. PM Performance Tests:

- ☒ Perform View Align.

Test Spectral Resolution:

- ☒ Measure the spectrometers ability to separate two adjacent wavelengths.

Parameter	Specification	Test Result	Pass/Fail
As 193.696 - Resolution	≤0.007	0.00523	Passed
Ni 231.604 - Resolution	≤0.008	0.00741	Passed
Ni 341.476 - Resolution	≤0.012	0.00902	Passed
La 408.672 - Resolution	≤0.020	0.01570	Passed
Ba 455.403 - Resolution	≤0.025	0.02150	Passed

Test Precision:

- ☒ Test for reproducibility of a set of measurement.

Parameter	Specification	Test Result	Pass/Fail
As 193.696	%RSD ≤ 1 %	0.32	Passed
Zn 213.856	%RSD ≤ 1 %	0.25	Passed
Mn 257.610	%RSD ≤ 1 %	0.29	Passed
La 379.478	%RSD ≤ 1 %	0.31	Passed
Ba 455.403	%RSD ≤ 1 %	0.33	Passed
Ba 493.408	%RSD ≤ 1 %	0.37	Passed

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☒ Run an Axial & Radial BEC according to the A&T spec.

Test Axial BEC Cd:

Method "BEC-XL" For Samples "IB (2%HNO3)" and "IS (N930-0221/100)", record intensities.
Calculated BEC: BEC = (IB * Conc of Std) / (IS - IB). Where Conc of Std = 500 PPB

Element	Conc.	IB	IS
Cd 226	500	931.0	202313.1
IB*Conc	IS-IB	BEC	Spec
465500	201382.1	2.31	<150 PPB
			Pass/Fail
			Passed

Test Radial BEC Mn:

Method "BEC-RL" For Samples "IB (2%HNO3)" and "IS (N069-1579)", record intensities.
Calculated BEC: BEC = (IB * Conc of Std) / (IS - IB). Where Conc of Std = 1,000 PPB

Element	Conc.	IB	IS
Mn 257	1,000	717.1	255339.9
IB*Conc	IS-IB	BEC	Spec
717100	254622.8	2.82	<45 PPB
			Pass/Fail
			Passed

6. Review:

- ☒ Review with the customer PM work performed.
- ☒ Discuss recommended customer supplied materials to have on hand.
- ☒ Attach PM sticker.

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Additional Comments

Additional Comments Regarding the PM

- Use with Sample Introduction AQ for PM test

Review

The preventive maintenance checks and if applicable performance tests for ICP-OES/Avio500 have been completed.

This ICP-OES/Avio500 Passes ☒ Fails ☐ the preventive maintenance.

Review of Preventive Maintenance:

Authorized PerkinElmer Representative:	<i>K.L.S.</i>	Date:	08-Apr-2026 (DD-MM-YYYY)
Authorized Customer Representative:	<i>ก้องเกียรติ</i>	Date:	08-Apr-2026 (DD-MM-YYYY)

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STANDARD WEIGHT 50 g



Certificate No. : 24-062445
Sample Code : 24-25551-001

CERTIFICATE OF CALIBRATION

Customer : EASTERN THAI CONSULTING 1992 CO., LTD.
683 Moo 11, Sukhapibarn 8 Rd., Nongkham,
Siracha, Chonburi 20230

Location of Calibration : Asia Medical and Agricultural Laboratory and Research Center Public Company Limited
(Calibration Laboratory)

Equipment : Standard Weight 50 g

Manufacturer : METTLER TOLEDO

Glass : F1

Serial No. : N/A

ID No. : LABE 10/1

Date of Receipt : 23 May 2024

Date of Calibration : 03 June 2024

Calibrated by : Mr. Somwang Sangdee
Scientist
Approved by : (Mr. Somchai Neampunt)
Signed for Director

Issue date : 04 June 2024

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

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

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 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 Asia Medical and Agricultural Laboratory and Research Center Public Company Limited (AMARC).



Certificate No. : 24-062445
Sample Code : 24-25551-001

REPORT OF CALIBRATION

Equipment : Standard Weight 50 g

Manufacturer : METTLER TOLEDO

Class : F1

Serial No. : N/A

ID No. : LABE 10/1

Result of Calibration : ☒ Without adjustment ☐ Adjustment

Conventional value of the result of weighing in air. For a weight taken at a reference temperature (t_{ref}) of 20°C, the conventional mass is the mass of a reference weight of a density (ρ_{ref}) of 8000 kg.m⁻³ which it balances in air of a reference density (ρ_0) of 1.2 kg.m⁻³

Description	Deviation (mg)	Conventional Mass	Expanded Uncertainty (mg)	Maximum Permissible Error $\pm$ (mg)	ID No.
50 g	-0.343	49.999657 g	0.10	0.30	LABE 10/1

The result expanded uncertainty of measurement U is stated as the standard uncertainty of measurement multiplied by the coverage factor $k = 2.0$, which for a normal distribution corresponds to a coverage probability of approximately 95%. The standard uncertainty of measurement has been determined in accordance with UKAS M3003

[Signature]

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Certificate No. : 24-062445
Sample Code : 24-25551-001

REPORT OF CALIBRATION

Condition of Calibration

1. Ambient Conditions : Temperature $20^{\circ}\text{C} \pm 1.5^{\circ}\text{C}$, Relative humidity $50\% \pm 10\%$ and air density 1.19 kg/m^3

2. Calibration Method : Direct comparison weighing according to OIML R111-1 : 2004(E)

3. Reference standard instrument

Instrument	Class	ID No.	Certificate No.	Due Date
1) Standard Weight 1 mg to 1 kg	E2	LB-WE-83	24-001894	11 January 2025

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

Asia Medical and Agricultural Laboratory and Research Center Public Company Limited
(Instrument number 1).

5. Condition of Calibration item: Normal

6. Description of Calibrated item :

Type and Nominal Value :	Standard Weight 50 g
Shape :	Cylindrical weight with knob
Material :	Stainless steel
Case :	Wooden Box
Comments :	Recalibration

- End of Report -

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STANDARD WEIGHT 100 g



Certificate No. : 24-079772
Sample Code : 24-31841-002

Page 1 of 3

CERTIFICATE OF CALIBRATION

Customer : EASTERN THAI CONSULTING 1992 CO., LTD.
683 Moo 11, Sukhapibarn 8 Rd., Nongkham,
Sriracha, Chonburi 20230

Location of Calibration : Asia Medical and Agricultural Laboratory and Research Center Public Company Limited
(Calibration Laboratory)

Equipment : Standard Weight 100 g

Manufacturer : N/A

Class : N/A

Serial No. : N/A

ID No. : LABE 10/2

Date of Receipt : 25 June 2024

Date of Calibration : 30 June 2024

Calibrated by : Mr. Nawa Sisuwan
Scientist
Issue date : 03 July 2024

Approved by : (Mr. Somchai Neampunt)
Signed for Director

03 July 2024

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

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

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 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 Asia Medical and Agricultural Laboratory and Research Center Public Company Limited (AMARC).

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Phlabphla, Wang Thonglang, Bangkok 10310
FM-CL-017
TEL 02-516-2422
FAX 02-516-6949
Rev.05
CONTACT@AMARC.CO.TH
WWW.AMARC.CO.TH
Effective Date: 15/10/21



Certificate No. : 24-079772
Sample Code : 24-31841-002

Page 2 of 3

REPORT OF CALIBRATION

Equipment : Standard Weight 100 g

Manufacturer : N/A

Class : N/A

Serial No. : N/A

ID No. : LABE 10/2

Result of Calibration : ☒ Without adjustment ☐ Adjustment

Conventional value of the result of weighing in air. For a weight taken at a reference temperature (t_{ref}) of 20°C, the conventional mass is the mass of a reference weight of a density (ρ_{ref}) of 8000 kg.m⁻³ which it balances in air of a reference density (ρ_a) of 1.2 kg.m⁻³

Description	Deviation	Conventional	Expanded	Maximum	ID No.
	(mg)	Mass	Uncertainty	Permissible Error	
			(mg)	$\pm$ (mg)	
100 g	-0.173	99.999827 g	0.16	0.50	LABE 10/2

The result expanded uncertainty of measurement U is stated as the standard uncertainty of measurement multiplied by the coverage factor $k = 2.0$, which for a normal distribution corresponds to a coverage probability of approximately 95%. The standard uncertainty of measurement has been determined in accordance with UKAS M3003

[Signature]

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FM-CL-064
TEL 02-516-2422
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CONTACT@AMARC.CO.TH
WWW.AMARC.CO.TH
Effective Date: 15/10/21



Certificate No. : 24-079772

Sample Code : 24-31841-002

REPORT OF CALIBRATION

Condition of Calibration

1. Ambient Conditions : Temperature 20 °C ± 1.5°C, Relative humidity 50% ± 10% and air density 1.19 kg/m³

2. Calibration Method : WI-CL-007 base on OIML R 111-1 : 2004(E)

3. Reference standard instrument

Instrument	Class	ID.No.	Certificate No.	Due Date
1) Standard Weight 1 mg to 1 kg	E2	LB-WE-83	24-001894	11 January 2025

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

Asia Medical and Agricultural Laboratory and Research Center Public Company Limited

(Instrument number '1).

5. Condition of Calibration item: Normal

6. Description of Calibrated Item :

Type and Nominal Value :	Standard Weight 100 g
Shape :	Cylindrical weight with knob
Material :	Stainless steel
Case :	Wooden Box
Comments :	Recalibration

- End of Report -

COPY

STANDARD WEIGHT 50 g



Certificate No. : 24-079773
Sample Code : 24-31841-003

CERTIFICATE OF CALIBRATION

Customer : EASTERN THAI CONSULTING 1992 CO., LTD.
683 Moo 11, Sukhapibarn 8 Rd., NongKham,
Sriracha, Chonburi 20230

Location of Calibration : Asia Medical and Agricultural Laboratory and Research Center Public Company Limited
(Calibration Laboratory)

Equipment : Standard Weight 50 g

Manufacturer : N/A

Class : N/A

Serial No. : N/A

ID No. : LABE 10/4

Date of Receipt : 25 June 2024

Date of Calibration : 30 June 2024

Calibrated by : Mr. Nawa Sisuwan
Scientist
Issue date : 03 July 2024

(Mr. Somchai Neampunt)
Signed for Director

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

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

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 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 Asia Medical and Agricultural Laboratory and Research Center Public Company Limited (AMARC).



Certificate No. : 24-079773
Sample Code : 24-31841-003

REPORT OF CALIBRATION

Equipment : Standard Weight 50 g

Manufacturer : N/A

Class : N/A

Serial No. : N/A

ID No. : LABE 10/4

Result of Calibration : ☒ Without adjustment ☐ Adjustment

Conventional value of the result of weighing in air. For a weight taken at a reference temperature (t_{ref}) of 20°C, the conventional mass is the mass of a reference weight of a density (ρ_{ref}) of 8000 kg.m⁻³ which it balances in air of a reference density (ρ_0) of 1.2 kg.m⁻³

Description	Deviation	Conventional	Expanded	Maximum	ID No.
	(mg)	Mass	Uncertainty	Permissible Error	
			(mg)	$\pm$ (mg)	
50 g	-0.176	49.999824 g	0.10	0.30	LABE 10/4

The result expanded uncertainty of measurement U is stated as the standard uncertainty of measurement multiplied by the coverage factor $k = 2.0$, which for a normal distribution corresponds to a coverage probability of approximately 95%. The standard uncertainty of measurement has been determined in accordance with UKAS M3003

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Certificate No. : 24-079773

Sample Code : 24-31841-003

Page 3 of 3

REPORT OF CALIBRATION

Condition of Calibration

1. Ambient Conditions : Temperature 20 °C ± 1.5°C, Relative humidity 50% ± 10% and air density 1.19 kg/m³
2. Calibration Method : WI-CI-007 base on OIML R 111-1 : 2004(E)

3. Reference standard Instrument

Instrument	Class	ID.No.	Certificate No.	Due Date
1) Standard Weight 1 mg to 1 kg	E2	LB-WE-83	24-001894	11 January 2025

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

Asia Medical and Agricultural Laboratory and Research Center Public Company Limited

(Instrument number 1).

5. Condition of Calibration item: Normal

6. Description of Calibrated Item :

Type and Nominal Value :	Standard Weight 50 g
Shape :	Cylindrical weight with knob
Material :	Stainless steel
Case :	Wooden Box
Comments :	Recalibration

- End of Report -

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THERMO-HYGROMETER

Model : 608-H1

Serial No. : 45106737



CERTIFICATE OF CALIBRATION

Customer : EASTERN THAI CONSULTING 1992 CO., LTD.
663 Moo 11, Sukhapbarn 8 Rd., Nongkham,
Sriacha, Chonburi 20230

Location of Calibration : Asia Medical and Agricultural Laboratory and Research Center Public Company Limited
(Calibration laboratory)

Equipment : Digital thermo-hygrometer

Manufacturer : testo

Model : 608-H1

Serial No. : 45106737

ID No. : LABE 08/7

Date of Receipt : 30 April 2026

Date of Calibration : 06 May 2026

Condition of Calibration

1. Environment
- 1.1 Ambient temperature : 23.0 °C ± 3.0 °C
- 1.2 Relative humidity : 55.0 % ± 15.0 %

2. Calibration method

- 2.1 In-house method: WI-CL-045 By comparison with thermometer standard / chilled mirror hygrometer in controlled chamber.
- 2.2 The calibration by comparison unit under calibration (UUC) to the thermometer standard / chilled mirror hygrometer in a chamber at the controlled temperature / relative humidity.

3. Reference standard instrument

Instrument	Model	ID No.	Certificate No.	Due Date
3.1 Chilled Mirror	Optidew 401	LB-DP-04 & LB-DP-04 (DP)	TH-0045-25	22 July 2026
3.2 Digital Thermometer	Optidew 401	LB-DP-04 & LB-DP-04 (Temp.)	25-157165	19 August 2026
3.3 Digital Thermometer	34972A	LB-DA-07 with RTD-69	25-115069	18 August 2026

4. This certificate is traceable to the international system of unit (SI Unit).

- 4.1 Instrument No. 3.1 through National Institute of Metrology (Thailand).
- 4.2 Instrument No. 3.2 and 3.3 through Asia Medical and Agricultural Laboratory and Research Center Public Company Limited.
5. This result of calibration was found accurate as shown on date and place of calibration only.
6. Condition of calibration item : Normal

Calibrated by Miss Pornsuda Lohabai

Scientist

08 May 2026

Approved by

(Mr. Nuttaput Timula)

Signed for Director

Issue date

08 May 2026

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

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

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 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 Asia Medical and Agricultural Laboratory and Research Center Public Company Limited (AMARC).

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Rev.02

CONTACT@AMARC.CO.TH
WWW.AMARC.CO.TH
Effective Date 16/03/26



REPORT OF CALIBRATION

Results of Calibration

Temperature measurement

Resolution : 0.1 °C

Range : 0 °C to 50 °C

Calibration point °C	Average of standard reading		Unit under calibration		uncertainty °C
	Controlled humidity %RH	Temperature °C	Average reading °C	Correction value °C	
20	50	20.00	19.9	+ 0.10	± 0.39
25	50	25.00	24.9	+ 0.10	± 0.39
30	50	30.02	29.8	+ 0.22	± 0.39

Humidity measurement

Resolution : 0.1 %RH

Range : 10 %RH to 95 %RH

Calibration point %RH	Average of standard reading		Unit under calibration		uncertainty %RH
	Air temperature °C	Calculated humidity %RH	Average reading %RH	Correction value %RH	
45	25.00	45.04	50.2	- 5.16	± 1.3
60	25.00	60.10	65.1	- 5.00	± 1.5
75	25.01	75.06	85.7	- 10.64	± 1.7

Notes

- Calibration results without adjustment.

The result expanded uncertainty of measurement U is stated as the standard uncertainty multiplied by the coverage factor $k=2.00$, which for a normal distribution corresponds to a coverage probability of approximately 95%. The standard uncertainty of measurement has been determined in accordance with UKAS M3003.

- End of Report -

COPY

Analytical Balances

Model : XS205DU

Serial No : B814654693

Mettler-Toledo (Thailand) Ltd.

846/4 - 846/5 Lasalle Rd., Bangna Tai Sub-District

Bangna District, Bangkok 10260

+662 723 0382

MT-TH.ServiceSupport@mt.com



NSC-TISI-TIS 17025
CALIBRATION 0062

Accuracy Calibration Certificate

Customer

Company: Eastern Thai Consulting 1992 Co., Ltd.
Address: 129 Moo 1, Nonsi
City: Kabin Buri
Zip / Postal: 25110
State / Province: Prachinburi
Order Number: 
0 3 3 3 8 2 3 9 7 4

Contact: Tassawan Chansamrong

Weighing Device

Manufacturer: Mettler Toledo
Model: XS205DU
Serial No.: B814654693
Instrument Type: Weighing Instrument
Asset Number: KB-LAB-61/002

Terminal Model: SAT
Terminal Serial No.: B814654693
Terminal Asset No.: N/A
Building: Office Laboratory
Floor: 1
Room: Laboratory

Range	Max. Capacity	Readability (d)
1	81 g	0.00001 g
2	220 g	0.0001 g

Procedure

Calibration Guideline: EURAMET cg-18 v. 4.0 (11/2015)

METTLER TOLEDO Work Instruction: CP/W002/20

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 and, consequently, measurements are shown as N/A.

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: 21.3 °C	End: 21.8 °C	Start: 65.0 %	End: 74.5 %

As Found Calibration Date: 17-Mar-2026
As Left Calibration Date: N/A
Issue Date: 18-Mar-2026

Calibrator: 
Sompong Nonting

Approved Signatory: 
Naruephon C.
Technical Manager / Head of Calibration Center

COPY

Measurement Results

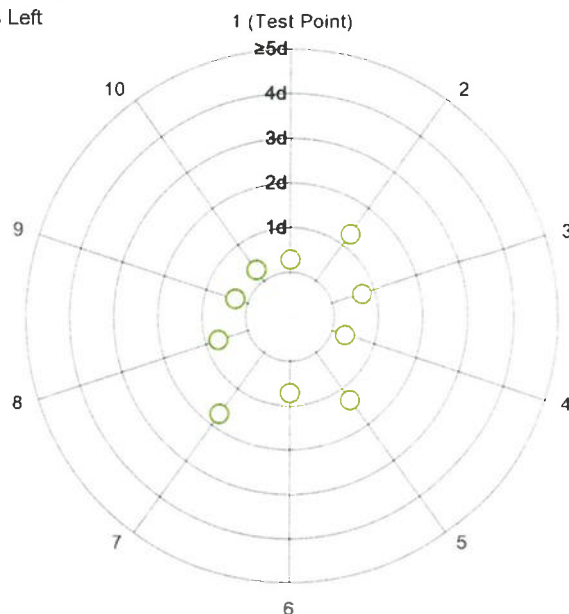
Repeatability

Test Load: 70 g

	As Found	As Left
1	70.00002 g	N/A
2	70.00001 g	N/A
3	70.00003 g	N/A
4	70.00002 g	N/A
5	70.00001 g	N/A
6	70.00003 g	N/A
7	70.00004 g	N/A
8	70.00003 g	N/A
9	70.00002 g	N/A
10	70.00002 g	N/A

Standard Deviation	0.000009 g	N/A
--------------------	------------	-----

○ As Found
◆ As Left



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

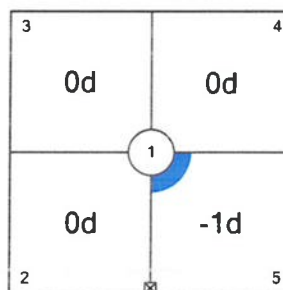
The results of this graph are based upon the absolute values of the differences from the mean value.

Eccentricity

Test Load: 100 g

Position	As Found	As Left
1	100.0001 g	N/A
2	100.0001 g	N/A
3	100.0001 g	N/A
4	100.0001 g	N/A
5	100.0000 g	N/A

Maximum Deviation	0.0001 g	N/A
-------------------	----------	-----



As Found

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

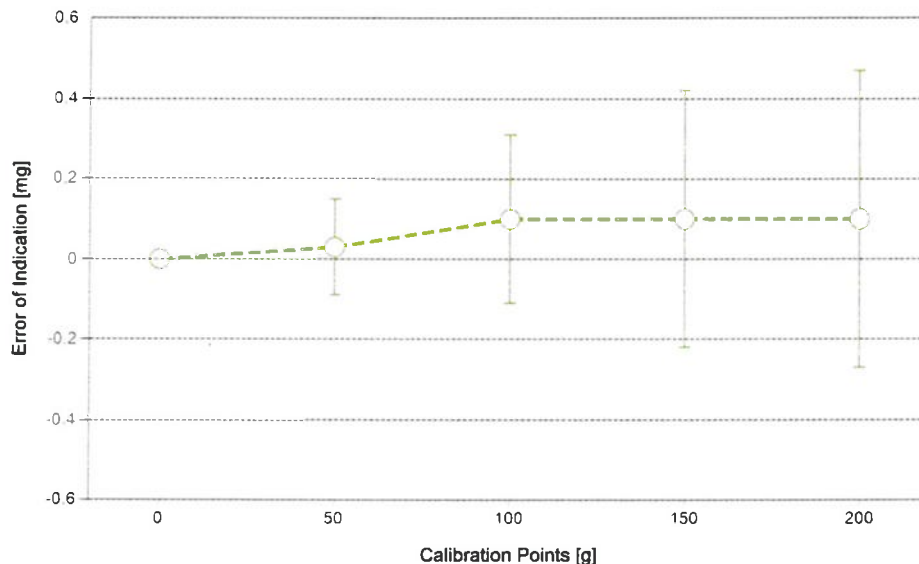
COPY

Error of Indication

As Found

	Reference Value	Indication	Error of Indication	Expanded Uncertainty	k
1	0.00000 g	0.00000 g	0.00000 g	0.020 mg	2
2	0.05000 g	0.05000 g	0.00000 g	0.023 mg	2
3	0.10000 g	0.10000 g	0.00000 g	0.025 mg	2
4	0.50000 g	0.50001 g	0.00001 g	0.030 mg	2
5	1.00000 g	1.00001 g	0.00001 g	0.034 mg	2
6	5.00000 g	5.00001 g	0.00001 g	0.049 mg	2
7	10.00001 g	10.00002 g	0.00001 g	0.062 mg	2
8 ¹	50.00002 g	50.00005 g	0.00003 g	0.12 mg	2
9	100.0000 g	100.0001 g	0.0001 g	0.21 mg	2
10	150.0000 g	150.0001 g	0.0001 g	0.32 mg	2
11	199.9999 g	200.0000 g	0.0001 g	0.37 mg	2

¹The calculated uncertainty was replaced by the CMC (Calibration and Measurement Capabilities) value because the calculated uncertainty was smaller than the CMC value.



○ As Found

◆ As Left

For improved legibility of the graphics only increasing measurement points are shown and measurement points close to zero are not displayed.

The expanded measurement uncertainty is reported as the standard measurement uncertainty multiplied by the coverage factor k such that the coverage probability corresponds to approximately 95 %.

The user is responsible for maintaining environmental conditions and the settings of the weighing instrument when it was calibrated. The results of this calibration certificate relate only to the calibrated item.

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.:	WS54	Date of Issue:	11-Sep-2025
Certificate Number:	L68/02499.1 - L68/02499.23	Calibration Due Date:	09-Jan-2027

COPY

Thermo Hygrometer

Equipment No.:	IN306	Date of Issue:	19-Dec-2025
Certificate Number:	SG-H-01037/68	Calibration Due Date:	15-Dec-2026

Remarks

FACT adjustment functionality activated
Equipment condition: Good
Next calibration according to customer's procedure
Calibration data not decide by calibration laboratory
Calibration Guideline: Based on EURAMET cg-18 v.4.0 (11/2015)

End of Accredited Section

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

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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: $1.5 \cdot 10^{-6} / K$

Temperature range on site for the evaluation of the measurement uncertainty in use: 3 K

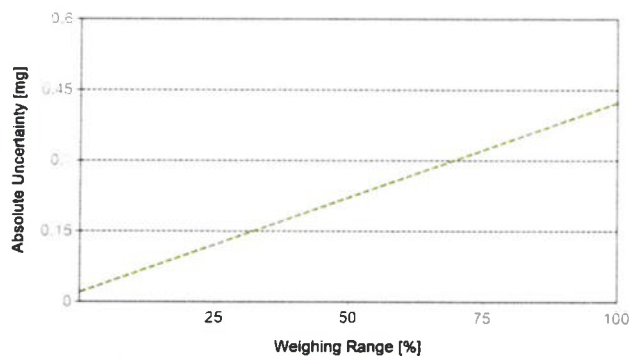
Linearization of Uncertainty Equation

Range			As Found	As Left
	d	Max		
1	0.00001 g	81 g	$U_1 = 0.021 \text{ mg} + 0.00497 \text{ mg/g} \cdot R$	N/A
2	0.0001 g	220 g	$U_2 = 0.06 \text{ mg} + 0.00495 \text{ mg/g} \cdot R$	N/A

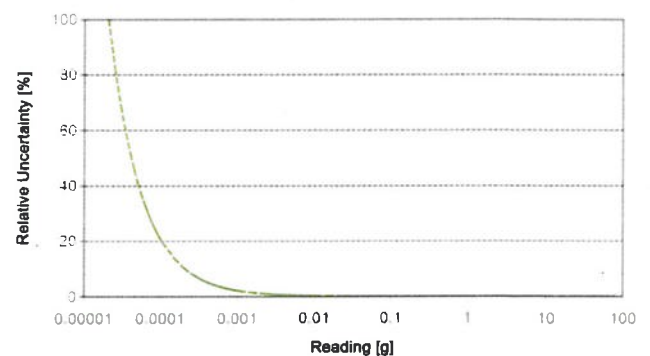
To optimize the stability of the linearization, besides of the zero load only increasing measurement points with a test load of 5% of the measurement range or larger are taken for the calculation of the linear equation.

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

Net Indication	As Found		As Left	
0.00220 g	0.021 mg	0.96%	N/A	N/A
0.02200 g	0.021 mg	0.096%	N/A	N/A
0.22000 g	0.022 mg	0.010%	N/A	N/A
2.20000 g	0.032 mg	0.0015%	N/A	N/A
220.0000 g	1.1 mg	0.00052%	N/A	N/A



As Found



As Left

The weighing range shown in the absolute uncertainty graph refers to the first interval/range of the device.

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Are you looking for some clarifications on the terms and graphs in your ACC calibration certificate? Do you know how to leverage its full value?

More information at:
► www.mt.com/ACC-Cert-Info



Thermo Reactor

Model : RD125

Serial No. : 0220/003514



Metrology Center
SCI ECO Services Company Limited

51 Moo 8, Tubkwang, Kaeng Khoi, Saraburi, Thailand 18260

Bangkok Tel : +668 9205 6851 , +669 81924 0059

Saraburi Tel : +669 8247 2360

Website : www.scieco.co.th E-Mail : calibrate@scg.co.th

Certificate No. T251191

Page 1 of 3

Certificate of Calibration

Equipment : Thermoreactor

Manufacturer : Lovibond

Model : RD125

Serial No. : 0220/003514

Customer Code : KB-LAB-63/004

ID No. : T2603A5

Customer : Eastern Thai Consulting 1992 Co.,Ltd.
129 Moo.1 Nonsi,
Kabinburi, Prachinburi 25110

Customer Location : Laboratory Room

Date of Receipt : 16 July 2025

Calibrated By : Sujjar Naknakred (Site Calibration Manager)

Approved By :  / Boonchai Suriyawong (Site Calibration Manager)

Date of Issue : 02 AUG 2025

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 standard laboratory. This certificate may not be reproduced other than in full except with the prior written approval of the Metrological Center.

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Metrology Center

SCI ECO Services Company Limited

51 Moo 8, Tubkwang, Kaeng Khoi, Saraburi, Thailand 18260

Certificate No. T251191

Page 2 of 3

Calibration Report

Equipment : Thermoreactor
Date of Calibration : 23 July 2025
Environment : Temperature : 21.8°C-30.6°C
Line Voltage : 225.7-227.8 V
Relative Humidity : 55 - 65 %RH

Condition of this results of calibration :

1. This equipment was calibrated by insert 29 standard thermocouples type T into its chamber , the other one standard thermocouples type T use for ambient temperature measurement . The calibration was done in according to WI-T20.

All data show below were final values and the initial data from customer request . The temperature scale used was based on ITS - 90 .

2. Reference Standard Instrument :

Instrument	Model	Instrument No.	Certificate No.	Due Date
TC	TYPE T	TN51-TN60	T242204	9 November 2025
TC	TYPE T	TN61-TN70	T242204	9 November 2025
DATA LOGGER	34970A	T47	T242204	9 November 2025

3. This certificate is traceable to :

National Institute of Metrology (Thailand) through Metrological Center (NSC-TISI-TIS 17025 CALIBRATION 0244.)

4. Condition of calibrated item : good

Equipment Description :

Time Constant 2 Hour 55 Minute At 150 °C
Fresh Air Damper ☐ Open ☐ Min ☐ Medium ☐ Max
☐ Close
☒ Not Available

5. Adjustment :

(X) without adjustment

() after adjustment

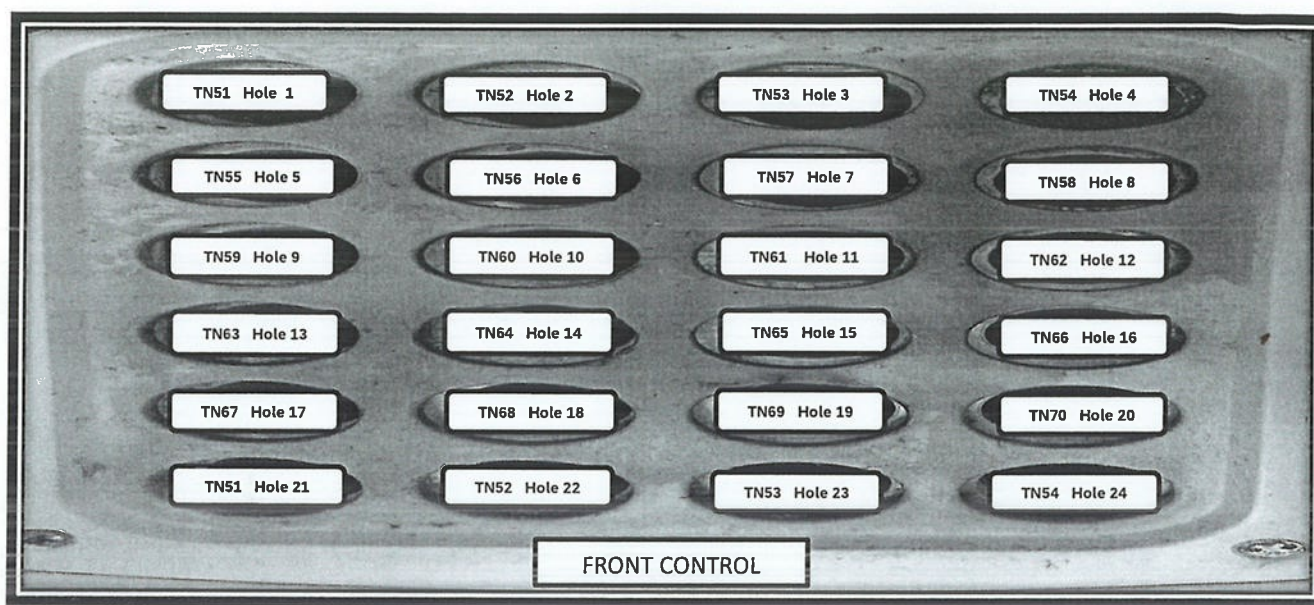
Approved By. _____

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Certificate No. T251191

Pag 3 of 3

Calibration Report



Measurement Results

		Average Standard Reading at each position (°C)									
CAL POINT		TN51 Hole 1	TN52 Hole 2	TN53 Hole 3	TN54 Hole 4	TN55 Hole 5	TN56 Hole 6	TN57 Hole 7	TN58 Hole 8	TN59 Hole 9	TN60 Hole 10
150	Max	150.99	149.53	151.08	151.09	150.02	151.07	150.77	151.22	151.25	149.54
	Min	150.88	149.36	150.94	150.92	149.87	150.98	150.69	151.14	151.13	149.45
	Average	150.94	149.45	151.01	151.00	149.95	151.03	150.73	151.18	151.19	149.49
CAL POINT		TN61 Hole 11	TN62 Hole 12	TN63 Hole 13	TN64 Hole 14	TN65 Hole 15	TN66 Hole 16	TN67 Hole 17	TN68 Hole 18	TN69 Hole 19	TN70 Hole 20
150	Max	150.60	150.91	151.18	150.83	150.07	150.92	151.18	150.59	151.22	149.43
	Min	150.53	150.84	151.12	150.77	150.00	150.84	151.08	150.52	151.15	149.36
	Average	150.56	150.87	151.15	150.80	150.03	150.88	151.13	150.55	151.18	149.39
CAL POINT		TN51 Hole 21	TN52 Hole 22	TN53 Hole 23	TN54 Hole 24						
150	Max	150.49	150.49	149.74	151.11						
	Min	150.43	150.43	149.68	150.99						
	Average	150.46	150.46	149.71	151.05						
Thermoreactor						Temperature Distribution					
Setting (°C)		Reading (°C)				Stability (±°C)		Uncertainty (±°C)			
		Min , Max		Average							
FIX 150		-		-		0.1		0.80			

The calibration result apply only the above calibrated item.

The result of test was found accurate as shown on date and place of test only.

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k which for a t-distribution, providing a level of confidence of approximately 95 % .

End of Certificate.

Approved By. 

COPY

Chamber (Incubator)

Model : TC445s

Serial No. : 0922/006981



Metrology Center

SCI ECO Services Company Limited

51 Moo 8, Tubkwang, Kaeng Khoi, Saraburi, Thailand 18260

Bangkok Tel : +668 9205 6851 , +668 1924 0059

Saraburi Tel : +669 8247 2360 Website : www.scieco.co.th

E-Mail :calibrate@scg.com , mkplan@scg.com



Certificate No. T260481

Page 1 of 3

Certificate of Calibration

Equipment : Chamber (Incubator)

Manufacturer : Lovibond

Model : TC445s

Serial No. : 0922/006981

Customer Code : KB-LAB-66/003

ID No. : T4983A5

Customer : Eastern Thai Consulting 1992 Co.,Ltd.
129 Moo.1 Nonsi,
Kabinburi, Prachinburi 25110

Customer Location : Laboratory

Date of Receipt : 11 March 2026

Calibrated By : Atiphong Rongrat (Technician)

Approved By :  / Boonchai Suriyawong (Site Calibration Manager)

Date of Issue : 24 APR 2026

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

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Certificate No. T260481

Page 2 of 3

Calibration Report

Equipment : Chamber (Incubator)
Date of Calibration : 18 March 2026
Environment : Temperature : 29.3-30.5 °C
Line Voltage : 222.7-227.4 V
Relative Humidity : 55 - 65 %RH

Condition of this results of calibration :

1. This equipment was calibrated by insert nine resistance thermometer detectors into its chamber, the other one resistance thermometer detector use for ambient temperature measurement . The calibration was done in according to WI-T20 (based on ASTM E145-94 (Reapproved 2001) and AS2853-1986).

All data show below were final values and the initial data from customer request . The temperature scale used was based on ITS - 90 .

2. Reference Standard Instrument :

Instrument	Model	Instrument No.	Certificate No.	Due Date
RTD	100 ohm	31-(CH1-10)	T250835	24 May 2026
DATA LOGGER	34970A	T193	T250835	24 May 2026

3. This certificate is traceable to :

National Institute of Metrology (Thailand) through Metrological Center (NSC-TISI-TIS 17025 CALIBRATION 0244.)

4. Condition of calibrated item : good

Equipment Description :

Time Constant 2 Hour 40 Minute At 20 °C
Fresh Air Damper ☐ Open ☐ Min ☐ Medium ☐ Max
 ☐ Close
 ☒ Not Available

5. Adjustment :

(X) without adjustment

() after adjustment

Approved By. _____

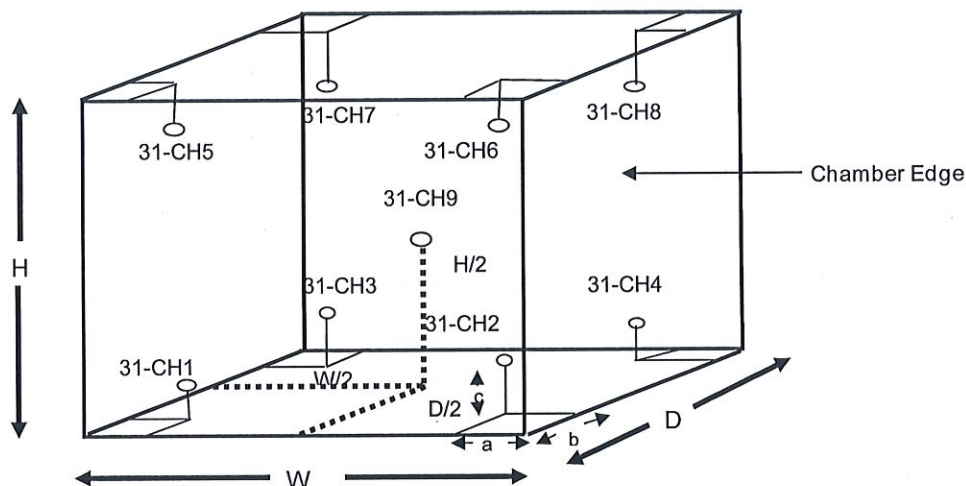


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Certificate No. T260481

Page 3 of 3

Calibration Report



Remark :

Internal Dimensions of Chamber : W (Width) = 60 cm. H (Height) = 146 cm. and D (Depth) = 64 cm.

Size of Installed Standard sensor number 31-CH1 to number 31-CH8 : a = 5 cm. , b = 5 cm. and c = 5 cm.

Size of Installed Standard sensor number 31-CH9 : W/2 = 40 cm./2 , H/2 = 32 cm./2 and D/2 = 25 cm./2

Measurement Results

Average Standard Reading at each position (°C)									
Calibration Point	31-CH1	31-CH2	31-CH3	31-CH4	31-CH5	31-CH6	31-CH7	31-CH8	31-CH9
20	20.07	20.28	19.77	20.07	19.83	19.88	19.79	20.25	20.00

Chamber (Incubator)			Temperature Distribution				
Setting (°C)	Reading (°C)		Average (°C)	Stability (± °C)	Uniformity (°C)	Uncertainty (± °C)	Coverage Factor k
	Min , Max	Average					
20.5	19.6 , 19.7	19.6	19.99	0.25	0.25	0.42	2.00

** Reading Temperature in Chamber with "Digital thermometer with sensor "KB-LAB-63/022"

The calibration result apply only the above calibrated item.

The result of test was found accurate as shown on date and place of test only.

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k which for a t-distribution, providing a level of confidence of approximately 95 % .

End of Certificate

Approved By. _____



COPY

DO METER

Model : YSI5000

Serial No. : 16H102702

CERT.No.: HS-W070I

Certificate of Calibration

Calibration Date : 30 Sep 25
Submitted by : Eastern Thai Consulting 1992 Co., Ltd.
129 Moo 1, Nonsi Subdistrict, Kabinburi
District Prachinburi Province 25110

Avg Room Temp : 20 °C
Avg Water Temp : 20 °C
Air Pressure : 760.00 mmHg
Salinity : 0 ppt

Model : YSI 5000
S/N : 16H102702
Probe : YSI 5010
S/N : 22A100334
ID NO. :
Air Temp ref : S/N. F8065C26
Barometric ref : S/N. F8065C26
Water Temp ref : -
ID NO. HS001
Technician : Kittipong M.

Calibration Details

Calibration Point	100% air sat. (@20 °C, DO = 9.09 mg/l)	(status)	(status)
Measurement 1 (mg/l)	9.08	(PASS)	-
Measurement 2 (mg/l)	9.08	(PASS)	-
Measurement 3 (mg/l)	9.08	(PASS)	-
Measurement 4 (mg/l)	9.09	(PASS)	-
Measurement 5 (mg/l)	9.08	(PASS)	-
Measurement 6 (mg/l)	9.09	(PASS)	-
Measurement 7 (mg/l)	9.08	(PASS)	-
Measurement 8 (mg/l)	9.08	(PASS)	-
Measurement 9 (mg/l)	9.08	(PASS)	-
Measurement 10 (mg/l)	9.08	(PASS)	-
Mean Measurement	9.08	mg/l	-
Inaccuracy	0.01	mg/l	-

Overall Status (PASS)

Manufacturer Specification

Accuracy = +/- 0.02 mg/l

- 1) This certificate is issued based on the result that are found as shown on date and place of test only.
- 2) The calibration procedure followed in accordance with Harikul Science Co., Ltd.
- 3) This result shall not be used for advertising purpose.



Technician Signature
(Kittipong Maekwong)

COPY



Laboratory Manager
(Supreecha Sumaritam)

WATER BATH

Model : WNB45

Serial No. : L719.0236

CERTIFICATE OF CALIBRATION

Page 1 of 3

Certificate No. : 25-180809

Sample Code : 25-79154-001

Customer : Eastern Thai Consulting 1992 Co., Ltd.
129 Moo 1, Suwannasorn Rd., Nonsri,
Kabinburi, Prachinburi 25110

Location of Calibration : Eastern Thai Consulting 1992 Co., Ltd.
(Hot Room)

Equipment : Liquid bath (Water bath)

Manufacturer : Memmert

Model : WNB 45

Serial No. : L719.0236

ID No. : KB-LAB-63/017

Date of Receipt : 03 October 2025

Date of Calibration : 03 October 2025

Condition of Calibration

1. Environment	1.1 Ambient temperature	: Maximum	31.4 °C	; Minimum	30.0 °C
	1.2 Relative humidity	: Maximum	72.9 %	; Minimum	65.1 %
	1.3 Line voltage supplied	: Maximum	240.7 VAC	; Minimum	233.2 VAC

2. Calibration method

In-house method WI-CL-023 based on ASTM E 715-80 (Reapproved 2022).

3. Reference standard instrument

Instrument	ID No.	Certificate No.	Due Date
Data acquisition with sensor (RTD-Pt100)	LB-DA-11 (RTD-214 to RTD-218)	24-151037	02 December 2025

4. This certificate is traceable to the international system of unit (SI Unit).

The measurement is traceable to Asia Medical and Agricultural Laboratory and Research Center Public Company Limited.

5. This result of calibration was found accurate as shown on date and place of calibration only.**6. Condition of calibration item** : Normal

Calibrated by Mr. Pattanapong Pulngern
Scientist

Approved by (Mr. Somchai Neampunt)
Signed for Director

Issue date 06 October 2025

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

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

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 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 Asia Medical and Agricultural Laboratory and Research Center Public Company Limited (AMARC).

REPORT OF CALIBRATION

Page 2 of 3

Certificate No. : 25-180809

Sample Code : 25-79154-001

Results of Calibration

Resolution : 0.1 °C

1. Reporting of Temperature

Calibration point (°C)	UUC* setting (°C)	UUC* reading (°C)	Measured temperature at each positions (°C)					Uncertainty ± (°C)	Coverage factor k
			# 1	# 2	# 3	# 4	# 5 ^{Ref.}		
85	85.9	85.9	84.955	85.110	85.222	85.183	85.072	0.17	2.00
95	95.0	95.0	93.967	94.159	94.240	94.173	94.061	0.19	2.00

2. Characterization results

Calibration point (°C)	Stability ± (°C)	Uniformity (°C)	Overall variation (°C)
85	0.069	0.225	0.388
95	0.094	0.269	0.430

Notes

- UUC* = Unit Under Calibration



REPORT OF CALIBRATION

Page 3 of 3

Certificate No. : 25-180809

Sample Code : 25-79154-001

Results of Calibration

Notes

1. Sensor installation locations
 - 1.1 Place five calibrated temperature sensors in the unloaded water bath with diffuser plate in place and at lowest position and water level approximately 38 mm from the top.
 - 1.2 Locate one sensor in each of the four corners of the bath approximately 50 mm from each wall and midway between the diffuser plate and the water surface.
 - 1.3 Locate the fifth sensor within 25 mm of the geometric center of the bath.
2. The quoted uncertainty includes "Stability of bath and loading effect in bath at 20% of uniformity".
3. 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.
4. Stability - one-half of the greatest maximum difference of measured temperatures at any one sensor.
5. Overall variation - the difference of the maximum and the minimum measured temperatures throughout observation time.
6. UUC* reading - the average reading of indicating device that forms the integral part of the bath.
7. Controlled circulation or stirrer motor setting : N/A
8. Cooling system : N/A
9. Calibration results without adjustment.

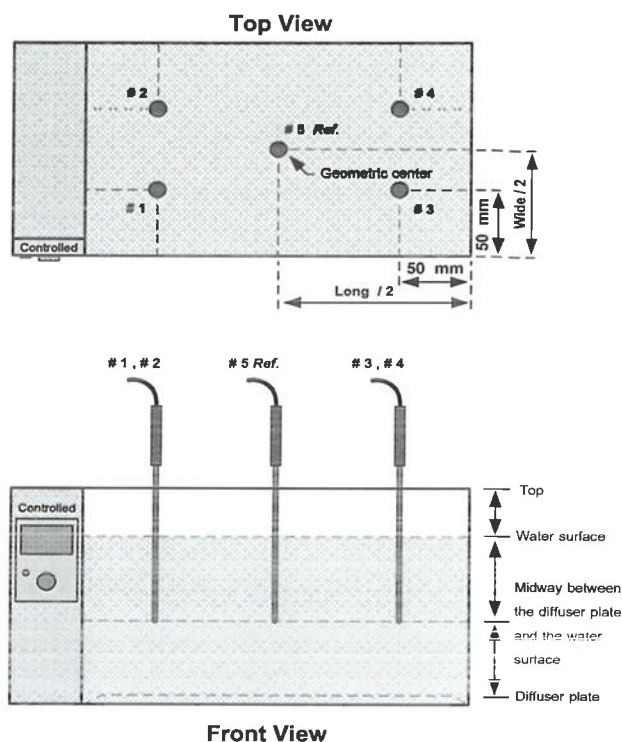


Figure: Example of sensor
installation Positions

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%. The standard uncertainty of measurement has been determined in accordance with UKAS M3003.

- End of Report -

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Chamber (Refrigerator)

Model : SCR-1320SAD

Serial No. : 0508-00065



Metrology Center

SCI ECO Services Company Limited

51 Moo 8, Tubkwang, Kaeng Khoi, Saraburi, Thailand 18260

Bangkok Tel : +668 9205 6851 , +668 1924 0059

Saraburi Tel : +669 8247 2360 Website : www.scieco.co.th

E-Mail : calibrate@scg.com , mkplan@scg.com



Certificate No. T260482

Page 1 of 3

Certificate of Calibration

Equipment : Chamber (Refrigerator)

Manufacturer : Sanden Intercool

Model : SRC-1320SAD

Serial No. : 0508-00065

Customer Code : KB-LAB-48/034

ID No. : T8421A2

Customer : Eastern Thai Consulting 1992 Co.,Ltd.
129 Moo.1 Nonsi,
Kabinburi, Prachinburi 25110

Customer Location : Laboratory

Date of Receipt : 11 March 2026

Calibrated By : Atiphong Rongrat (Technician)

Approved By :  / Boonchai Suriyawong (Site Calibration Manager)

Date of Issue : 24 APR 2026

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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 standard laboratory. This certificate may not be reproduced other than in full except with the prior written approval of the Metrology.

Certificate No. T260482

Page 2 of 3

Calibration Report

Equipment : Chamber (Refrigerator)
Date of Calibration : 19 March 2026
Environment : Temperature : 29.2-30.5 °C
Line Voltage : 222.7-227.4 V
Relative Humidity : 55 - 65 %RH

Condition of this results of calibration :

1. This equipment was calibrated by insert nine resistance thermometer detectors into its chamber, the other one resistance thermometer detector use for ambient temperature measurement . The calibration was done in according to WI-T20 (based on ASTM E145-94 (Reapproved 2001) and AS2853-1986).

All data show below were final values and the initial data from customer request . The temperature scale used was based on ITS - 90 .

2. Reference Standard Instrument :

Instrument	Model	Instrument No.	Certificate No.	Due Date
RTD	100 ohm	31-(CH1-10)	T250835	24 May 2026
DATA LOGGER	34970A	T193	T250835	24 May 2026

3. This certificate is traceable to :

National Institute of Metrology (Thailand) through Metrological Center (NSC-TISI-TIS 17025 CALIBRATION 0244.)

4. Condition of calibrated item : good

Equipment Description :

Time Constant 3 Hour - Minute At 3 °C
Fresh Air Damper ☐ Open ☐ Min ☐ Medium ☐ Max
☐ Close
☒ Not Available

5. Adjustment :

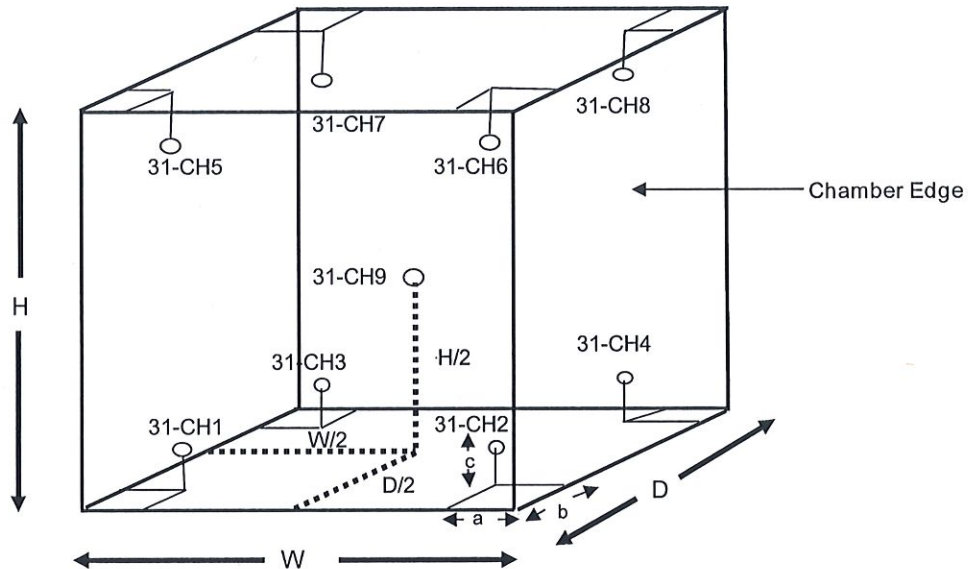
(X) without adjustment

() after adjustment

Approved By. _____

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Calibration Report



Remark :

Internal Dimensions of Chamber : W (Width) = 100 cm. , H(Height)=135 cm. and D(Depth)=45 cm.

Size of Installed Standard sensor number 31-CH1to number 31-CH8 : a = 5 cm. ,b = 5 cm. and c = 5 cm.

Size of Installed Standard sensor number 31-CH9 : W/2=100 cm./2 H/2=135 cm./2 and D/2=45 cm./2

Measurement Results	Average Standard Reading at each position (°C)								
Calibration Point	31-CH1	31-CH2	31-CH3	31-CH4	31-CH5	31-CH6	31-CH7	31-CH8	31-CH9
3	3.11	3.23	2.81	3.18	3.15	3.04	2.94	2.66	2.98

Chamber (Refrigerator)			Temperature Distribution				
Setting (°C)	Reading (°C)		Average (°C)	Stability (±°C)	Uniformity (°C)	Uncertainty (±°C)	Coverage Factor k
	Min , Max	Average					
3.0	2.9 , 3.8	3.5	3.01	0.76	0.43	1.45	2.20

The calibration result apply only the above calibrated item.

The result of test was found accurate as shown on date and place of test only.

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k which for a t-distribution, providing a level of confidence of approximately 95 % .

Approved By. _____



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pH METER

Model : SevenCompact

Serial No. : B824972289



CERTIFICATE OF CALIBRATION

Certificate No. : 25-158075

Sample Code : 25-69374-001

Customer : Eastern Thai Consulting 1992 Co., Ltd.
129 Moo 1, Suwannasorn Rd., Nonsri,
Kabinburi, Prachinburi 25110

Location of Calibration : Eastern Thai Consulting 1992 Co., Ltd.
(Laboratory)

Equipment : pH Meter

Manufacturer : METTLER TOLEDO

Model : SevenCompact S220

Serial No. : B824972289

ID No. : KB-LAB-61/003

Date of Receipt : 21 August 2025

Date of Calibration : 21 August 2025

Condition of Calibration

1. Environment Ambient temperature : 15.0 to 35.0 °C Relative humidity : 35.0 to 80.0 %RH
1.1 Start time : 25.6 °C ; End time : 25.0 °C 1.2 Start time : 71.8 %RH ; End time : 66.6 %RH

2. Calibration method

In house method WI-CL-019 : Direct measurement with standard voltage calibrator and direct measurement with certified reference material (CRM).

3. Reference standard / Certified reference material

Instrument	ID No.	Certificate No.	Due Date
3.1 Voltage Calibrator	LB-DPC-02	25E1215	16 April 2026
3.2 Digital Thermometer	LB-DPC-02	25-141889	29 July 2026
Certified Reference Material	Lot. No.	Ref No.	Expire Date
3.3 Buffer Solution pH 4.007	1125959	PH216.L5	13 July 2027
3.4 Buffer Solution pH 6.999	C03273	S11M004	13 May 2027
3.5 Buffer Solution pH 10.010	1125958	PH220.L5	13 July 2026

4. This certificate is traceable to the international system of unit (SI Unit).

- 4.1 Instrument No. 3.1 through Technology Promotion Association (Thailand-Japan).
4.2 Instrument No. 3.2 through Asia Medical and Agricultural Laboratory and Research Center Public Company Limited.
4.3 Buffer Solution No. 3.3 and No. 3.5 traceable to CPA chem (through primary measurement method-Harned cell using calibrated thermometer, barometer, and nanovoltmeter Accredited laboratory ISO/IEC 17025 and ISO 17034).
4.4 Buffer Solution No. 3.4 traceable to HACH (Certified Reference Material from DFM and PTB Certificate Nr. CRM-P1118 and Certificate Nr. PTB-PHOB-555/30620/22. According to DIN EN ISO 17034:2017).

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

6. Condition of calibration item : Normal

Calibrated by Mr. Chakrin Chiangsorn
Scientist

Approved by

(Mr. Somchai Neampunt)
Signed for Director

Issue date 22 August 2025

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

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

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REPORT OF CALIBRATION

Certificate No. : 25-158075

Sample Code : 25-69374-001

Equipment : pH Meter Resolution : 0.01 pH ; 0.1 mV ; 0.1 °C
Manufacturer : METTLER TOLEDO Model : SevenCompact S220
Serial No. : B824972289 ID No. : KB-LAB-61/003
Range : -2.000 pH to 20.000 pH ; -2000.0 mV to 2000.0 mV ; -5.0°C to 130.0°C

Results of Calibration

Part 1. DC Voltage measurement

pH Meter Serial No. : B824972289

Nominal Value pH	Applied DC Voltage mV	Average indicator reading		Uncertainty mV	Coverage factor k
		mV	pH		
0	414.113	414.0	0.00	± 0.083	2.00
4	177.477	177.5	4.00	± 0.083	2.00
7	0.000	0.0	7.00	± 0.083	2.00
10	-177.477	-177.4	10.00	± 0.083	2.00
14	-414.113	-413.9	14.00	± 0.083	2.00

Part 2. Performance of Electrode system

Electrode Manufacturer : METTLER TOLEDO Model : InLab Expert Pro-ISM

Electrode Serial No. : 4293264

Three-Point Calibration at pH4 and pH7 Percent Slope : 98.0 , at pH7 and pH10 Percent Slope : 99.5

Standard Buffer Solution pH (@ 25 °C)	Average indicator reading		Error Value pH	Uncertainty pH	Coverage factor k
	pH	mV			
4.007	4.00	180.0	-0.007	± 0.0093	2.00
6.999	7.01	5.4	0.011	± 0.0093	2.00
10.010	10.00	-170.6	-0.010	± 0.0093	2.00

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%. The standard uncertainty of measurement has been determined in accordance with UKAS M3003.



REPORT OF CALIBRATION

Certificate No. : 25-158075

Sample Code : 25-69374-001

Equipment : pH Meter (Digital Thermometer with sensor)

Thermometer readout

Manufacturer : METTLER TOLEDO Model : SevenCompact S220
Serial No. : B824972289 ID No. : KB-LAB-61/003
Resolution : 0.1 °C Range : -5.0 °C to 130.0 °C

Thermometer sensor

Manufacturer : METTLER TOLEDO Model : InLab Expert Pro-ISM
Serial No. : 4293264 ID No. : N/A

Condition of Calibration

1. Environment
- 1.1 Ambient temperature : 24.8 °C ± 0.1 °C
1.2 Relative humidity : 61.7 % ± 0.4 %

2. Calibration method

- 2.1 The calibration use in house method WI-CL-021 : by comparison with standard thermometer
2.2 The calibration by comparison unit under calibration (UUC) to the standard thermometer in a calibration bath at the controlled temperature.
2.3 The temperature scale in use of this laboratory is the international temperature scale of 1990 (ITS-90).

3. Reference standard instrument

Instrument	Model	ID. No.	Certificate No.	Due date
3.1 Resistance Thermometer	PT-100	RTD-366	25-141889	29 July 2026
3.2 Thermometer Readout	754	LB-DPC-02	25-141889	29 July 2026

4. This certificate is traceable to the international system of unit (SI Unit).

Asia Medical and Agricultural Laboratory and Research Center Public Company Limited (Accreditation Under TLAS Laboratory Calibration No.0152)

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

6. Condition of Calibration item : Normal

Results of Calibration

Calibration point °C	Average of standard reading °C	Unit under calibration			Expanded uncertainty °C	Coverage factor k
		Immersion depth mm	Average reading °C	Correction value °C		
23	23.00	100	22.8	+ 0.20	± 0.16	2.00
25	25.00	100	24.8	+ 0.20	± 0.16	2.00
27	27.00	100	26.8	+ 0.20	± 0.16	2.00

Notes

- Calibration results without adjustment

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%. The standard uncertainty of measurement has been determined in accordance with UKAS M3003.

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- End of report -

HOT AIR OVEN

Model : UF55

Serial No. : B224.1762

CERTIFICATE OF CALIBRATION

Certificate No. : 26-023790

Sample Code : 26-010660-003

Customer : Eastern Thai Consulting 1992 Co., Ltd.
129 Moo 1, Suwannasorn Rd., Nonsri,
Kabinburi, Prachinburi 25110

Location of Calibration : Eastern Thai Consulting 1992 Co., Ltd.
(Hot Room)

Equipment : Temperature controlled enclosures (Hot air oven)

Manufacturer : Memmert Model : UF55

Serial No. : B224.1762 ID No. : KB-LAB-68/002

Date of Receipt : 11 February 2026 Date of Calibration : 11-12 February 2026

Condition of Calibration

1. Environment	1.1 Ambient temperature	: Maximum 36.2 °C ; Minimum 34.5 °C
	1.2 Relative humidity	: Maximum 48.0 % ; Minimum 37.2 %
	1.3 Line voltage supplied	: Maximum 223.5 VAC ; Minimum 222.6 VAC

2. Calibration method

TLAS-G-20: Guidelines for calibration and checks of temperature controlled enclosures.

3. Reference standard instrument

Instrument	ID No.	Certificate No.	Due Date
Data acquisition with sensor (RTD-Pt100)	LB-DA-19 (RTD-292 to RTD-300)	26-006549	20 January 2027

4. This certificate is traceable to the international system of unit (SI Unit).

The measurement is traceable to Asia Medical and Agricultural Laboratory and Research Center Public Company Limited.

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

6. Condition of calibration item : Normal

Calibrated by Mr. Pattarakorn Panklong
Scientist

Approved by



(Mr. Nuttaput Timula)

Signed for Director

Issue date 18 February 2026



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

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

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 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 Asia Medical and Agricultural Laboratory and Research Center Public Company Limited (AMARC).

REPORT OF CALIBRATION

Page 2 of 3

Certificate No. : 26-023790

Sample Code : 26-010660-003

Results of Calibration

Resolution : 0.1 °C

1. Reporting of Temperature

Calibration point (°C)	UUC* setting (°C)	UUC* reading (°C)	Measured temperature at each positions (°C)									Uncertainty ± (°C)	Coverage factor <i>k</i>
			# 1	# 2	# 3	# 4	# 5	# 6	# 7	# 8	# 9 ^{Ref}		
85	85.0	85.0	85.28	85.13	85.27	85.28	85.21	85.14	84.88	85.22	85.26	0.25	2.00
104	104.0	104.0	104.27	104.11	104.31	104.29	104.20	104.12	103.83	104.25	104.26	0.47	2.00
150	150.0	150.0	150.27	149.98	150.32	150.33	150.20	150.05	149.66	150.15	150.33	0.47	2.00
180	180.0	180.0	180.25	179.92	180.38	180.38	180.25	180.06	179.65	180.16	180.39	0.48	2.00

2. Characterization results

Calibration point (°C)	Stability ± (°C)	Uniformity (°C)	Overall variation (°C)
85	0.05	0.41	0.46
104	0.06	0.48	0.56
150	0.14	0.76	0.86
180	0.11	0.87	0.93

Notes

- UUC* = Unit Under Calibration



REPORT OF CALIBRATION

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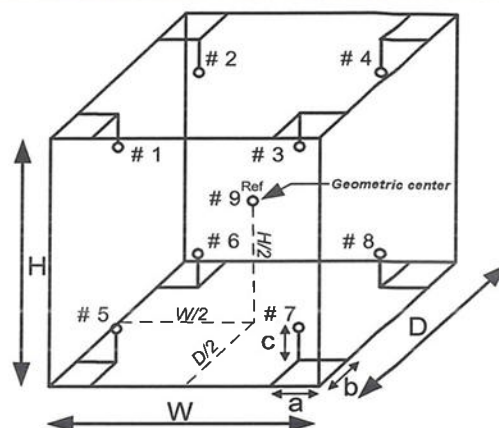
Certificate No. : 26-023790

Sample Code : 26-010660-003

Results of Calibration

Notes

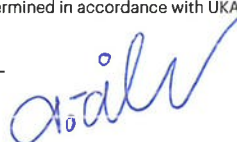
1. Sensor installation locations
 - 1.1 All sensors at any corners or walls should be positioned 5 cm (a x b x c) from the wall.
 - 1.2 The reference sensor is preferably located of the geometric center of the chamber.
2. Interior dimensions approx of chamber :
W = 40 cm ; D = 33 cm ; H = 40 cm
3. Air valve or fresh air level : Off
4. Fan level : Open
5. The quoted uncertainty includes" Stability of chamber and loading effect in chamber at 20% of uniformity ".
6. 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.
7. Stability - one-half of the greatest maximum difference of measured temperatures at any one sensor.
8. Overall variation - the difference of the maximum and the minimum measured temperatures throughout observation time.
9. UUC* reading - the average reading of indicating device that forms the integral part of the enclosure.
10. Calibration results without adjustment.



**Figure: Example of sensor
installation Positions**

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%. The standard uncertainty of measurement has been determined in accordance with UKAS M3003.

- End of Report -



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