

ภาคผนวก ข-27

รายงานผลการสำรวจบริเวณชายฝั่งทะเล

รายงานผลการสำรวจบริเวณชายฝั่งทะเล

อำเภอสิงหนคร – อำเภอเมือง จังหวัดสงขลา

วัตถุประสงค์

สำรวจหาระดับแนวชายฝั่งและความลึกของท้องน้ำเพื่อดูความเปลี่ยนแปลงของชายหาดจากผลกระทบของธรรมชาติและสิ่งแวดล้อม

ขอบเขตของงานและระยะเวลาสำรวจ

ดำเนินการสำรวจ ตั้งแต่วันที่ 10 ถึง 16 มีนาคม 2568

บริเวณสำรวจ ตั้งแต่อำเภอสิงหนคร ถึงอำเภอเมือง จังหวัดสงขลา

ขอบเขตของการสำรวจ พื้นที่สำรวจเริ่มจากบริเวณท่าเทียบเรือ บริษัท ปตท.สผ. จำกัด(มหาชน) อำเภอสิงหนคร จังหวัดสงขลา สำรวจไปตามแนวชายฝั่งทะเลด้านทิศเหนือระยะทางประมาณ 5,000 เมตร สิ้นสุดที่ค่าพิกัด N-804312 E-669336 และสำรวจลงใต้ทางด้านทิศใต้ระยะทางประมาณ 5,000 เมตร สิ้นสุดที่ค่าพิกัด N-794209 E-678612 สำรวจออกจากแนวชายฝั่งออกไปทะเลประมาณ 1000 เมตร โดยกำหนดแนวสำรวจทุกๆ 100 เมตร พร้อมทำรูปตัดแนวชายฝั่ง รวมทั้งที่สำรวจประมาณ 10 ตารางกิโลเมตร



รูปที่ 1 พื้นที่บริเวณสำรวจ

ระบบพิกัดแผนที่

ระบบพิกัดทางราบ

ใช้ระบบพิกัดแผนที่ ยู.ที.เอ็ม.กริด WGS.1984 Zone 47 (No Datum)

ระดับอ้างอิงทางดิ่ง

ระดับทางดิ่งอ้างอิงจากค่าระดับทะเลปานกลาง (MSL.)

เหตุผลพื้นฐานแผนที่และหมุดอ้างอิงตามชายหาด

ตรวจสอบหมุดหลักฐานที่สร้างไว้เมื่อเดือนเมษายน 2550 และซ่อมแซมหรือสร้างใหม่ทดแทนของเก่าหากพบว่าชำรุดหรือสูญหาย

ขั้นตอนและวิธีการสำรวจตรวจสอบหมุดหลักฐาน

งานตรวจสอบหมุดหลักฐาน

ทำการตรวจสอบหมุดหลักฐานโดยเครื่องมือรังวัด ซึ่งจากการตรวจสอบหมุดหลักฐานต่างๆ หมุด BM01,BM02 ถูกกัดเซาะพังเสียหาย ทำการสร้างหมุดใหม่ยังค่าพิกัดใหม่



รูปที่ 2 หมุดหลักฐาน BM01,BM02



รูปที่3 แผนที่สังเขปหมุดหลักฐาน BM01,BM02 ด้านทิศเหนือ

หมุดBM03,BM04 ซึ่งสภาพทั่วไปของหมุดยังคงมีความสมบูรณ์ ผลจากการตรวจสอบหมุดหลักฐานในงานสำรวจ ตำแหน่งค่าพิกัดและค่าระดับยังอยู่ในตำแหน่งเดิม



รูปที่ 4 หมุดหลักฐาน BM03,BM04



รูปที่ 5 แผนที่สังเขปหมุดหลักฐาน BM03,BM04

ตำแหน่งค่าพิกัดหมุดหลักฐาน

- BM.01 N-804177.046 E-669381.524 Elev.1.694
- BM.02 N-804311.327 E-669335.832 Elev.2.034
- BM.03 N-795238.916 E-677807.640 Elev.2.841
- BM.04 N-794209.223 E-678602.346 Elev.2.064

*** อ้างอิงระบบค่าพิกัดจาก WGS.84 ***



รูปที่ 6 งานตรวจสอบหมุดหลักฐาน

หมุดอ้างอิงแนวชายหาด

ทำหมุดอ้างอิงตามแนวชายหาดจากการตรวจสอบพบว่า ด้านทิศเหนือจากหมุด N4+300 ถึง N3+900 ถูกคลื่นกัดเซาะพังทะลาย ทำการหล่อและฝังหมุดใหม่ สํำรวจตรวจสอบค่าพิกัดและค่าระดับใหม่



รูปที่ 7 หมุด N4+300 ถึงหมุด N3+900

หมุด N3+800 ถึง หมุด N3+200 มีการทับถมของตะกอนบนเขื่อนกันคลื่น ทำการตรวจสอบค่าพิกัดและค่าระดับใหม่



รูป หมุดที่ 8 N3+800 ถึงหมุด N3+200

หมุด N3+200 ถึง หมุด N1+300 มีสภาพใช้งานได้ สํำรวจตรวจสอบค่าพิกัดและค่าระดับใหม่ มีค่าพิกัดและค่าระดับเท่าเดิม



รูปที่ 9 หมุด N3+000 ถึงหมุด N1+300

หมุด N1+200 ถึง N0+000 หล่อและฝังหมุดบนเขื่อนกันคลื่น สํำรวจตรวจสอบค่าพิกัดและค่าระดับใหม่ มีค่าพิกัดและค่าระดับเท่าเดิม



รูปที่ 10 หมุด N1+200 ถึงหมุด N0+000

ด้านทิศใต้ บริเวณเขื่อนกันคลื่น หมุด S0+100, S0+200, S0+300 มีสภาพใช้งานได้ จากการตรวจสอบ หมุดทั้ง 3 หมุดมีค่าพิกัดและค่าระดับเท่าเดิม

หมุดอ้างอิงตามแนวชายฝั่งจากหมุด S0+800, S2+400 สูญหาย ได้สร้างหมุดใหม่ขึ้นมาแทนหมุดเดิม สํำรวจตรวจสอบค่าพิกัดและค่าระดับใหม่

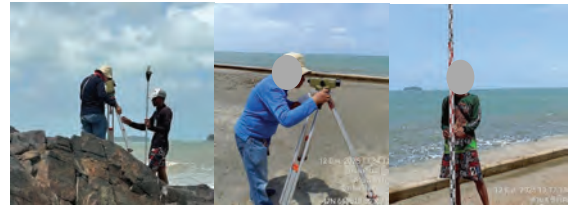


รูปที่ 11 หมุด S0+800 ถึงหมุด S2+400

หมุด S2+500 ถึง S6+000 มีสภาพที่ยังใช้งานได้ ทำการตรวจสอบค่าพิกัดและค่าระดับใหม่



รูปที่ 12 หมุด S2+500 ถึงหมุด S6+000



รูปที่ 13 งานตรวจสอบหมุดอ้างอิงแนวชายฝั่ง

ค่าพิกัดหมุดอ้างอิงแนวชายหาดด้านทิศเหนือ

Northing	Easting	Elevation	Station
804311.327	669335.832	2.034	BM02
804201.768	669409.486	1.694	BM01
804087.910	669446.060	1.662	N4+300
804015.090	669502.969	2.433	N4+200
803929.743	669558.543	2.057	N4+100
803847.712	669615.019	1.684	N4+000
803754.437	669652.812	1.888	N3+900
803720.222	669796.293	2.440	N3+800
803644.994	669852.044	2.411	N3+700
803569.011	669907.637	2.520	N3+600
803494.603	669960.747	2.588	N3+500
803416.552	670018.586	2.041	N3+400
803338.939	670076.554	2.680	N3+300
803253.356	670142.848	2.026	N3+200
803182.589	670200.212	1.992	N3+100
803104.374	670264.962	1.936	N3+000
803044.098	670317.323	2.022	N2+900
802957.438	670394.532	1.998	N2+800
802878.712	670464.444	2.017	N2+700
802803.570	670536.535	1.986	N2+600
802737.488	670594.339	2.007	N2+500
802658.193	670667.032	1.982	N2+400
802584.880	670732.132	2.001	N2+300
802508.316	670798.871	1.982	N2+200
802408.847	670881.748	2.023	N2+100
802308.946	670960.980	2.105	N2+000
802188.308	671058.081	2.145	N1+900
802100.980	671130.758	2.163	N1+800
801966.575	671248.533	2.201	N1+700
801864.982	671362.950	2.153	N1+600
801801.956	671448.704	2.140	N1+500
801714.025	671595.532	4.493	N1+400
801659.272	671769.373	4.452	N1+300

801565.851	672084.206	2.964	N1+200
801408.091	672106.107	2.860	N1+100
801296.531	672165.948	3.283	N1+000
801174.706	672231.354	3.233	N0+900
801091.643	672276.306	3.031	N0+800
800987.175	672331.964	3.033	N0+700
800895.464	672379.873	2.822	N0+600
800798.414	672432.994	2.874	N0+500
800700.601	672484.942	2.561	N0+400
800580.322	672549.111	2.832	N0+300
800469.278	672615.755	2.690	N0+200
800383.259	672692.494	2.982	N0+100
800345.123	672866.222	2.752	N0+000

ค่าพิกัดหมุดอ้างอิงแนวชายหาดด้านทิศใต้

Northing	Easting	Elevation	Station
800197.359	673539.350	2.870	S0+100
800096.264	673615.373	2.880	S0+200
799998.031	673691.391	2.810	S0+300
799560.797	674518.773	1.770	S0+800
799468.398	674670.128	1.540	S0+900
799357.550	674705.108	1.624	S1+000
799249.560	674737.912	1.603	S1+100
799126.392	674798.514	1.641	S1+200
799029.910	674836.829	1.933	S1+300
798953.959	674883.680	1.720	S1+400
798831.668	674919.764	1.780	S1+500
798756.603	674958.708	1.770	S1+600
798645.626	674977.392	1.840	S1+700
798535.031	675027.431	1.940	S1+800
798414.566	675081.706	1.880	S1+900
798317.886	675126.637	1.980	S2+000
798241.277	675182.153	2.032	S2+100
798132.220	675244.702	1.990	S2+200
797999.736	675257.709	1.980	S2+300
797899.457	675340.536	1.868	S2+400
797830.318	676303.058	3.945	S2+500
797702.620	676377.411	3.360	S2+600
797601.180	676421.186	3.269	S2+700
797501.424	676475.145	3.291	S2+800
797401.413	676528.615	3.380	S2+900
797302.357	676582.632	3.495	S3+000
797194.213	676641.161	3.694	S3+100
797104.094	676691.099	3.840	S3+200
797003.332	676748.362	3.924	S3+300
796905.048	676804.618	3.900	S3+400
796798.800	676853.463	3.790	S3+500

796698.515	676911.020	3.910	S3+600
796601.372	676967.162	3.654	S3+700
796501.121	677022.257	3.724	S3+800
796396.932	677080.050	3.801	S3+900
796299.904	677132.725	3.822	S4+000
796200.415	677190.209	3.886	S4+100
796097.513	677246.362	3.798	S4+200
795995.439	677303.303	3.829	S4+300
795900.019	677356.461	3.729	S4+400
795817.921	677405.908	3.305	S4+500
795708.053	677468.164	3.211	S4+600
795597.840	677534.815	2.910	S4+700
795499.091	677600.982	2.544	S4+800
795400.232	677668.797	2.796	S4+900
795296.545	677738.652	3.078	S5+000
795196.049	677806.776	2.974	S5+100
795098.422	677874.165	2.989	S5+200
794999.206	677946.740	3.199	S5+300
794895.879	678012.547	3.193	S5+400
794797.874	678077.847	3.038	S5+500
794696.103	678148.054	2.942	S5+600
794600.012	678224.589	3.286	S5+700
794498.248	678284.018	3.338	S5+800
794396.921	678353.338	3.299	S5+900
794300.310	678462.966	2.777	S6+000
795238.916	677807.640	2.841	BM03
794209.223	678602.346	2.064	BM04

งานสำรวจภูมิประเทศและงานสำรวจชายฝั่ง

เครื่องมือและอุปกรณ์การสำรวจ

- กล้อง Total Station พร้อมอุปกรณ์ จำนวน 1 ชุด
- กล้องระดับ พร้อมอุปกรณ์ จำนวน 1 ชุด
- เครื่องหาพิกัดด้วยดาวเทียม จำนวน 2 ชุด
- เครื่องหยั่งน้ำพร้อมอุปกรณ์ จำนวน 1 ชุด
- โปรแกรมสำรวจและคอมพิวเตอร์
- เครื่องวัดระดับน้ำขึ้น-ลง แบบดิจิทัล
- อุปกรณ์งานสนามและอื่นๆ

วิธีการขั้นตอนการสำรวจ

งานสำรวจเก็บรายละเอียดแนวชายฝั่ง

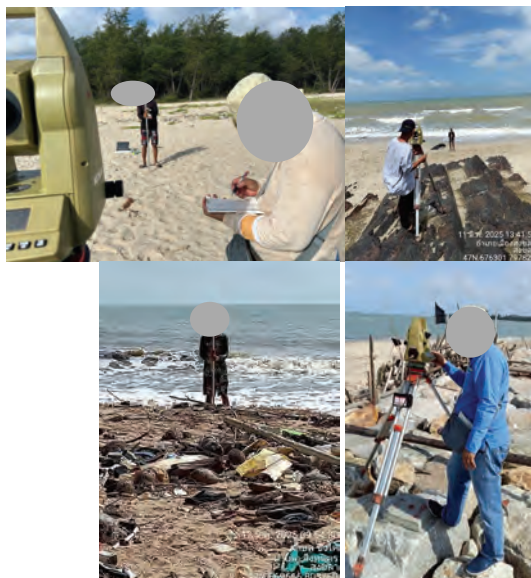
ตรวจสอบหมุดหลักฐาน BM.01-BM.02-BM.03และ BM.04 ใช้ค่าพิกัดหมุดหลักฐานดังกล่าวเป็นพิกัดเริ่มงาน ตรวจสอบพิกัดทางราบและทางตั้งของหมุดอ้างอิงตามแนวชายหาด เพื่อใช้ในการตั้งกล้องสำหรับเก็บรายละเอียดตามแนวสำรวจที่กำหนดไว้

ตั้งกล้อง ตรงตามหมุดหลักฐานอ้างอิงแนวชายฝั่ง ส่องเก็บรายละเอียดตามแนวสำรวจในแต่ละแนวจากหมุดอ้างอิง ลงไปในทะเลให้ได้ตำแหน่งที่เรือสำรวจเข้ามาได้ เก็บรายละเอียดตามแนวชายฝั่งตามจุดเปลี่ยนของระดับของแนวสำรวจ จดบันทึกข้อมูลจากกล้องสำรวจให้ได้ค่า มุมราบ ระยะแนวราบ ระยะสูงต่างแนวตั้ง เพื่อนำมาคำนวณค่าพิกัดและค่าระดับในตำแหน่งนั้นๆ

ทำการสำรวจให้ครอบคลุมในบริเวณพื้นที่สำรวจตามแนวชายฝั่งที่กำหนดจนแล้วเสร็จ นำข้อมูลที่ได้ไปประมวลผลเพื่อใช้ในการทำงานขั้นตอนต่อไป



รูปที่ 14 งานสำรวจเก็บรายละเอียดชายฝั่ง



รูปที่ 15 งานสำรวจเก็บรายละเอียดชายฝั่ง

งานสำรวจหยั่งน้ำ

ใช้ระดับน้ำขึ้นน้ำลง ที่สถานีวัดระดับน้ำอัตโนมัติของกรมเจ้าท่า ที่ติดตั้งไว้ที่ท่าเทียบเรือศูนย์จุด
ลงก่นำร่องรักษาร่องน้ำสงขลา



รูปที่ 16 เครื่องวัดระดับน้ำอัตโนมัติ

ระดับน้ำขึ้นน้ำลงที่ขึ้น-น้ำลงทุก 10 นาที ตลอดระยะเวลาที่สำรวจหยั่งน้ำ เพื่อใช้เป็นเกณฑ์ที่กลม
กับระดับน้ำที่หยั่งได้

ติดตั้ง GPS.BASE STATION ทำการติดตั้ง GPS.BASE STATION ที่หมุดหลักฐาน BM.03 เพื่อให้
เป็นหมุดควบคุมการรังวัดที่จะส่งสัญญาณค่าแก่ด้วย RADIO MODEM ให้กับ GPS.ROVER ที่อยู่บนเรือ
สำรวจ



รูปที่ 17 การติดตั้ง GPS.BASE STATION

ติดตั้งอุปกรณ์สำรวจในเรือสำรวจ

-ติดตั้งหัวรับส่งคลื่นความถี่เสียงใต้น้ำ(Transducer) ไว้ที่บริเวณกัปเรือ โดยให้หัวรับส่งคลื่น
ความถี่เสียงใต้น้ำลงไปในน้ำนับจากผิวหน้า 0.60 เมตร ต่อสายสัญญาณเข้ากับตัวเครื่อง Echo Sounder

-ติดตั้งเสาอากาศเครื่องรับสัญญาณดาวเทียม ให้ตรงกับตำแหน่งที่ติดตั้ง Transducer ของเครื่อง
Echo Sounder เพื่อจะทำให้ค่าที่วัดตรงกับตำแหน่งค่าความลึก

-ติดตั้ง Echo Sounder, GPS.Rover และคอมพิวเตอร์โน้ตบุ๊ก ไว้ในเรือ ตั้งเวลาของ Echo Sounder,
GPS, และคอมพิวเตอร์โน้ตบุ๊กให้ตรงกัน ต่อสายสัญญาณรับ/ส่งข้อมูลของเครื่อง GPS, และเครื่อง Echo
Sounder เข้ากับคอมพิวเตอร์ ที่ติดตั้งโปรแกรมสำรวจทางอุทกศาสตร์(Hydro Pro2.3) และทดสอบการ
ทำงานของระบบ ก่อนการสำรวจ



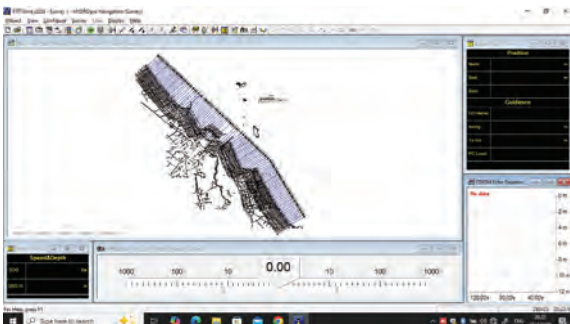
รูปที่ 18 ติดตั้งอุปกรณ์สำรวจในเรือสำรวจ

ทำการตรวจสอบความถูกต้องของค่าความลึกที่ได้จากเครื่องหยั่งน้ำด้วยการทำ Bar Check คือ
การนำเอาแผ่นโลหะ(Bar)ที่สะท้อนสัญญาณคลื่นเสียงซึ่งผูกด้วยลวดสลิงมีเครื่องหมายบอกระยะทุก ๆ 1
เมตร หย่อนลงไปใต้น้ำในแนวตั้งตรงกับบริเวณที่ติดตั้ง Transducer ของเครื่องหยั่งน้ำ แผ่นโลหะจะสะท้อน
สัญญาณเสียงที่ส่งออกไปกลับคืนมายังเครื่องหยั่งน้ำ ทำให้ทราบค่าระดับในระยะที่หย่อนแผ่นลงไป หาก
เครื่องหยั่งน้ำอ่านค่าความลึกไม่ตรงกับระยะที่แผ่นโลหะ ให้ปรับแต่งเครื่องหยั่งน้ำให้อ่านค่าความลึกให้ตรง
กับระยะที่ลวดสลิง ทำการทดสอบทุก ๆ ระยะ 1 เมตร จนถึงความลึกที่ถ่วงน้ำ



รูปที่ 19 ตรวจสอบความถูกต้องของเครื่องหยั่งน้ำ

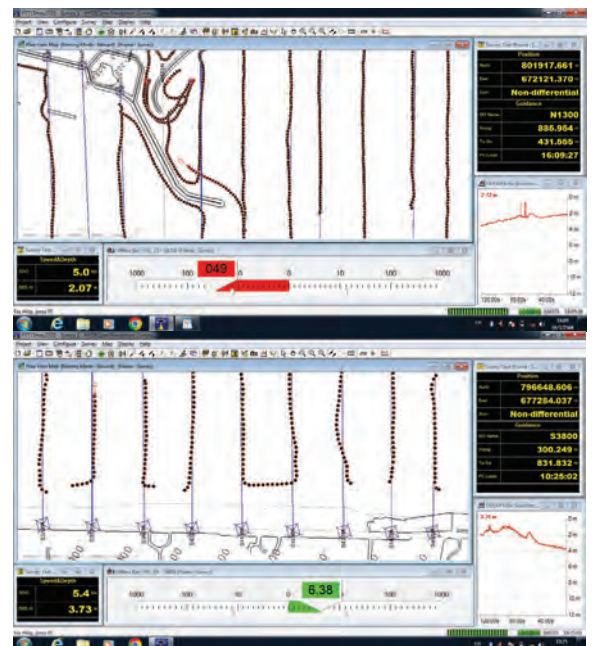
หยั่งน้ำและบันทึกข้อมูล ออกแบบแนวหยั่งน้ำในพื้นที่สำรวจตามแผนที่กำหนดด้วยการกำหนดค่า
พิกัดจุดเริ่มต้น(Start Point) และจุดสิ้นสุด(End Point) ของแต่ละแนวตามพิกัดอ้างอิงตามแนวชายฝั่งทะเล
ที่สร้างไว้ โดยใช้โปรแกรมสำรวจทางอุทกศาสตร์ กำหนดแนวสำรวจทุก ๆ 100 เมตร ตามแนวเส้นสีแดง
ตลอดระยะทาง 10 กิโลเมตร ตามแนวชายฝั่ง



รูปที่ 20 การออกแบบเส้นแนวสำรวจกับข้อมูล

เส้นสีน้ำเงินคือเส้นที่ออกแบบสำหรับนำทางเรือสำรวจ

สำรวจและบันทึกข้อมูลโดยการควบคุมเรือสำรวจให้อยู่ในแนวสำรวจที่ออกแบบไว้ รับข้อมูลค่า
พิกัดเรือสำรวจจากเครื่อง GPS ซึ่งจะมีการ Update ข้อมูลทุก 1 วินาที โปรแกรมสำรวจจะแจ้งทิศทางและ
ตำแหน่งเรือให้ผู้ควบคุมเรือทราบจากคอมพิวเตอร์ ซึ่งจะทำให้ผู้ควบคุมเรือสามารถควบคุมเรือให้อยู่ใน
แนวสำรวจที่ออกแบบไว้ได้ตลอดเวลา สำรวจบันทึกข้อมูลในแต่ละแนวสำรวจโปรแกรมสำรวจจะบันทึก
ข้อมูลของเวลา ตำแหน่ง และค่าความลึกของน้ำในแต่ละแนว เก็บข้อมูลต่อเนื่องตลอดแนวในขณะทำการ
สำรวจ ทำการสำรวจตามที่ยกแบบไว้ทุกแนวจนแล้วเสร็จ



รูปที่ 21 การเก็บข้อมูลของโปรแกรมสำรวจ

อธิบายเกี่ยวกับงานสำรวจและโปรแกรมสำรวจตามรูปภาพด้านบน

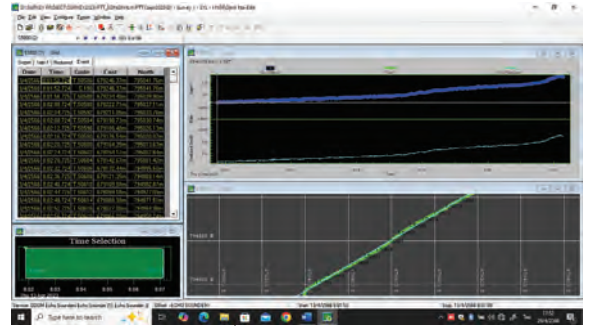
พื้นที่ขาวคือแผนที่ที่ใช้ในการออกแบบเส้นสำรวจและนำเรือสำรวจเส้นน้ำเงินคือเส้นที่ออกแบบสำหรับแนวสำรวจ จุดแดงด้านบนสุดคือตำแหน่งของเรือสำรวจ จุดแดง-ดำกลมๆหลังจากจุดบนคือข้อมูลสำรวจที่ถูกบันทึก พื้นที่ดำมบนขวาคือข้อมูลแสดงสถานะของตำแหน่งที่เรืออยู่ ประกอบด้วย ค่าพิกัด, ค่าความลึก, ท้องน้ำขณะสำรวจ, เวลา, ชื่อของเส้นขณะสำรวจ พื้นที่ขาวเล็กถัดลงมาคือกราฟที่แสดงความลึกขณะสำรวจ ถัดลงมาที่มีเลข 6.38 คือค่าระยะของoffsetซ้าย-ขวา จากแนวเส้นสำรวจ พื้นที่ดำมล่างซ้ายคือข้อมูลความเร็วของเรือและค่าระดับความลึก



รูปที่ 22 การสำรวจหยั่งน้ำเก็บข้อมูลตามแนวสำรวจ

ประมวลผลและจัดรูปแบบแผนที่รูปตัด

นำข้อมูลสำรวจที่บันทึกไว้มาตรวจสอบความถูกต้องของข้อมูล ด้วยโปรแกรมการสำรวจโดยเรียกดูข้อมูลที่ถูกบันทึกไว้ในแต่ละแนวสำรวจ ตรวจสอบและเปรียบเทียบกับกระดาษกราฟที่พล็อตจากเครื่องหยั่งน้ำว่ามีข้อมูลที่ไม่ใช่ข้อมูลที่แท้จริงจากการสำรวจหรือไม่ เช่นข้อมูลที่ลึกหรือตื้นผิดไปจากปกติจะถูกคัดออกไป นำข้อมูลที่ผ่านการตรวจสอบแล้วมาห้กลับกับระดับน้ำขึ้น-ลงที่ได้จากการบันทึกของเครื่องวัดระดับน้ำดิจิตอล ซึ่งกำหนดบันทึกทุกๆ 10 นาที อ้างอิงค่าระดับน้ำจากระดับทะเลปานกลาง โดยการป้อนข้อมูลค่าระดับน้ำขึ้น-ลง ตามวันที่และเวลาที่ทำการสำรวจ โปรแกรมจะคำนวณและห้กลับค่าความลึกระดับน้ำโดยอัตโนมัติ นำข้อมูลที่ห้กลับระดับน้ำแล้วไปใช้ในการทำงานต่อไป

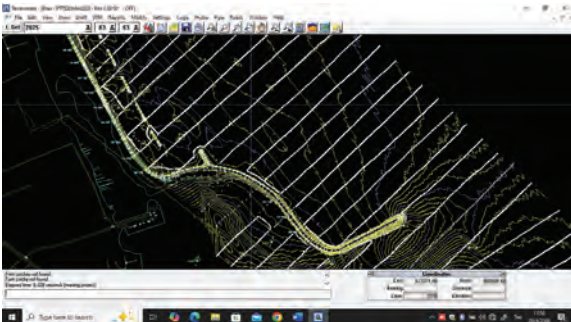


รูปที่ 23 การตรวจสอบข้อมูลสำรวจ

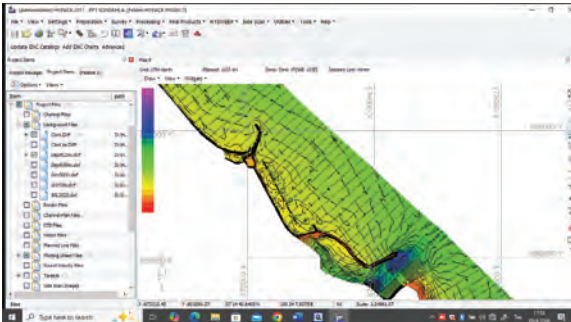
จากรูปด้านบน หน้าต่างด้านซ้ายบนคือข้อมูลของงานสำรวจ ประกอบด้วย ตารางวันที่ เวลา ระดับความลึก ระดับน้ำขึ้น-ลง ค่าพิกัดและ ระดับที่ห้กลับระดับน้ำแล้ว หน้าต่างด้านซ้ายล่าง(แถบสีเขียว)คือช่วงของระยะเวลาที่สำรวจ หน้าต่างด้านขวาคือกราฟที่แสดงค่าข้อมูลสำรวจ เส้นน้ำเงินด้านบนคือระดับความลึกที่จะแสดงสำรวจ สีฟ้าคือระดับความลึกที่จะห้กลับระดับน้ำแล้ว หน้าต่างด้านล่างขวาสี่เหลี่ยมคือของบริเวณสำรวจ สีเขียวที่บนคือแนวเก็บข้อมูลที่สำรวจ

งานสร้างแผนที่และเส้นระดับความสูง(Contour)

นำข้อมูลที่ได้จากการสำรวจ (Points) มาทำเป็นเลขแสดงระดับของท้องน้ำ พร้อมกำหนดเส้นแสดงค่าระดับ(Contour) ซึ่งจะกำหนดไว้ทุกๆ 0.50 เมตร

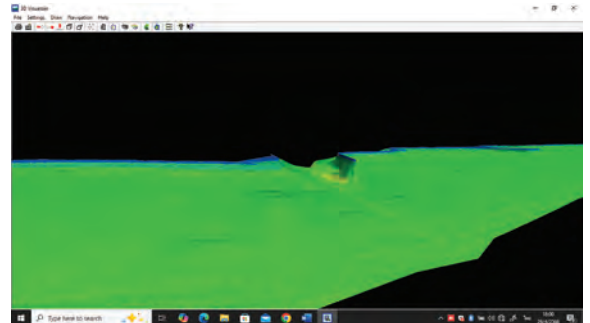


รูปที่ 24 การสร้างเส้นระดับน้ำและเส้นระดับความสูงจากโปรแกรมสำรวจ

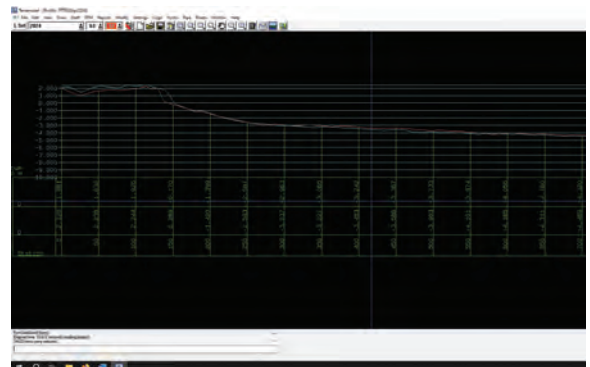


รูปที่ 25 การสร้างเส้นระดับน้ำจากโปรแกรมสำรวจ

การทำรูปตัดแนวชายหาดจากข้อมูลที่ได้จากการสำรวจ (Points) นำมาสร้างพื้นผิว(Surface หรือ DTM) ซึ่งคุณลักษณะของ Points จะประกอบด้วย ค่า X,Y และ Z ดังนั้นโปรแกรมก็สามารถรวม Points และสร้างเป็นพื้นผิวขึ้นมา สร้างเส้นแนวตัด(Alignments) ในตำแหน่งที่ต้องการทำรูปตัดแนวชายหาด ใส่พิกัดจุดเริ่มต้นและพิกัดจุดสิ้นสุดของเส้นแนวตัด ในตำแหน่งและระยะที่ต้องการ ทำความและพล็อตรูปตัดจากค่าส่งไปโปรแกรมสำรวจ โปรแกรมจะคำนวณและสร้างรูปตัดขึ้นมา

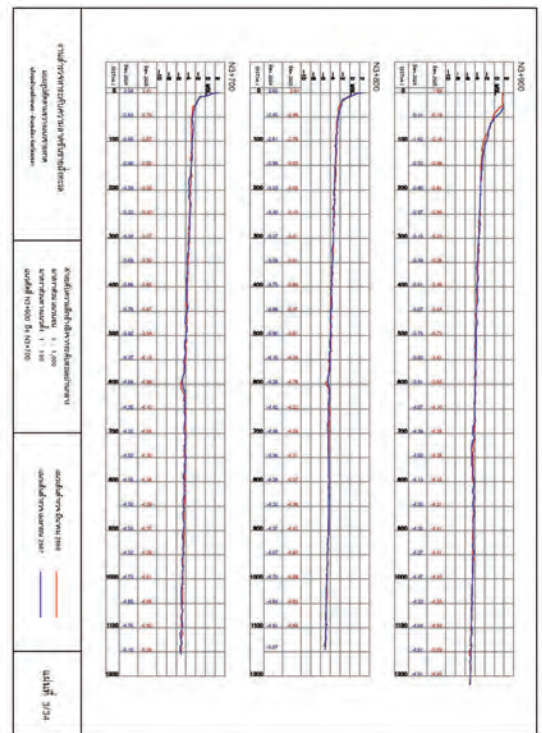
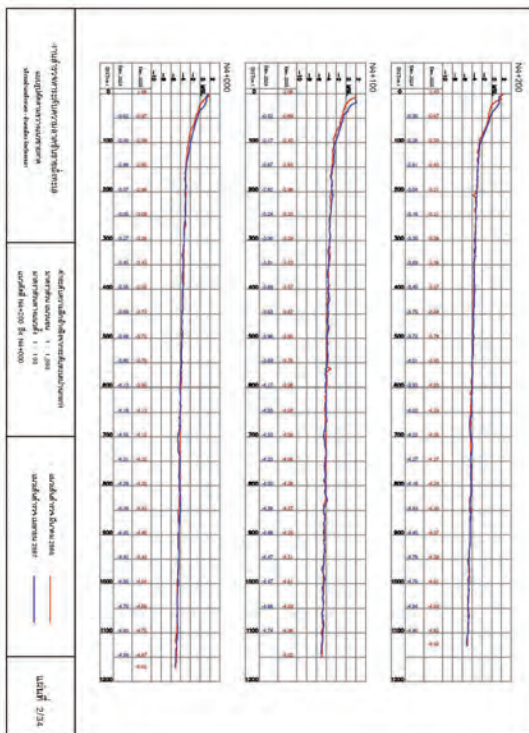
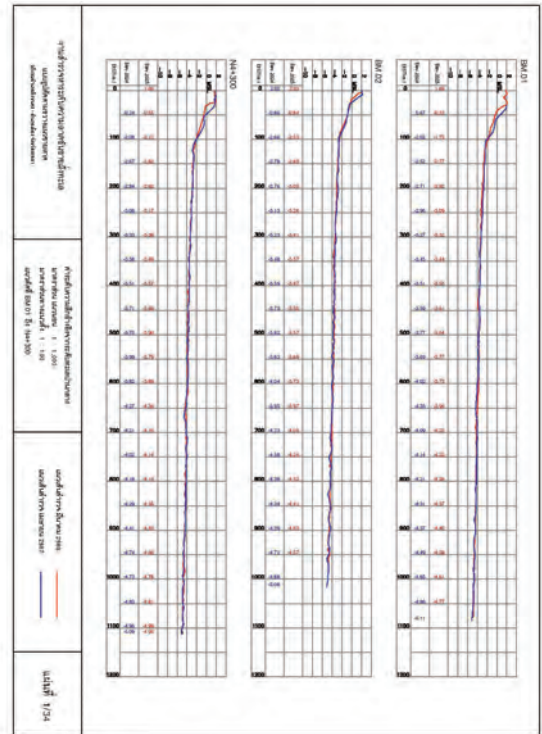
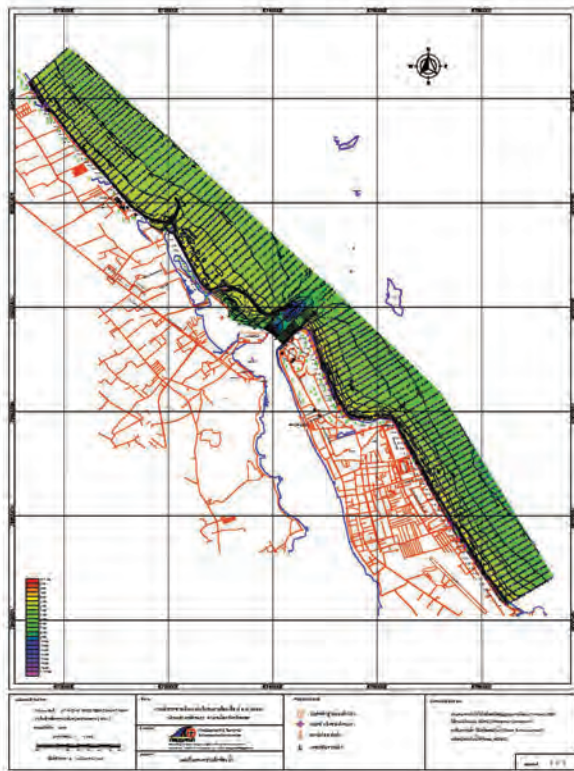


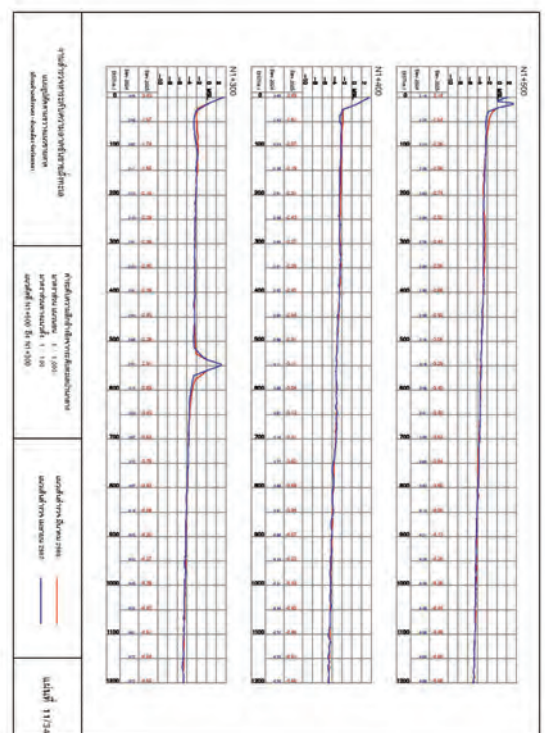
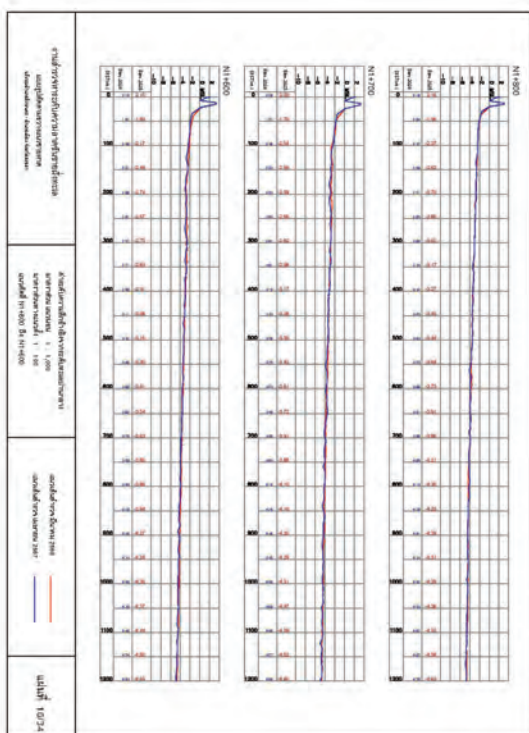
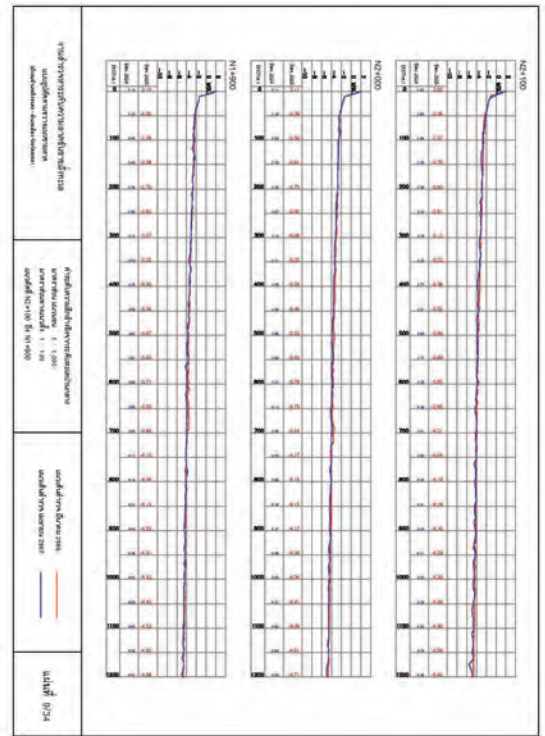
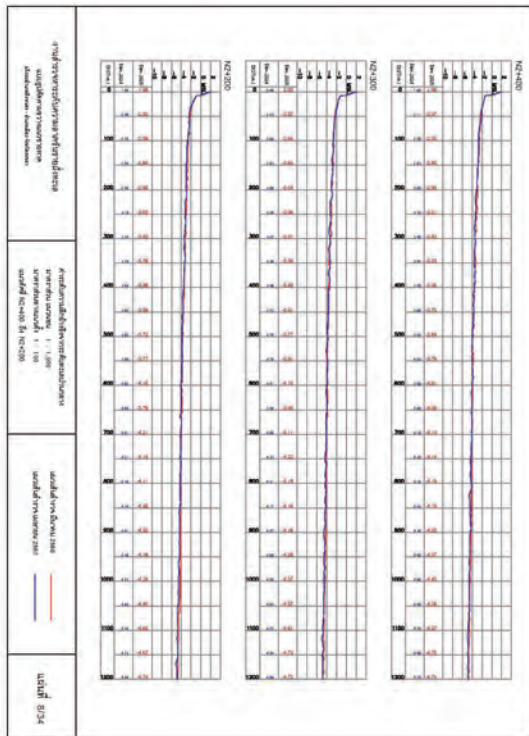
รูปที่ 26 พื้นผิวจำลองบริเวณสำรวจ

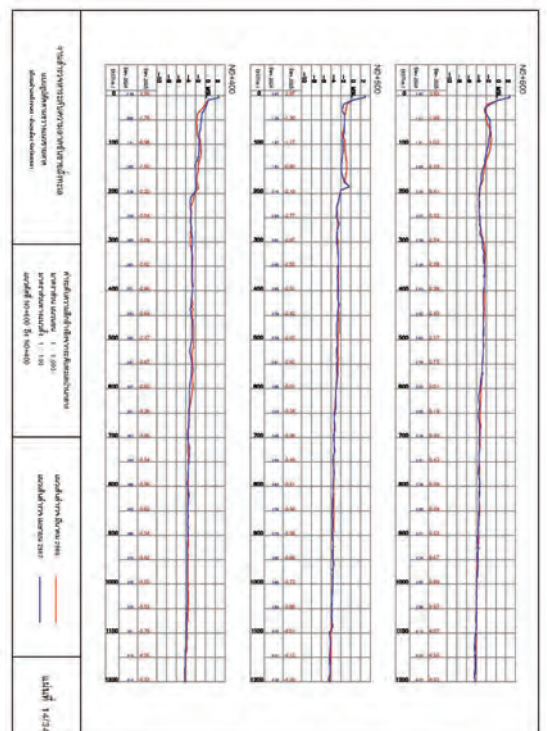
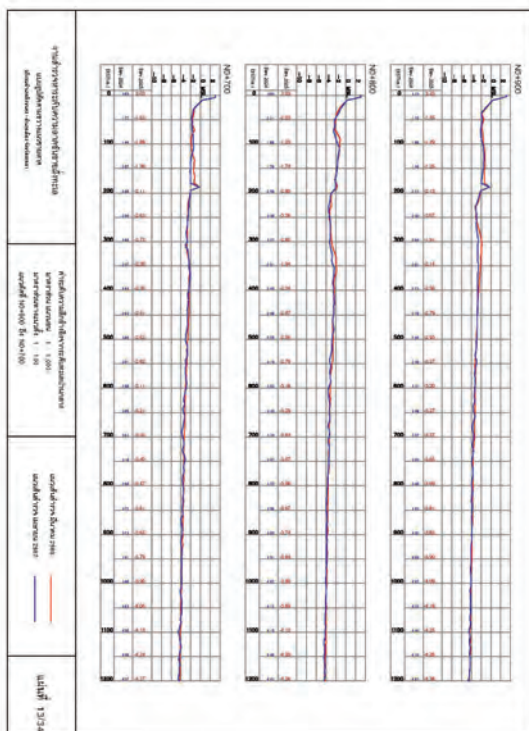
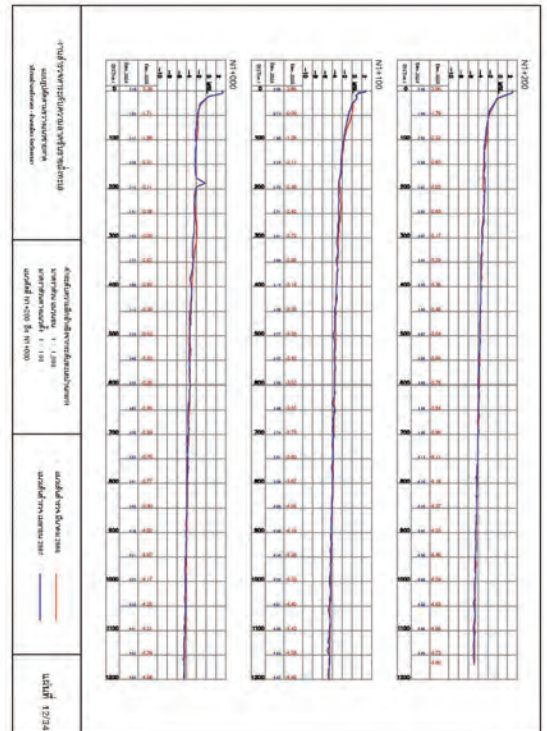
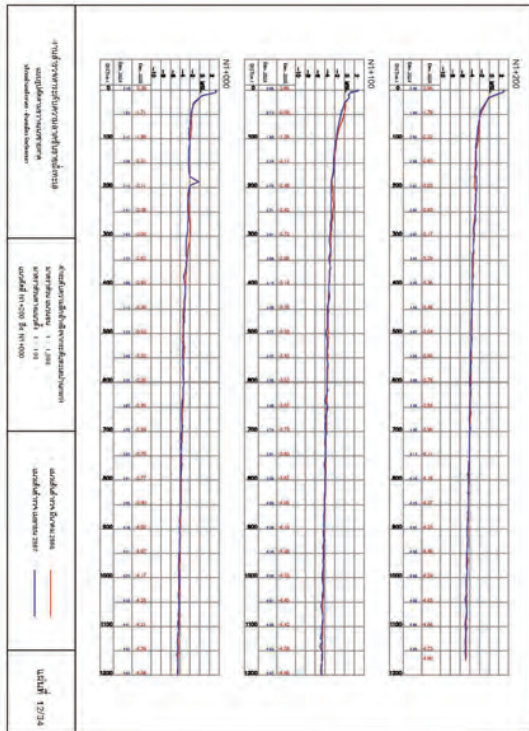


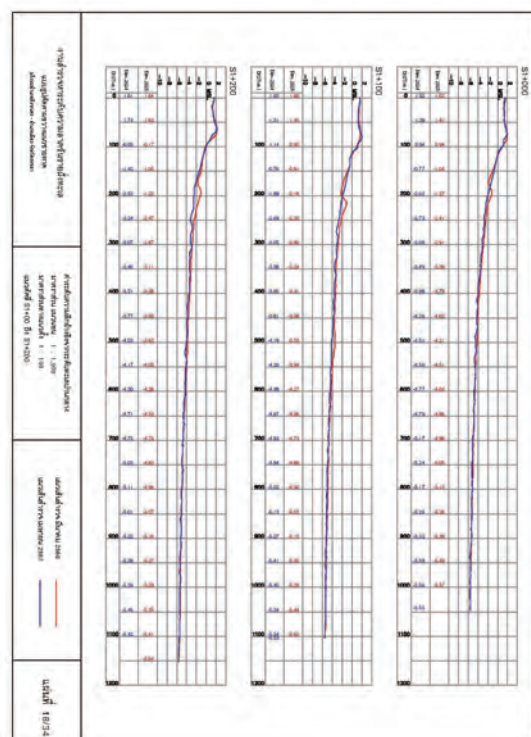
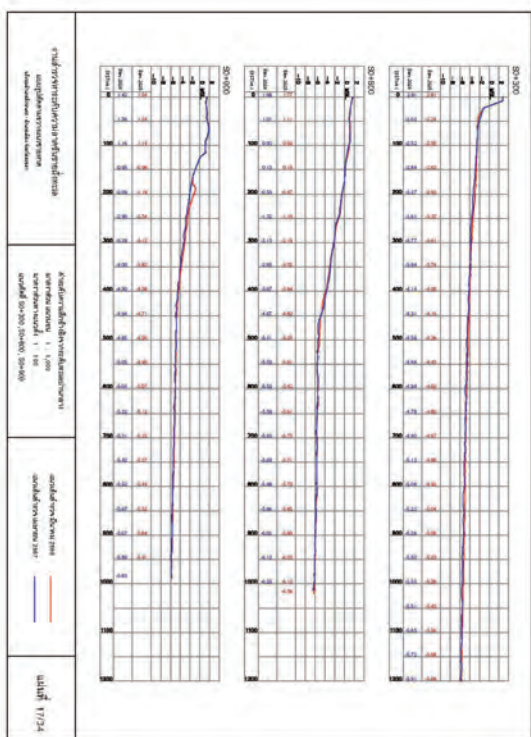
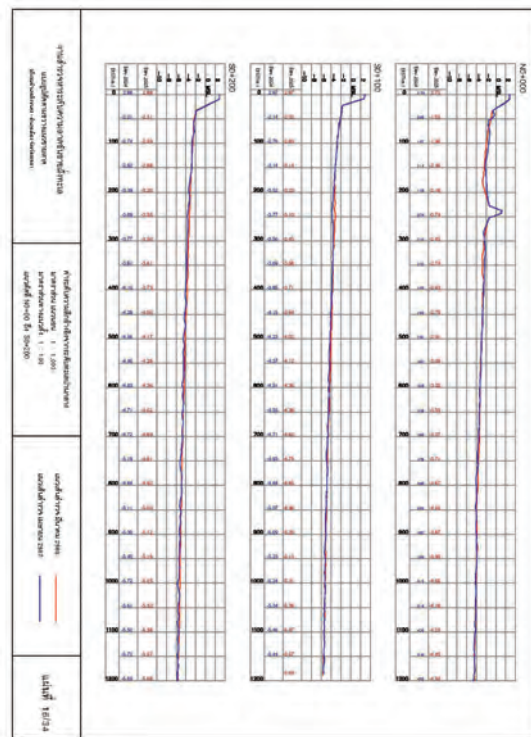
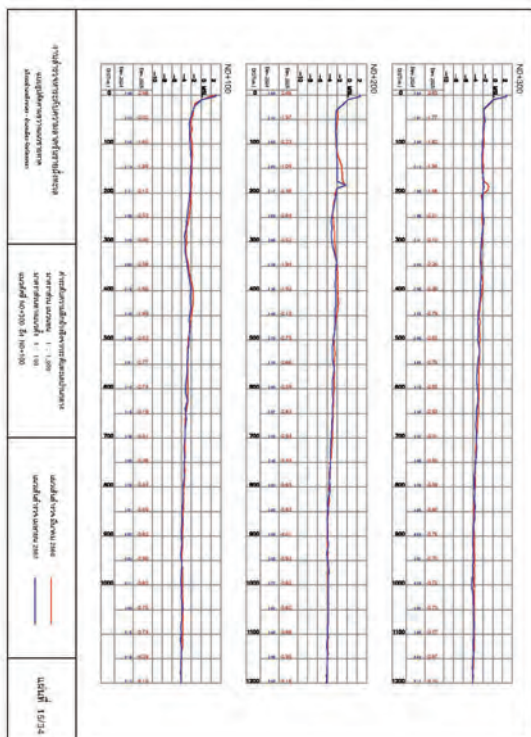
รูปที่ 27 โปรแกรมสำรวจ การสร้างรูปตัดแนวชายหาด

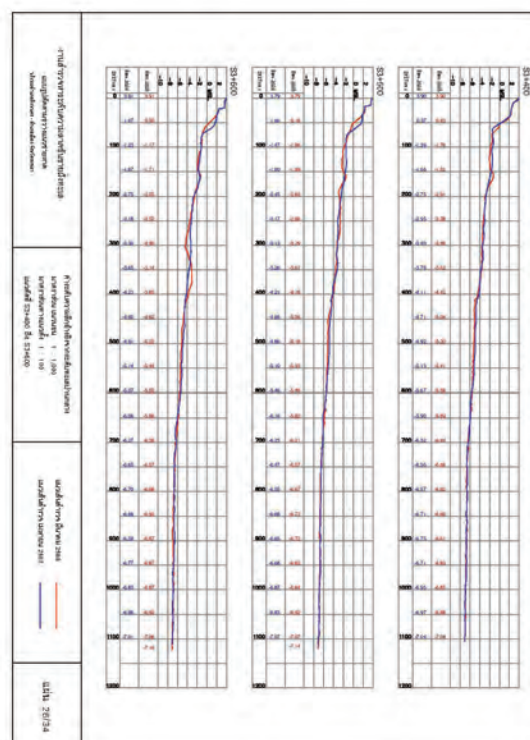
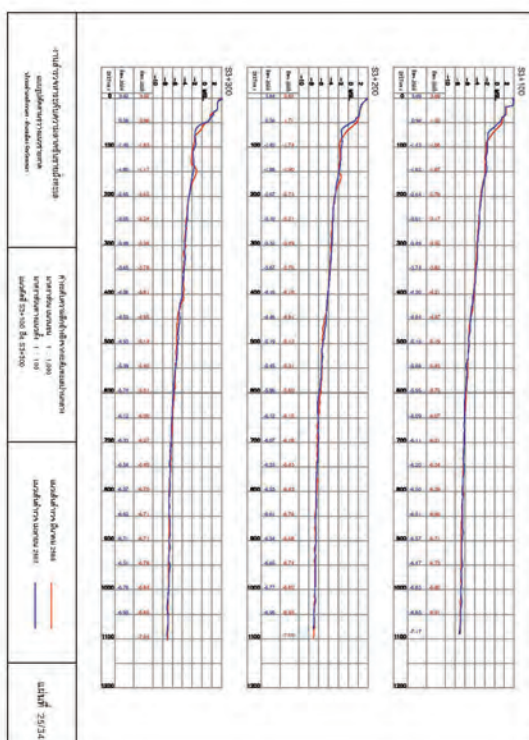
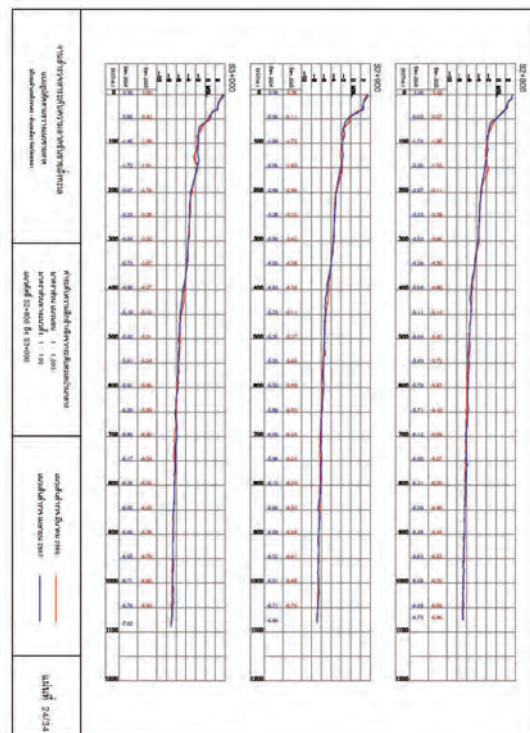
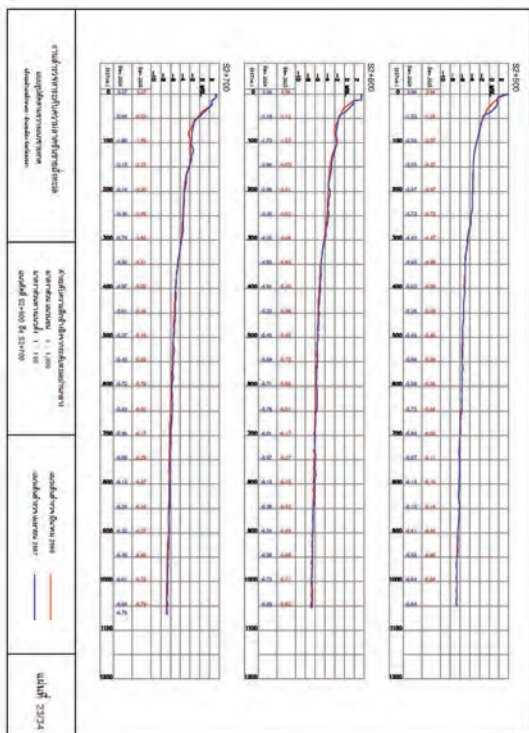
ผลการสำรวจ

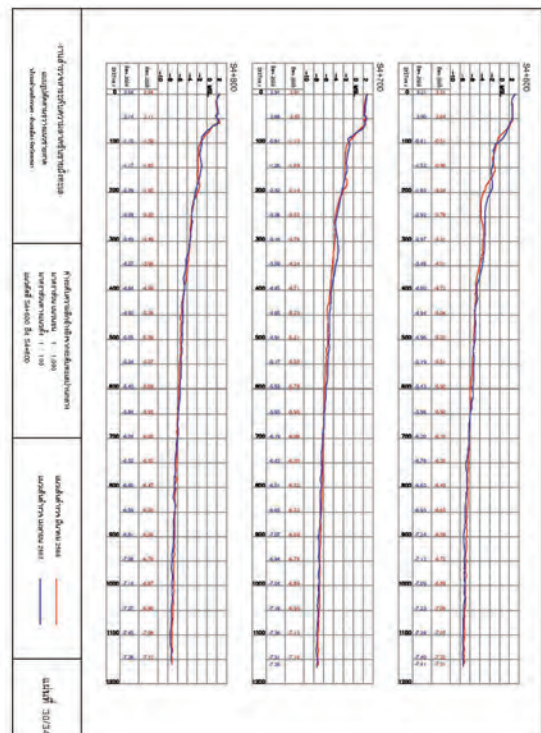
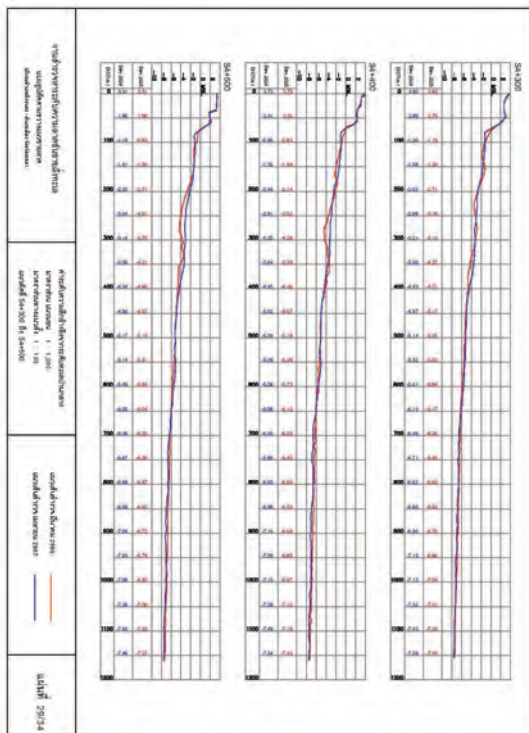
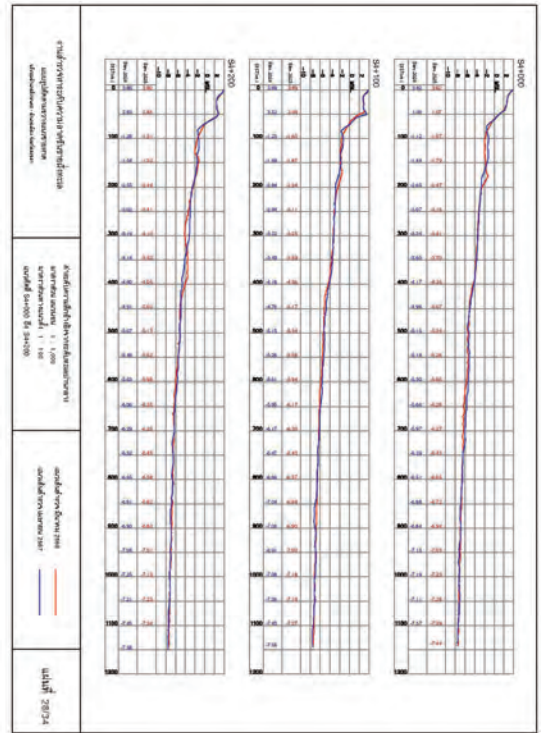
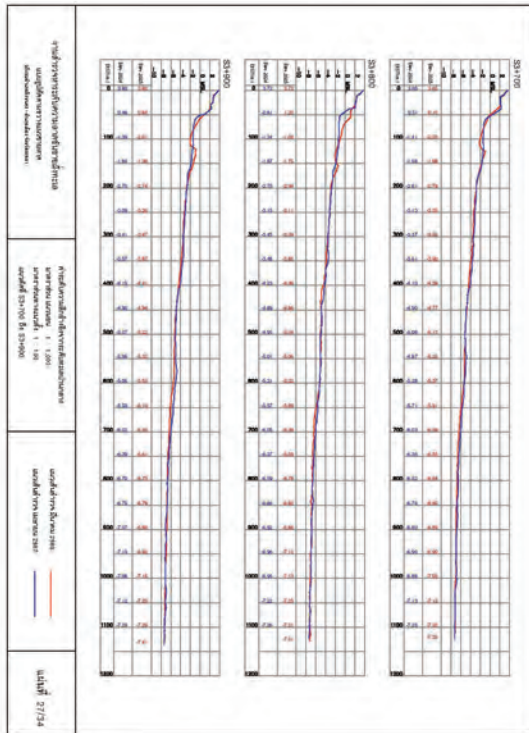


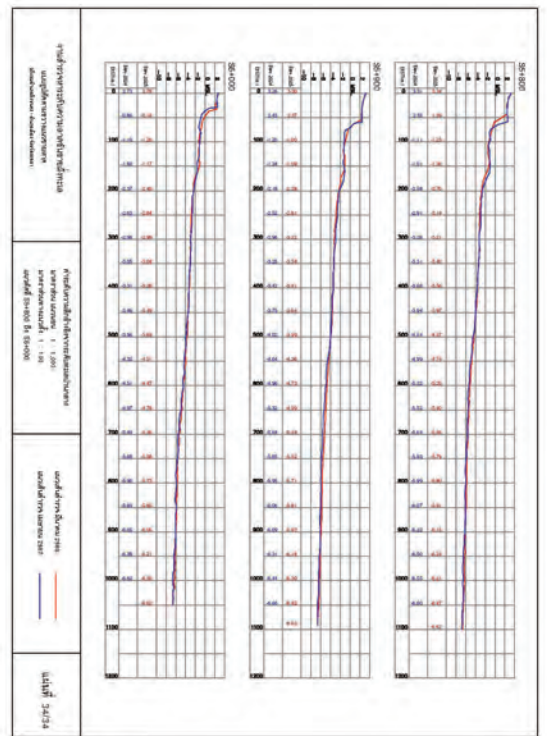
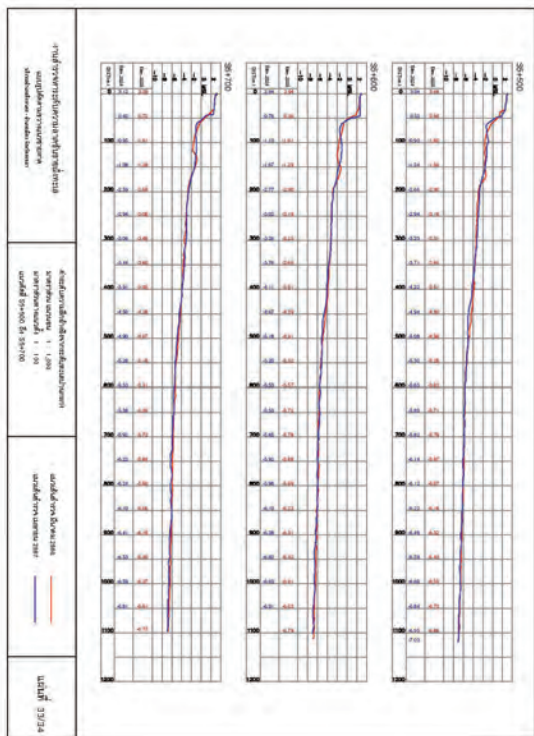
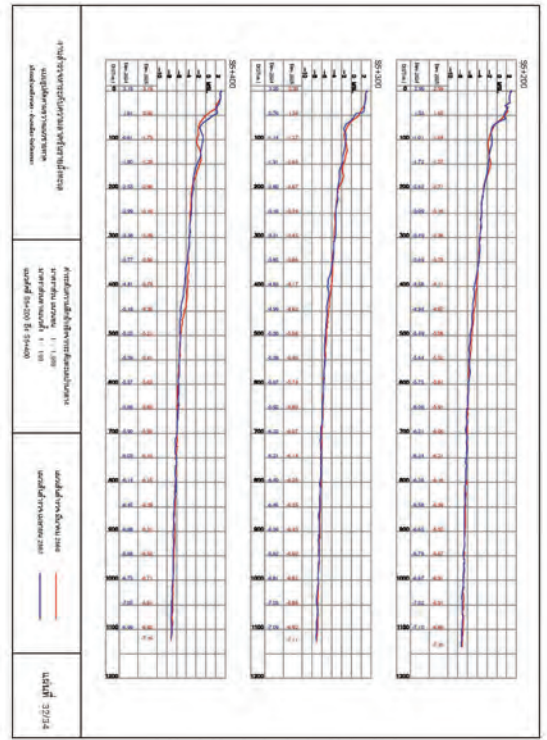
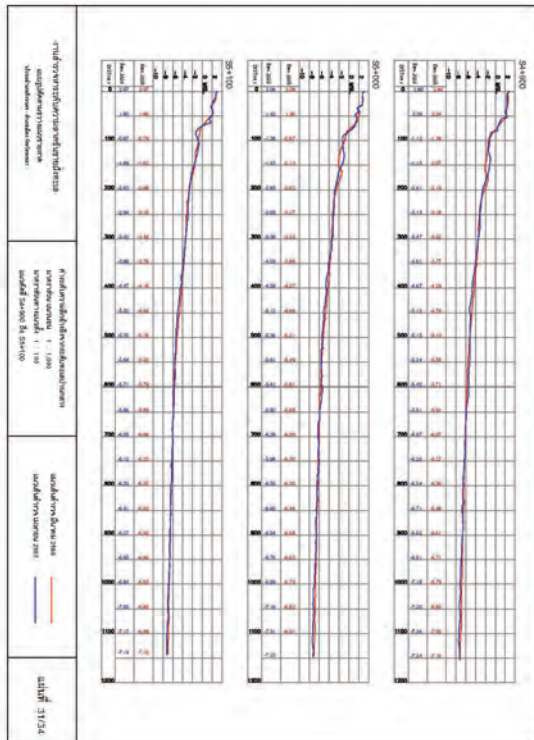












นำเอารูปตัดที่สำรวจในปี 2567 มาวางซ้อนทับรูปตัดที่สำรวจในปี 2568 เปรียบเทียบหาความแตกต่างของพื้นที่น้ำซึ่งผลดังนี้

บริเวณตั้งแต่ BM.02 ถึง N3+900 เปรียบเทียบกับปี 2567 สภาพพื้นที่จากหมุดข้างอิงออกไปประมาณ 80 เมตร มีการกัดเซาะของชายฝั่งเข้ามาประมาณ 12 - 15 เมตร ค่าระดับลดลงประมาณ 1.00-1.20 เมตร ระยะจาก 80 เมตรออกไปจนสุดแนวสำรวจ สภาพพื้นที่มีเปลี่ยนแปลงเล็กน้อย ความลาดเอียงของท้องทะเล จากเส้น Contour ที่ระดับ 2.50 ม. ออกไปถึงระยะที่ 400 เมตร มีความลาดเอียงประมาณ 1 ต่อ 250 (ทางฝั่งตอราบ) จากระยะที่ 400 เมตร ออกไปมีความลาดเอียงประมาณ 1 ต่อ 400 (ทางฝั่งตอราบ)



รูปที่ 28 สภาพชายหาดช่วง BM02 ถึง N3+900

บริเวณตั้งแต่ N3+800 ถึง N3+000 เปรียบเทียบกับปี 2567 สภาพพื้นที่บริเวณหมุดข้างอิงออกไปจนสุดแนวสำรวจ มีการทับถมของตะกอนเพิ่มขึ้นเล็กน้อยเฉลี่ยประมาณ 10-15 ซม. ความลาดเอียงของท้องทะเล จากเส้น Contour ที่ระดับ 2.50 ม. ออกไปถึงระยะที่ 400 เมตร มีความลาดเอียงประมาณ 1 ต่อ 250 (ทางฝั่งตอราบ) จากระยะที่ 450 เมตร ออกไปมีความลาดเอียงประมาณ 1 ต่อ 420 (ทางฝั่งตอราบ)



รูปที่ 29 สภาพชายหาดช่วง N3+800 ถึง N3+000

บริเวณตั้งแต่ N3+000 ถึง N2+000 เปรียบเทียบกับปี 2567 สภาพพื้นที่เป็นเขื่อนกันตลิ่งทั้ง พื้นคอนกรีตบริเวณหมุดถูกกัดเซาะแตกพัง จากหมุดข้างอิงออกไปจนสุดแนวสำรวจ มีการทับถมของตะกอนเพิ่มขึ้นเฉลี่ยประมาณ 10-20 ซม. จากเส้น Contour ที่ระดับ 2.50 ม. ออกไปถึงระยะที่ 500 เมตร มีความลาดเอียงประมาณ 1 ต่อ 300 (ทางฝั่งตอราบ) จากระยะที่ 500 เมตร ออกไปจนสุดแนวสำรวจมีความลาดเอียงประมาณ 1 ต่อ 450



รูปที่ 30 สภาพชายหาดช่วง N3+000 ถึง N2+000

บริเวณตั้งแต่ N2+000 ถึง N1+400 เปรียบเทียบกับปี 2567 สภาพพื้นที่เป็นเขื่อนกันตลิ่งทั้ง มีการสร้างเขื่อนกันคลื่นซ้อนเขื่อนกันตลิ่งทั้ง จากหมุดข้างอิงออกไปจนสุดแนวสำรวจ มีการทับถมของตะกอนเพิ่มขึ้นเล็กน้อยเฉลี่ยประมาณ 10-20 ซม. จากเส้น Contour ที่ระดับ 2.50 ม. ออกไปถึงระยะที่ 500 เมตร มีความลาดเอียงประมาณ 1 ต่อ 300 (ทางฝั่งตอราบ) จากระยะที่ 550 เมตร ออกไปจนสุดแนวสำรวจมีความลาดเอียงประมาณ 1 ต่อ 440



รูปที่ 31 สภาพชายหาดช่วง N2+000 ถึง N1+400

บริเวณ N1+300 เปรียบเทียบกับปี 2567 สภาพพื้นที่มีการจากหมุดข้างอิงออกไป 50 เมตร ถึงระยะที่ 100 เมตร สภาพพื้นที่มีค่าระดับเพิ่มขึ้นมีการทับถมของตะกอนเพิ่มขึ้นเฉลี่ยประมาณ 50-60 ซม. จากระยะที่ 100 เมตร ออกไปจนสุดแนวสำรวจ สภาพพื้นที่มีค่าระดับเพิ่มขึ้นมีการทับถมของตะกอนเพิ่มขึ้นเฉลี่ยประมาณ 5-10 ซม. ความลาดเอียงของท้องทะเลประมาณ 1 ต่อ 480

บริเวณตั้งแต่ N1+200 ถึง N0+000 บริเวณตั้งแต่ตรมสถานหาดทรายแก้ว เมื่อเปรียบเทียบกับปี 2567 บริเวณหมุดข้างอิงสภาพพื้นที่เป็นเขื่อนกันคลื่นจากหมุดข้างอิงออกไปที่ระยะ 150 เมตร มีการทับถมของตะกอนเพิ่มขึ้นเฉลี่ยประมาณ 30-50 ซม. จากระยะที่ 150 เมตร ออกไป สภาพพื้นที่มีการเปลี่ยนแปลงเพิ่มขึ้นของตะกอนเล็กน้อยเฉลี่ยประมาณ 20-30 ซม. ความลาดเอียงของท้องทะเลมีความลาดเอียงประมาณ 1 ต่อ 400 (ทางฝั่งตอราบ)



รูปที่ 32 สภาพชายหาดช่วง N1+200,N0+000

แนวสำรวจที่ S0+100 S0+200 S0+300 เมื่อเปรียบเทียบกับรูปตัดกับปี 2567 ค่าระดับมีการเปลี่ยนแปลงเล็กน้อย มีการทับถมของตะกอนเพิ่มขึ้นประมาณ 20-30 ซม. ความลาดเอียงของท้องทะเลมีความลาดเอียงประมาณ 1 ต่อ 390 (ทางฝั่งตอราบ)

บริเวณตั้งแต่ S0+800 ถึง S1+300 เมื่อเปรียบเทียบกับรูปตัดกับปี 2567 บริเวณตั้งแต่หมุดข้างอิงออกไปประมาณ 150 ม.มีการทับถมของทรายเพิ่มขึ้นประมาณ 20-30 ซม.จากระยะที่ 150 เมตร ออกไปจนถึงระยะที่ 500 เมตร มีการทับถมของทรายเพิ่มขึ้นประมาณ 40-50 ซม.ระยะที่ 500 เมตร ออกไปจนสุดแนวสำรวจมีการทับถมของตะกอนเพิ่มขึ้นประมาณ 15-20 ซม. ความลาดชันของท้องทะเลมีความลาดเอียงประมาณ 1 ต่อ 380 (ทางฝั่งตอราบ)



รูปที่ 33 สภาพชายหาดช่วง S0+800,S1+300

บริเวณตั้งแต่ S1+300 ถึง S2+400 เมื่อเปรียบเทียบกับรูปตัดกับปี 2567 บริเวณตั้งแต่หมุดข้างอิงออกไปประมาณ 80 เมตร ถึงระยะที่ 400 เมตร มีการทับถมของทรายเพิ่มขึ้นประมาณ 50-80 ซม.จากระยะที่ 400 เมตร ออกไปจนสุดแนวสำรวจมีการเพิ่มขึ้นลดลงของตะกอน เฉลี่ยประมาณ 20-30 ซม. ความลาดเอียงของท้องทะเลมีความลาดเอียงประมาณ 1 ต่อ 390 (ทางฝั่งตอราบ)



รูปที่ 34 สภาพชายหาดช่วง S1+300,S2+400



รูปที่ 35 สภาพชายหาดช่วง S2+500,S6+000

ข้อมูลสำรวจ X,Y,Z (Text File)

1. GPS.



KEY FEATURES

Industry-leading technology provides superior performance

Flexible configurations put you in total control

rugged, high-performance hardware is built to last

With the Trimble controller and software of your choice, you choose integrated surveying

USE RECIPIENT MANY CONFIGURATIONS, FOR GREATER FLEXIBILITY AND CHOICE

The Trimble® 5700 GPS receiver is an advanced, fast, easy-to-use, surveying receiver that is rugged and accurate enough for any job.

Combine your 5700 with the antenna and radio that best suit your needs, and, you've got the Trimble controller and software of your choice for a total surveying solution.

The power to 5700 GPS system will provide all the advanced technology benefits and unparalleled flexibility you need to increase your efficiency and productivity in any surveying environment.

ADVANCED GPS RECEIVER TECHNOLOGY

The 5700 is a 24-channel, real-time, surveying RTK GPS receiver featuring the advanced Trimble Maxwell™ technology for superior tracking of GPS satellites, increased accuracy, and longer battery life through less power loss, and optimized precision in tough power lines, WAAS and EGNOS capability lets you perform real-time differential corrections to GPS, without a base station.

MODES AS DESIGN FOR VERSATILITY

For topographic, boundary, or engineering surveying, use the receiver to your best, carry it in a comfortable backpack, or configure it with all components in a lightweight range pole. With the free attachment to your site vehicle, you can recover a lost spot as fast as you can drive. For control applications, attach the receiver to a tripod... its designed to work the way your job requires.

FOR REAL-ACCESSION... AND LIGHTWEIGHT

The 5700 GPS receiver boasts the toughest mechanical and waterproofing specs in the business. Its magnesium alloy case is stronger than aluminum, but also 30% lighter—the 5700 weighs just 1.4 kg (3 lb) with batteries. Whether you're collecting control points on a tripod, or scrambling down a steep slope collecting real-time kinematic data, the receiver is light enough and tough enough to carry on and survive.

FAST AND EFFICIENT DATA STORAGE AND COMMUNICATIONS

Use the receiver's CompactFlash memory to store more than 3,600 hours of generous 12 data collections at an average of 15-second intervals. Transfer data to a PC at speeds of more than 1 megabit per second through the super-fast USB port. Your choice of serial radio models is built in to the receiver to provide RTK communications moving without the need for cables or extra power.

YOUR CHOICE OF TRIMBLE ANTENNA

Choose the high-accuracy Trimble GPS antenna that best suits your needs, the lightweight and portable 5700 antenna for RTK, using, or the Zephyr Geodetic™ antenna for geodetic, surveying.

The Zephyr Geodetic antenna offers unsurpassed ultra-center repeatability and excellent low-elevation tracking, while the innovative design of its Trimble Datasheet™ ground plane literally draws up multipath energy using technology similar to what you'd find on aircraft to hide from radar. The Zephyr Geodetic antenna thus provides unsurpassed accuracy from a portable antenna.



[illegible]

Teledyne Odom Hydrographic
Hydrotac II
Single-Frequency
Portable Hydrographic
Echo Sounder

Precise Data Collection in Adverse Conditions

Specifically designed for use in less-than-ideal, cloudy situations on an all-day basis and it looks like it will be, the HYDRONAC™ Bio-enzyme productibility and the confidence of knowing you're using a proven Odor product. It is completely safe and you are engaged with the most advanced business you can be in and depend on in Odor reduction.

[illegible]

3.โปรแกรมสำรวจ



Applications

- Fast and robust surveys and maintenance
- Ground hydrographic surveys
- Hydrographic measurements
- Cable and pipeline maintenance surveys
- Marine survey applications
- Industrial marine applications


Features

HYPERION Navigation software

- Operation on Windows operating systems for single point and dual operation
- Fully configurable graphics database with easily pre-defined objects and coordinate system
- Complete Calculator for points and lists
- Built in the calculator and adjustment
- Graphical vector shape editor
- Automatic updating to handle (secondary) position and attitude sensors
- Automatic updating (survey) facility and control to vessel guidance
- Multiple workbooks and guidance objects (ranges, halos, notes, etc.)
- Interactive real time Plot View (Data from real time including the Up, Down and motion history) based on the Data being supported
- Interactive real time Plot View (Data from Data base)
- CDF and motion history based on the Data being supported
- Log of operator's activities and system alarms
- Multiple sensor inputs (driven by hardware only)
- Heave and roll data from WFK
- Real time depth profile and channel cross section display
- Multi defined sensor/sonar simulation
- Navigation data input to middleware systems
- Project information and survey data all stored in a single Microsoft Access database file
- Heading from dual positioning devices
- Fully configurable equipment history (status, repair, cost, time, comments)
- Survey data is available for processing
- Output of data to printer, file, or small print on real time
- On line help and training

HYPERION View/Chart software (included)

- Graphics, depth, heave, and roll adding to navigation graphics or being processed
- Processing displays show both the raw and computer data on both screen



Technical Specifications

Minimum Configuration

Processor	Intel Pentium 4	Minimum 800 MHz
RAM	1 GB	Minimum 2 GB
Hard disk	10 GB	Minimum 20 GB
Monitor	15" or larger	Minimum 1920 x 1080
Data interface	RS-485	Minimum 1920 x 1080
Operating system	Windows XP, Windows 7, Windows 10	Minimum 1920 x 1080

Options

Components such as radar telemetry can be ordered through Intelco.

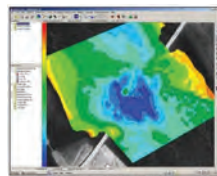
- 15 inch for training and mounting events
- Training

Ordering Information

HYPERION Navigation software is available standard with quick reference guide, survey file, and software database file.

HYPERION Navigation	Part Number 44292-00
HYPERION Configuration upgrade	Part Number 44293-00
HYPERION HEMS	Part Number 44294-00
HYPERION Channel Group	Part Number 44295-00
HYPERION Visualizer	Part Number 44296-00

For further information contact your local Intelco office or representative.
 We also have web site at <http://www.intelco.com>



HYPACK® is a Windows™-based software package used primarily for hydrographic surveying and data processing.

It is optimized to run under:

- Windows 2000™
- Windows XP™

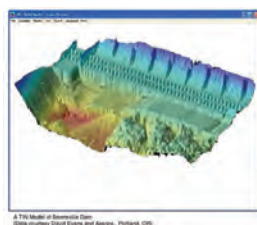
HYPACK® performs all of the tasks necessary to complete your survey from beginning to end.

- * Geodetic Parameters
- * Planned Line Design
- * Equipment Configuration
- * Data Collection supporting over 200 sensors
- * Data Processing
- * Tides and Sound Velocity
- * Sounding Reduction
- * Export to DXF/DGN
- * Plotting of Smooth Sheets
- * Volumes by Section
- * Volumes by Surface Model
- * Contouring to DXF
- * 3D Visualization
- * Side Scan Collection and Processing
- * ACDP Collection and Display

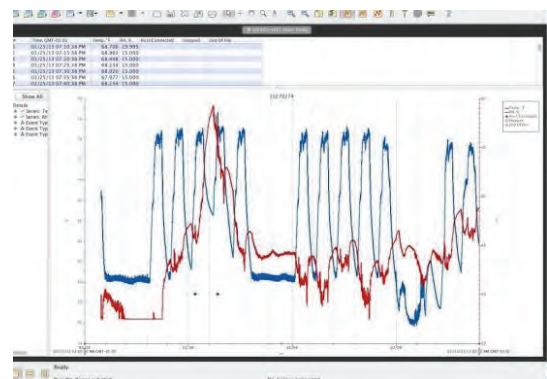
The optional HYSWEEP® module allows for the configuration, calibration, collection and processing of multibeam and multiple transducer sonar systems.

The DREDGEPACK[®] version allows you to maximize the efficiency of your dredge operations by tracking and maintaining a history of where the cutting tool has passed and how deep it was.

HYPACK®, HYSWEEP® and DREDGEPAK® are all developed by HYPACK, Inc.



4.เครื่องวัดระดับน้ำ



HOBO Water Level Logger – U20L

The HOBO U20L is a low-cost, research-grade water level data logger for continuously measuring water level and temperature in a wide range of underwater environments. It features 0.1% measurement accuracy, a polypropylene housing for use in both fresh and salt water, and a non-vented design for convenient and hassle-free deployment.

This data logger requires either the U-DTW-1 Waterproof Shuttle or the Base-U-4 Base Station for configuration and data offload, HOBOware software (free download). NOTE:

HOBOWare Pro is required when using the U-DTW-1 Waterproof Shuttle. See compatible items below.

5.กล้องสำรวจแบบประมวลผล



1. ระบบกล้องเล็ง

- กำลังขยาย 30 เท่า
- ขนาดความกว้างของภาพ 1 องศา 30 ลิปดา (26 เมตร ที่ระยะ 1 กิโลเมตร)
- ระยะเห็นภาพชัดใกล้สุดไม่เกิน 1.7 เมตร
- ตัวกล้องถอดจากฐานกล้องได้
- Laser Plummet ค่าความถูกต้อง 1.5 มิลลิเมตร ที่ระยะ 1.5 เมตร

2. ระบบการวัดมุม

- ระบบวัดมุมแบบ Absolute, Continuous, Diametric แสดงผลบนจอ LCD ทั้งสองด้าน
- ความละเอียด (Accuracy) 5 พิลิปดา
- มีระบบ Compensator แบบ Quadruple axis
- โครงสร้างกล้อง ป้องกันละอองน้ำและฝุ่นได้ ตามมาตรฐาน IP54

3. ระบบการวัดระยะทาง

- วัดระยะทางได้ 1.7 ถึง 250 เมตร โดยใช้เป้าสะท้อน และในสภาวะอากาศปกติ วัดระยะทางได้ 3,000 เมตร โดยใช้เป้าสะท้อนแบบ 1 ดวง
- แสดงค่าการวัดได้ละเอียด 1 มิลลิเมตร (Precise mode)
- ความถูกต้องของการวัดระยะโหมด ใช้เป้าสะท้อน เท่ากับ $\pm(2\text{mm} + 2\text{ppm})$ และโหมด Reflectorless เท่ากับ $\pm(3\text{mm}+2\text{ppm})$

5.กล้องระดับ



ภาคผนวก ค

ใบรับรองผลการตรวจวัดคุณภาพสิ่งแวดล้อม

ภาคผนวก ค-1

คุณภาพอากาศในบรรยากาศโดยทั่วไป



Analysis / Test Report

Client : PTTEP International Limited
222 Moo 1, Tambon Huakao, Amphur Singhanakorn, Songkhla Thailand 90280
P/O : 3450040615
Project Name : PSB Songkhla
Project Location :

Lot ID: 2594520

Date Received : Oct 21, 2025
Date Reported : Oct 27, 2025
Report Number: 3435661-1

Page 1 of 1

Sample Description Air Quality
Location บริเวณพื้นที่โครงการ (47N 672452 N, 800003 E)
Parameter Carbon monoxide (ppm)
Measurement Date Oct 16, 2025 - Oct 17, 2025
Measurement by Narathorn Keawpongsa

	2594520-1	-	-	-	-	-	-
Time	Oct 16, 2025	-	-	-	-	-	-
09:00 AM - 10:00 AM	0.2	-	-	-	-	-	-
10:00 AM - 11:00 AM	0.2	-	-	-	-	-	-
11:00 AM - 12:00 PM	0.2	-	-	-	-	-	-
12:00 PM - 01:00 PM	0.2	-	-	-	-	-	-
01:00 PM - 02:00 PM	0.2	-	-	-	-	-	-
02:00 PM - 03:00 PM	0.2	-	-	-	-	-	-
03:00 PM - 04:00 PM	0.3	-	-	-	-	-	-
04:00 PM - 05:00 PM	0.3	-	-	-	-	-	-
05:00 PM - 06:00 PM	0.3	-	-	-	-	-	-
06:00 PM - 07:00 PM	0.3	-	-	-	-	-	-
07:00 PM - 08:00 PM	0.4	-	-	-	-	-	-
08:00 PM - 09:00 PM	0.3	-	-	-	-	-	-
09:00 PM - 10:00 PM	0.3	-	-	-	-	-	-
10:00 PM - 11:00 PM	0.3	-	-	-	-	-	-
11:00 PM - 12:00 AM	0.3	-	-	-	-	-	-
12:00 AM - 01:00 AM	0.3	-	-	-	-	-	-
01:00 AM - 02:00 AM	0.3	-	-	-	-	-	-
02:00 AM - 03:00 AM	0.3	-	-	-	-	-	-
03:00 AM - 04:00 AM	0.3	-	-	-	-	-	-
04:00 AM - 05:00 AM	0.2	-	-	-	-	-	-
05:00 AM - 06:00 AM	0.2	-	-	-	-	-	-
06:00 AM - 07:00 AM	0.3	-	-	-	-	-	-
07:00 AM - 08:00 AM	0.3	-	-	-	-	-	-
08:00 AM - 09:00 AM	0.3	-	-	-	-	-	-
Average	0.3	-	-	-	-	-	-
1hr - Maximum	0.4	-	-	-	-	-	-
Standard 1hr - Average	30	-	-	-	-	-	-

Standard : Notification of the National Environmental Board. No.10, 1995 (B.E.2538).
Reference Method : U.S. Environmental Protection Agency 40 CFR Part 50Appendix C

Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. The report shall not be reproduced except in full without the written approval of the laboratory.

Approved by

Orawan R.

Orawan Rakyong
Scientist (3)

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

Client : PTTEP International Limited
222 Moo 1, Tambon Huakao, Amphur Singhanakorn, Songkhla Thailand 90280
P/O : 3450040615
Project Name : PSB Songkhla
Project Location :

Lot ID: 2594520

Date Received : Oct 21, 2025
Date Reported : Oct 27, 2025
Report Number: 3435662-1

Page 1 of 1

Sample Description Air Quality
Location บริเวณบ้านพักเจ้าหน้าที่ด้านตุลาการ (47N 672452 N, 800003 E)
Parameter Carbon monoxide (ppm)
Measurement Date Oct 16, 2025 - Oct 17, 2025
Measurement by Narathorn Keawpongsa

	2594520-2	-	-	-	-	-	-
Time	Oct 16, 2025	-	-	-	-	-	-
10:00 AM - 11:00 AM	0.6	-	-	-	-	-	-
11:00 AM - 12:00 PM	0.7	-	-	-	-	-	-
12:00 PM - 01:00 PM	0.8	-	-	-	-	-	-
01:00 PM - 02:00 PM	0.9	-	-	-	-	-	-
02:00 PM - 03:00 PM	0.9	-	-	-	-	-	-
03:00 PM - 04:00 PM	0.8	-	-	-	-	-	-
04:00 PM - 05:00 PM	0.8	-	-	-	-	-	-
05:00 PM - 06:00 PM	0.7	-	-	-	-	-	-
06:00 PM - 07:00 PM	0.7	-	-	-	-	-	-
07:00 PM - 08:00 PM	0.6	-	-	-	-	-	-
08:00 PM - 09:00 PM	0.6	-	-	-	-	-	-
09:00 PM - 10:00 PM	0.6	-	-	-	-	-	-
10:00 PM - 11:00 PM	0.6	-	-	-	-	-	-
11:00 PM - 12:00 AM	0.6	-	-	-	-	-	-
12:00 AM - 01:00 AM	0.6	-	-	-	-	-	-
01:00 AM - 02:00 AM	0.6	-	-	-	-	-	-
02:00 AM - 03:00 AM	0.6	-	-	-	-	-	-
03:00 AM - 04:00 AM	0.6	-	-	-	-	-	-
04:00 AM - 05:00 AM	0.5	-	-	-	-	-	-
05:00 AM - 06:00 AM	0.5	-	-	-	-	-	-
06:00 AM - 07:00 AM	0.6	-	-	-	-	-	-
07:00 AM - 08:00 AM	0.5	-	-	-	-	-	-
08:00 AM - 09:00 AM	0.5	-	-	-	-	-	-
09:00 AM - 10:00 AM	0.5	-	-	-	-	-	-
Average	0.6	-	-	-	-	-	-
1hr - Maximum	0.9	-	-	-	-	-	-
Standard 1hr - Average	30	-	-	-	-	-	-

Standard : Notification of the National Environmental Board. No.10, 1995 (B.E.2538).
Reference Method : U.S. Environmental Protection Agency 40 CFR Part 50Appendix C

Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. The report shall not be reproduced except in full without the written approval of the laboratory.

Approved by

Orawan R.

Orawan Rakyong
Scientist (3)

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197
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Life Sciences

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RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

TESTING
No.0009

Client : PTTEP International Limited
222 Moo 1, Tambon Huakao, Amphur Singhanakorn, Songkhla Thailand 90280
P/O : 3450040615
Project Name : PSB Songkhla
Project Location :

Lot ID: 2594525

Date Received : Oct 21, 2025
Date Reported : Oct 29, 2025
Report Number : 3424562-1

Page 1 of 2

Sample Number 2594525-1
Sampled Date Oct 16, 2025
Sample Description Air Quality
Location บริเวณพื้นที่โครงการ (47N 672452 N, 800003 E)
Date Analysis Commenced Oct 22, 2025
Condition of Sample Drawn into one 10-L air sampling bag, one glass filter paper (8x10 inch) placed in plastic bag and one quartz filter paper (8x10 inch) placed in plastic bag
Barometric Pressure 757 mmHg
Atmospheric Temperature 30.2 °C

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Particulate matter as PM 10	16/10/25 - 17/10/25	mg/m3	-	0.005	0.015	0.12	In - house method : STM 04-052 based on U.S. Environmental Protection Agency 40 CFR, method 50, Appendix J, revised as of July 1, 2008 (Include sampling)	NEB No.24 Bangkok	
Total Hydrocarbon *	09:00 AM - 10:00 AM	ppm	-	1.0	3.3	No Standard	Total Hydrocarbon Analyzer (FID)	-	Bangkok
Total Suspended Particulate	16/10/25 - 17/10/25	mg/m3	-	0.005	0.019	0.33	In - house method : STM 04-051 based on U.S. Environmental Protection Agency 40 CFR, method 50, Appendix B, revised as of July 1, 2008 (Include sampling)	NEB No.24 Bangkok	

Guideline :

NEB No.24 : Notification of the National Environmental Board. No.24, 2004 (B.E.2547) dated September 22, 2004

Sampled By : Narathorn Keawpongsa

Remark :

- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
- Analyte(s) marked * is/are not included in scope of Accreditation ISO/IEC 17025.

Approved by

Saranya C.

Saranya Chalermtamrong
Scientist (4)

Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. The report shall not be reproduced except in full without the written approval of the laboratory.



Analysis / Test Report

TESTING
No.0009

Client : PTTEP International Limited
222 Moo 1, Tambon Huakao, Amphur Singhanakorn, Songkhla Thailand 90280
P/O : 3450040615
Project Name : PSB Songkhla
Project Location :

Lot ID: 2594525

Date Received : Oct 21, 2025
Date Reported : Oct 29, 2025
Report Number : 3424562-1

Page 2 of 2

Sample Number : 2594525-2
Sampled Date : Oct 16, 2025
Sample Description : Air Quality
Location : บริเวณบ้านพักเจ้าหน้าที่ด่านศุลกากร (47N 672452 N, 800003 E)
Date Analysis Commenced : Oct 22, 2025
Condition of Sample : Drawn into one 10-L air sampling bag, one glass filter paper (8x10 inch) placed in plastic bag and one quartz filter paper (8x10 inch) placed in plastic bag
Barometric Pressure : 757 mmHg
Atmospheric Temperature : 30.2 °C

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Particulate matter as PM 10	16/10/25 - 17/10/25	mg/m3	-	0.005	0.012	0.12	In - house method : STM 04-052 based on U.S. Environmental Protection Agency 40 CFR, method 50, Appendix J, revised as of July 1, 2008 (Include sampling)	NEB No.24 Bangkok	
Total Hydrocarbon *	10:00 AM - 11:00 AM	ppm	-	1.0	3.8	No Standard	Total Hydrocarbon Analyzer (FID)	-	Bangkok
Total Suspended Particulate	16/10/25 - 17/10/25	mg/m3	-	0.005	0.014	0.33	In - house method : STM 04-051 based on U.S. Environmental Protection Agency 40 CFR, method 50, Appendix B, revised as of July 1, 2008 (Include sampling)	NEB No.24 Bangkok	

Guideline :

NEB No.24 : Notification of the National Environmental Board. No.24, 2004 (B.E.2547) dated September 22, 2004

Sampled By : Narathorn Keawpongsa

Remark :

- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
- Analyte(s) marked * is/are not included in scope of Accreditation ISO/IEC 17025.

Approved by

Saranya C.

Saranya Chalermtamrong
Scientist (4)

Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. The report shall not be reproduced except in full without the written approval of the laboratory.



Analysis / Test Report

Client : PTTEP International Limited
222 Moo 1, Tambon Huakao, Amphur Singhanakorn, Songkhla Thailand 90280

Lot ID: 2594529
Date Received : Oct 21, 2025
Date Reported : Oct 24, 2025
Report Number : 3424571-1

P/O : 3450040615
Project Name : PSB Songkhla
Project Location :

Page 1 of 2

Sample Number 2594529-1
Parameter Wind Speed / Wind Direction
Location บริเวณพื้นที่โครงการ (GPS 47N 0672452 N, 0800003 E)
Sampling Date Oct 16 - Oct 17, 2025
Sampling by Narathorn Keawpongsa

Time	Oct 16 - Oct 17, 2025		-		-		-		-		-		-		-		-	
	WS (m/s)	WD (deg)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
09:00 AM - 10:00 AM	0.3	163.0	SSE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10:00 AM - 11:00 AM	1.1	71.0	ENE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11:00 AM - 12:00 PM	0.9	348.0	NNW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12:00 PM - 01:00 PM	1.1	54.0	NE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
01:00 PM - 02:00 PM	1.1	84.0	E	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
02:00 PM - 03:00 PM	0.9	75.0	ENE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
03:00 PM - 04:00 PM	1.4	83.0	E	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
04:00 PM - 05:00 PM	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
05:00 PM - 06:00 PM	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
06:00 PM - 07:00 PM	0.4	242.0	WSW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
07:00 PM - 08:00 PM	1.1	187.0	S	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
08:00 PM - 09:00 PM	0.9	229.0	SW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
09:00 PM - 10:00 PM	0.7	246.0	WSW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10:00 PM - 11:00 PM	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11:00 PM - 12:00 AM	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12:00 AM - 01:00 AM	0.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
01:00 AM - 02:00 AM	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
02:00 AM - 03:00 AM	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
03:00 AM - 04:00 AM	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
04:00 AM - 05:00 AM	0.9	239.0	WSW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
05:00 AM - 06:00 AM	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
06:00 AM - 07:00 AM	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
07:00 AM - 08:00 AM	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
08:00 AM - 09:00 AM	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Reference Method : Cup Anemometer & Anodized Aluminium Vane Method

The above results are valid only for the analyzed/tested sample(s) as indicated in this report. No part of this report or certificate may be reproduced in any form without written consent from the Laboratory. ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

Approved by

Sarayuth Jittranont
Assistant General Manager



Analysis / Test Report

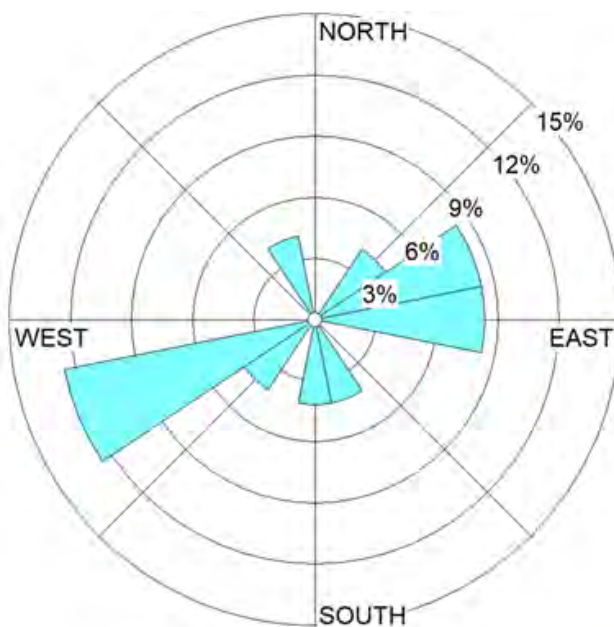
Client : PTTEP International Limited
222 Moo 1, Tambon Huakao, Amphur Singhanakorn, Songkhla Thailand 90280

Lot ID: 2594529
Date Received : Oct 21, 2025
Date Reported : Oct 24, 2025
Report Number : 3424571-1

P/O : 3450040615
Project Name : PSB Songkhla
Project Location :

Page 2 of 2

Wind Rose



Date : Oct 16-17, 2025

	WS (m/s)	%
	≥ 10.0	0.00
	8.0-10.0	0.00
	5.5-8.0	0.00
	3.3-5.5	0.00
	1.7-3.3	0.00
	0.3-1.7	50.00
	Calms	50.00

Location : บริเวณพื้นที่โครงการ (GPS 47N 0672452 N, 0800003 E)

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Sarayuth Jittranont
Assistant General Manager



Analysis / Test Report

Client : PTTEP International Limited
222 Moo 1, Tambon Huakao, Amphur Singhanakorn, Songkhla Thailand 90280

Lot ID: 2594529
Date Received : Oct 21, 2025
Date Reported : Oct 24, 2025
Report Number : 3424571-1

P/O : 3450040615
Project Name : PSB Songkhla
Project Location :

Page 1 of 2

Sample Number 2594529-2
Parameter Wind Speed / Wind Direction
Location บริเวณบ้านพักเจ้าหน้าที่ด่านศุลกากร (GPS 47N 0672452 N, 0800003 E)
Sampling Date Oct 16 - Oct 17, 2025
Sampling by Narathorn Keawpongsa

Time	Oct 16 - Oct 17, 2025			-			-			-			-			-			-		
	WS (m/s)	WD (deg)		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10:00 AM - 11:00 AM	2.1	18.0	NNE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11:00 AM - 12:00 PM	1.7	24.0	NNE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12:00 PM - 01:00 PM	1.7	49.0	NE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
01:00 PM - 02:00 PM	1.3	73.0	ENE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
02:00 PM - 03:00 PM	1.6	39.0	NE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
03:00 PM - 04:00 PM	0.4	46.0	NE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
04:00 PM - 05:00 PM	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
05:00 PM - 06:00 PM	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
06:00 PM - 07:00 PM	1.6	64.0	ENE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
07:00 PM - 08:00 PM	1.0	174.0	S	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
08:00 PM - 09:00 PM	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
09:00 PM - 10:00 PM	0.8	222.0	SW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10:00 PM - 11:00 PM	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11:00 PM - 12:00 AM	0.3	228.0	SW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12:00 AM - 01:00 AM	0.4	232.0	SW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
01:00 AM - 02:00 AM	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
02:00 AM - 03:00 AM	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
03:00 AM - 04:00 AM	0.4	211.0	SSW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
04:00 AM - 05:00 AM	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
05:00 AM - 06:00 AM	1.1	359.0	N	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
06:00 AM - 07:00 AM	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
07:00 AM - 08:00 AM	0.4	318.0	NW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
08:00 AM - 09:00 AM	1.6	209.0	SSW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
09:00 AM - 10:00 AM	0.5	211.0	SSW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Reference Method : Cup Anemometer & Anodized Aluminium Vane Method

The above results are valid only for the analyzed/tested sample(s) as indicated in this report. No part of this report or certificate may be reproduced in any form without written consent from the Laboratory. ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

Approved by

Sarayuth Jittranont
Assistant General Manager



Analysis / Test Report

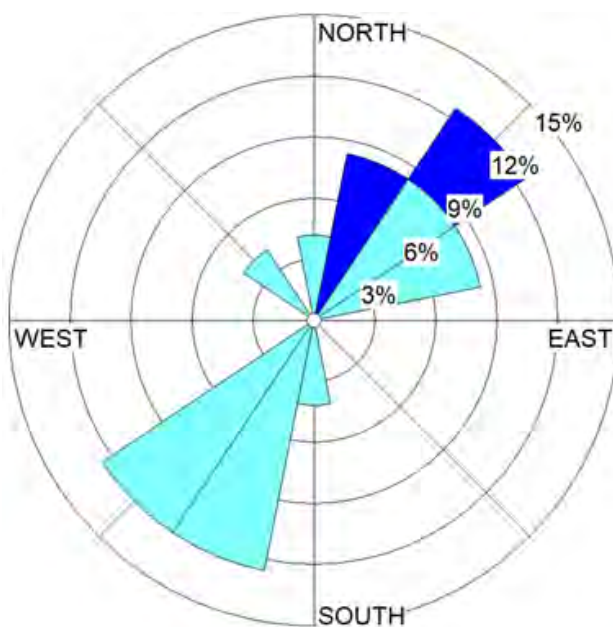
Client : PTTEP International Limited
222 Moo 1, Tambon Huakao, Amphur Singhanakorn, Songkhla Thailand 90280

P/O : 3450040615
Project Name : PSB Songkhla
Project Location :

Lot ID: 2594529
Date Received : Oct 21, 2025
Date Reported : Oct 24, 2025
Report Number : 3424571-1

Page 2 of 2

Wind Rose



Date : Oct 16-17, 2025

	WS (m/s)	%
	≥ 10.0	0.00
	8.0-10.0	0.00
	5.5-8.0	0.00
	3.3-5.5	0.00
	1.7-3.3	12.50
	0.3-1.7	54.17
	Calms	33.33

Location : บริเวณบ้านพักเจ้าหน้าที่ด่านศุลกากร (GPS 47N 0672452 N, 0800003 E)

The above results are valid only for the analyzed/tested sample(s) as indicated in this report. No part of this report or certificate may be reproduced in any form without written consent from the Laboratory. ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

Approved by

Sarayuth Jittranont
Assistant General Manager

ภาคผนวก ค-2

ระดับเสียงในสถานประกอบการ



Analysis / Test Report

Client : PTTEP International Limited
222 Moo 1, Tambon Huakao, Amphur Singhanakorn, Songkhla Thailand 90280
P/O : 3450040615
Project Name : PSB Songkhla
Project Location :

Lot ID: 2594536

Date Received : Oct 21, 2025
Date Reported : Oct 29, 2025
Report Number: 3424604-1

Page 1 of 1

Sample Number 2594536-1
Parameter Noise (Leq 8 hrs.)
Location บริเวณพื้นที่โครงการ (47N 672422 E, 800027 N)
Measurement Date Oct 16, 2025
Measurement by Narathorn Keawpongsa

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:00 AM - 10:00 AM	57.9	89.7	54.2
10:00 AM - 11:00 AM	58.8	90.9	54.1
11:00 AM - 12:00 PM	60.2	77.6	53.5
12:00 PM - 01:00 PM	57.9	73.1	54.1
01:00 PM - 02:00 PM	58.0	83.7	54.2
02:00 PM - 03:00 PM	57.1	81.1	53.3
03:00 PM - 04:00 PM	54.5	72.6	51.4
04:00 PM - 05:00 PM	55.4	74.8	51.3

Leq Average 8 hrs. (dB(A)) 57.8
Lmax (dB(A)) 90.9
L90 (dB(A))
Standard (dB(A)) 90
Reference Method : ISO1996-1 and 1996-2
Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรการคุ้มครองความปลอดภัย
ในการประกอบกิจการโรงงานเกี่ยวกับสภาวะแวดล้อมในการทำงาน พ.ศ.๒๕๔๖

Technical Management

Saranya C.

Saranya Chalermthamrong
Scientist (4)

Approved by

Supot S.

Supot Salamteh
Section Head

ภาคผนวก ค-3

ระดับเสียงโดยทั่วไป



Analysis / Test Report

Client : PTTEP International Limited
222 Moo 1, Tambon Huakao, Amphur Singhanakorn, Songkhla Thailand 90280
P/O : 3450040615
Project Name : PSB Songkhla
Project Location :

Lot ID: 2594532

Date Received : Oct 21, 2025
Date Reported : Oct 29, 2025
Report Number: 3424586-1

Page 1 of 1

Sample Number 2594532-1
Parameter Noise (Leq 24 hrs.)
Location บริเวณพื้นที่โครงการ (47N 672422 E, 800027 N)
Measurement Date Oct 16 - Oct 17, 2025
Measurement by Narathorn Keawpongsa
Sound Level meter Serial No. 873118

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:00 AM - 10:00 AM	57.9	89.7	54.2
10:00 AM - 11:00 AM	58.8	90.9	54.1
11:00 AM - 12:00 PM	60.2	77.6	53.5
12:00 PM - 01:00 PM	57.9	73.1	54.1
01:00 PM - 02:00 PM	58.0	83.7	54.2
02:00 PM - 03:00 PM	57.1	81.1	53.3
03:00 PM - 04:00 PM	54.5	72.6	51.4
04:00 PM - 05:00 PM	55.4	74.8	51.3
05:00 PM - 06:00 PM	62.2	78.2	53.2
06:00 PM - 07:00 PM	64.5	84.3	54.6
07:00 PM - 08:00 PM	60.8	79.0	58.9
08:00 PM - 09:00 PM	57.9	71.8	54.2
09:00 PM - 10:00 PM	52.9	67.0	49.6
10:00 PM - 11:00 PM	50.8	72.9	48.7
11:00 PM - 12:00 AM	49.9	65.2	48.3
12:00 AM - 01:00 AM	51.0	72.8	48.4
01:00 AM - 02:00 AM	49.6	63.5	47.9
02:00 AM - 03:00 AM	49.1	59.6	47.9
03:00 AM - 04:00 AM	49.5	63.1	48.0
04:00 AM - 05:00 AM	67.2	81.4	48.6
05:00 AM - 06:00 AM	57.7	86.4	52.2
06:00 AM - 07:00 AM	59.5	77.2	56.1
07:00 AM - 08:00 AM	58.5	74.0	55.5
08:00 AM - 09:00 AM	56.5	73.5	53.0

Leq Average 24 hrs. (dB(A)) 59.2
Lmax (dB(A)) 90.9
L90 (dB(A)) 53.0
Ldn (dB(A)) 65.5

Standard (dB(A))

70

115

Reference Method : ISO1996-1 and 1996-2

Standard : 1. ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 15 (พ.ศ. 2540) เรื่องกำหนดมาตรฐานระดับเสียงโดยทั่วไป
2. ประกาศกระทรวงอุตสาหกรรม เรื่องกำหนดค่าระดับเสียงการรบกวน และระดับเสียงที่เกิดจากการประกอบกิจการ
โรงงาน พ.ศ. 2548

Note : Lmin =45.8 dB(A)

Technical Management

Saranya C.

Saranya Chalermthamrong
Scientist (4)

Approved by

Supot S.

Supot Salamteh
Section Head

ภาคผนวก ค-4

คุณภาพน้ำทะเล



Analysis / Test Report

TESTING
No.0166

Client : PTTEP International Limited
222 Moo 1, Tambon Huakao, Amphur Singhanakorn, Songkhla Thailand 90280
P/O : 3450040615
Project Name : PSB Songkhla
Project Location :

Lot ID: 2572189

Date Received : Sep 05, 2025

Date Reported : Sep 20, 2025

Report Number : 3371420-1

Page 1 of 8

Sample Number	2572189-1
Sampled Date	Sep 05, 2025 9:20 AM
Sample Description	Seawater
Location	สถานีที่ 1 บริเวณพื้นที่วางท่อน้ำมัน ด้านใกล้แนววางท่อน้ำมัน
Date Analysis Commenced	Sep 05, 2025
Condition of Sample	Contained in one amber glass bottle and five plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Microbiological Testing							
Fecal Coliform	CFU/100mL	-	-	12	≤100	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 9222 D	Songkhla
Total Coliform	MPN/100mL	-	-	13.0	≤1000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 9221 B	Songkhla
Water Testing							
BOD (5 days at 20 degree C) *	mg/L	-	2.0	<2.0	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5210 B, part 4500 - O G	Songkhla
Dissolved Oxygen (On site) *	mg/L	-	0.1	6.6	≥4	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-O (G)	Songkhla
Nitrate as N *	mg/L	0.003	0.02	Not Detected	≤0.06	Based on Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-NO3 E	Bangkok
Oil & Grease *	mg/L	-	3	<3	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5520 B	Songkhla
pH at 25 degree C *		-	-	8.0	7.0-8.5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B)	Songkhla
Phosphate as P *	mg/L	0.005	0.01	Not Detected	≤0.045	Based on Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-P (E)	Bangkok
Salinity *	ppt	-	-	31.4	Change from lower salinity not more than 10%	Based on Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2520 B	Songkhla

Approved by

Chompoonuch F.

Chompoonuch Funtha
Supervisor

Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. The report shall not be reproduced except in full without the written approval of the laboratory.

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Analysis / Test Report

TESTING
No.0166

Client : PTTEP International Limited
222 Moo 1, Tambon Huakao, Amphur Singhanakorn, Songkhla Thailand 90280
P/O : 3450040615
Project Name : PSB Songkhla
Project Location :

Lot ID: 2572189

Date Received : Sep 05, 2025

Date Reported : Sep 20, 2025

Report Number : 3371420-1

Page 2 of 8

Sample Number	2572189-1						
Sampled Date	Sep 05, 2025 9:20 AM						
Sample Description	Seawater						
Location	สถานีที่ 1 บริเวณพื้นที่วางท่อน้ำมัน ด้านใกล้แนววางท่อน้ำมัน						
Date Analysis Commenced	Sep 05, 2025						
Condition of Sample	Contained in one amber glass bottle and five plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Sulfide as H ₂ S *	mg/L	-	0.01	<0.01	≤0.01	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-S ₂ (D)	Bangkok
Temperature *	Degree C	-	-	30.1	Change from natural condition not more than 2 degree C	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2550 B	Songkhla
Total Suspended Solids *	mg/L	-	2	13	≤16.90	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 D	Songkhla
Transparency *	m	-	-	2.3	Change from Natural condition not more than 10% of the lowest transparency	Visual Method	Songkhla
Turbidity *	NTU	-	0.1	12.0	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2130 B	Songkhla

Guideline : Notification of the National Environmental Board, B.E.2564 : Coastal Water Quality Standard (Class 5)

Sampling By : Somsak Junkong , Tana Supapan

Remark :

- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
- Analyte(s) marked * is/are not included in scope of Accreditation ISO/IEC 17025.
- Sampling is not included in scope of accreditation ISO/IEC 17025

Approved by

Chompoonuch F.

Chompoonuch Funtha
Supervisor

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Analysis / Test Report

TESTING
No.0166

Client : PTTEP International Limited
222 Moo 1, Tambon Huakao, Amphur Singhanakorn, Songkhla Thailand 90280
P/O : 3450040615
Project Name : PSB Songkhla
Project Location :

Lot ID: 2572189

Date Received : Sep 05, 2025

Date Reported : Sep 20, 2025

Report Number : 3371420-1

Page 3 of 8

Sample Number	2572189-2
Sampled Date	Sep 05, 2025 9:10 AM
Sample Description	Seawater
Location	สถานีที่ 2 บริเวณที่มีการเพาะเลี้ยงสัตว์น้ำในกระชัง ด้านชุมชนบ้านเล
Date Analysis Commenced	Sep 05, 2025
Condition of Sample	Contained in one amber glass bottle and five plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Microbiological Testing							
Fecal Coliform	CFU/100mL	-	-	30	≤100	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 9222 D	Songkhla
Total Coliform	MPN/100mL	-	-	33.0	≤1000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 9221 B	Songkhla
Water Testing							
BOD (5 days at 20 degree C) *	mg/L	-	2.0	<2.0	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5210 B, part 4500 - O G	Songkhla
Dissolved Oxygen (On site) *	mg/L	-	0.1	6.5	≥4	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-O (G)	Songkhla
Nitrate as N *	mg/L	0.003	0.02	Not Detected	≤0.06	Based on Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-NO3 E	Bangkok
Oil & Grease *	mg/L	-	3	<3	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5520 B	Songkhla
pH at 25 degree C *		-	-	8.1	7.0-8.5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B)	Songkhla
Phosphate as P *	mg/L	0.005	0.01	<0.01	≤0.045	Based on Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-P (E)	Bangkok
Salinity *	ppt	-	-	31.2	Change from lower salinity not more than 10%	Based on Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2520 B	Songkhla

Approved by

Chompoonuch F.

Chompoonuch Funtha
Supervisor

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Analysis / Test Report

TESTING
No.0166

Client : PTTEP International Limited
222 Moo 1, Tambon Huakao, Amphur Singhanakorn, Songkhla Thailand 90280
P/O : 3450040615
Project Name : PSB Songkhla
Project Location :

Lot ID: 2572189

Date Received : Sep 05, 2025

Date Reported : Sep 20, 2025

Report Number : 3371420-1

Page 4 of 8

Sample Number	2572189-2
Sampled Date	Sep 05, 2025 9:10 AM
Sample Description	Seawater
Location	สถานที่ 2 บริเวณที่มีการเพาะเลี้ยงสัตว์น้ำในกระชัง ด้านชุมชนบ้านเล
Date Analysis Commenced	Sep 05, 2025
Condition of Sample	Contained in one amber glass bottle and five plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Sulfide as H ₂ S *	mg/L	-	0.01	<0.01	≤0.01	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-S2 (D)	Bangkok
Temperature *	Degree C	-	-	29.3	Change from natural condition not more than 2 degree C	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2550 B	Songkhla
Total Suspended Solids *	mg/L	-	2	9	≤31.88	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 D	Songkhla
Transparency *	m	-	-	2.4	Change from Natural condition not more than 10% of the lowest transparency	Visual Method	Songkhla
Turbidity *	NTU	-	0.1	8.40	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2130 B	Songkhla

Guideline : Notification of the National Environmental Board, B.E.2564 : Coastal Water Quality Standard (Class 5)

Sampling By : Somsak Junkong , Tana Supapan

Remark :

- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
- Analyte(s) marked * is/are not included in scope of Accreditation ISO/IEC 17025.
- Sampling is not included in scope of accreditation ISO/IEC 17025

Approved by

Chompoonuch F.

Chompoonuch Funtha
Supervisor

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Analysis / Test Report

TESTING
No.0166

Client : PTTEP International Limited
222 Moo 1, Tambon Huakao, Amphur Singhanakorn, Songkhla Thailand 90280
P/O : 3450040615
Project Name : PSB Songkhla
Project Location :

Lot ID: 2572189

Date Received : Sep 05, 2025

Date Reported : Sep 20, 2025

Report Number : 3371420-1

Page 5 of 8

Sample Number	2572189-3
Sampled Date	Sep 05, 2025 9:00 AM
Sample Description	Seawater
Location	สถานีที่ 3 บริเวณแหล่งน้ำธรรมชาติ ด้านสะพานรับ-ส่งน้ำมันของ ปตท.
Date Analysis Commenced	Sep 05, 2025
Condition of Sample	Contained in one amber glass bottle and five plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Microbiological Testing							
Fecal Coliform	CFU/100mL	-	-	5	≤100	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 9222 D	Songkhla
Total Coliform	MPN/100mL	-	-	7.8	≤1000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 9221 B	Songkhla
Water Testing							
BOD (5 days at 20 degree C) *	mg/L	-	2.0	<2.0	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5210 B, part 4500 - O G	Songkhla
Dissolved Oxygen (On site) *	mg/L	-	0.1	6.6	≥4	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-O (G)	Songkhla
Nitrate as N *	mg/L	0.003	0.02	<0.02	≤0.06	Based on Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-NO3 E	Bangkok
Oil & Grease *	mg/L	-	3	<3	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5520 B	Songkhla
pH at 25 degree C *		-	-	8.1	7.0-8.5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B)	Songkhla
Phosphate as P *	mg/L	0.005	0.01	Not Detected	≤0.045	Based on Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-P (E)	Bangkok
Salinity *	ppt	-	-	31.2	Change from lower salinity not more than 10%	Based on Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2520 B	Songkhla

Approved by

Chompoonuch F.

Chompoonuch Funtha
Supervisor

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Analysis / Test Report

TESTING
No.0166

Client : PTTEP International Limited
222 Moo 1, Tambon Huakao, Amphur Singhanakorn, Songkhla Thailand 90280
P/O : 3450040615
Project Name : PSB Songkhla
Project Location :

Lot ID: 2572189

Date Received : Sep 05, 2025

Date Reported : Sep 20, 2025

Report Number : 3371420-1

Page 6 of 8

Sample Number	2572189-3
Sampled Date	Sep 05, 2025 9:00 AM
Sample Description	Seawater
Location	สถานีที่ 3 บริเวณแหล่งน้ำธรรมชาติ ด้านสะพานรับ-ส่งน้ำมันของ ปตท.
Date Analysis Commenced	Sep 05, 2025
Condition of Sample	Contained in one amber glass bottle and five plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Sulfide as H ₂ S *	mg/L	-	0.01	<0.01	≤0.01	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-S ₂ (D)	Bangkok
Temperature *	Degree C	-	-	29.5	Change from natural condition not more than 2 degree C	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2550 B	Songkhla
Total Suspended Solids *	mg/L	-	2	13	≤19.88	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 D	Songkhla
Transparency *	m	-	-	0.5	Change from Natural condition not more than 10% of the lowest transparency	Visual Method	Songkhla
Turbidity *	NTU	-	0.1	12.0	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2130 B	Songkhla

Guideline : Notification of the National Environmental Board, B.E.2564 : Coastal Water Quality Standard (Class 5)

Sampling By : Somsak Junkong , Tana Supapan

Remark :

- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
- Analyte(s) marked * is/are not included in scope of Accreditation ISO/IEC 17025.
- Sampling is not included in scope of accreditation ISO/IEC 17025

Approved by

Chompoonuch F.

Chompoonuch Funtha
Supervisor

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Analysis / Test Report

TESTING
No.0166

Client : PTTEP International Limited
222 Moo 1, Tambon Huakao, Amphur Singhanakorn, Songkhla Thailand 90280

P/O : 3450040615

Project Name : PSB Songkhla

Project Location :

Lot ID: 2572189

Date Received : Sep 05, 2025

Date Reported : Sep 20, 2025

Report Number : 3371420-1

Page 7 of 8

Sample Number	2572189-4
Sampled Date	Sep 05, 2025 9:30 AM
Sample Description	Seawater
Location	สถานีที่ 4 บริเวณที่มีการเพาะเลี้ยงสัตว์น้ำ ด้านชุมชนฝั่งคลองน้ำมัน ปตท.
Date Analysis Commenced	Sep 05, 2025
Condition of Sample	Contained in one amber glass bottle and five plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Microbiological Testing							
Fecal Coliform	CFU/100mL	-	-	17	≤100	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 9222 D	Songkhla
Total Coliform	MPN/100mL	-	-	17.0	≤1000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 9221 B	Songkhla
Water Testing							
BOD (5 days at 20 degree C)	mg/L	-	2.0	<2.0	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5210 B, part 4500 - O G	Songkhla
Dissolved Oxygen (On site) *	mg/L	-	0.1	6.2	≥4	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-O (G)	Songkhla
Nitrate as N *	mg/L	0.003	0.02	Not Detected	≤0.06	Based on Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-NO3 E	Bangkok
Oil & Grease *	mg/L	-	3	<3	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5520 B	Songkhla
pH at 25 degree C *		-	-	8.0	7.0-8.5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B)	Songkhla
Phosphate as P *	mg/L	0.005	0.01	Not Detected	≤0.045	Based on Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-P (E)	Bangkok
Salinity *	ppt	-	-	31.1	Change from lower salinity not more than 10%	Based on Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2520 B	Songkhla

Approved by

Chompoonuch F.

Chompoonuch Funtha
Supervisor

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Analysis / Test Report

TESTING
No.0166

Client : PTTEP International Limited
222 Moo 1, Tambon Huakao, Amphur Singhanakorn, Songkhla Thailand 90280
P/O : 3450040615
Project Name : PSB Songkhla
Project Location :

Lot ID: 2572189

Date Received : Sep 05, 2025

Date Reported : Sep 20, 2025

Report Number : 3371420-1

Page 8 of 8

Sample Number	2572189-4
Sampled Date	Sep 05, 2025 9:30 AM
Sample Description	Seawater
Location	สถานีที่ 4 บริเวณที่มีการเพาะเลี้ยงสัตว์น้ำ ด้านชุมชนฝั่งคลองน้ำมัน ปตท.
Date Analysis Commenced	Sep 05, 2025
Condition of Sample	Contained in one amber glass bottle and five plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Sulfide as H ₂ S *	mg/L	-	0.01	<0.01	≤0.01	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-S ₂ (D)	Bangkok
Temperature *	Degree C	-	-	30.0	Change from natural condition not more than 2 degree C	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2550 B	Songkhla
Total Suspended Solids *	mg/L	-	2	9	≤13.48	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 D	Songkhla
Transparency *	m	-	-	0.9	Change from Natural condition not more than 10% of the lowest transparency	Visual Method	Songkhla
Turbidity *	NTU	-	0.1	12.0	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2130 B	Songkhla

Guideline : Notification of the National Environmental Board, B.E.2564 : Coastal Water Quality Standard (Class 5)

Sampling By : Somsak Junkong , Tana Supapan

Remark :

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- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
- Analyte(s) marked * is/are not included in scope of Accreditation ISO/IEC 17025.
- Sampling is not included in scope of accreditation ISO/IEC 17025

Approved by

Chompoonuch F.

Chompoonuch Funtha
Supervisor

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Analysis / Test Report

TESTING
No.0166

Client : PTTEP International Limited
222 Moo 1, Tambon Huakao, Amphur Singhanakorn, Songkhla Thailand 90280
P/O : 3450040615
Project Name : PSB Songkhla
Project Location :

Lot ID: 2596729
Date Received : Dec 03, 2025
Date Reported : Dec 16, 2025
Report Number : 3464518-1 Rev. No.1

Page 1 of 8

Sample Number	2596729-1
Sampled Date	Dec 03, 2025 9:20 AM
Sample Description	Seawater
Location	สถานีที่ 1 บริเวณพื้นที่วางท่อน้ำมัน ด้านใกล้แนววางท่อน้ำมัน
Date Analysis Commenced	Dec 04, 2025
Condition of Sample	Contained in one amber glass bottle and five plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Microbiological Testing							
Fecal Coliform	CFU/100mL	-	-	80	≤100	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 9222 D	Songkhla
Total Coliform	MPN/100mL	-	-	790.0	≤1000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 9221 B	Songkhla
Water Testing							
BOD (5 days at 20 degree C) *	mg/L	-	2.0	<2.0	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5210 B, part 4500 - O G	Bangkok
Dissolved Oxygen (on site) *	mg/L	-	-	5.4	≥4	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-O (G)	Bangkok
Nitrate as N *	mg/L	0.003	0.02	<0.02	≤0.06	Based on Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-NO3 E	Bangkok
Oil & Grease *	mg/L	-	3	<3	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5520 B	Bangkok
pH at 25 degree C *		-	-	7.3	7.0-8.5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B)	Bangkok
Phosphate as P *	mg/L	0.005	0.01	<0.01	≤0.045	Based on Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-P (E)	Bangkok
Salinity *	ppt	-	0.1	1.2	Change from lower salinity not more than 10%	Based on Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2520 B	Bangkok

Approved by

Chompoonuch F.

Chompoonuch Funtha
Supervisor

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Analysis / Test Report

TESTING
No.0166

Client : PTTEP International Limited
222 Moo 1, Tambon Huakao, Amphur Singhanakorn, Songkhla Thailand 90280
P/O : 3450040615
Project Name : PSB Songkhla
Project Location :

Lot ID: 2596729
Date Received : Dec 03, 2025
Date Reported : Dec 16, 2025
Report Number : 3464518-1 Rev. No.1

Page 2 of 8

Sample Number	2596729-1
Sampled Date	Dec 03, 2025 9:20 AM
Sample Description	Seawater
Location	สถานที่ 1 บริเวณพื้นที่วางท่อน้ำมัน ด้านใกล้แนววางท่อน้ำมัน
Date Analysis Commenced	Dec 04, 2025
Condition of Sample	Contained in one amber glass bottle and five plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Sulfide as H ₂ S *	mg/L	-	0.01	<0.01	≤0.01	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-S ₂ (D)	Bangkok
Temperature *	Degree C	-	-	29.6	Change from natural condition not more than 2 degree C	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2550 B	Bangkok
Total Suspended Solids Dried at 103-105 degree C *	mg/L	-	2	17	≤19	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 D	Bangkok
Transparency *	m	-	-	0.50	Change from Natural condition not more than 10% of the lowest transparency	Visual Method	Bangkok
Turbidity *	NTU	-	0.1	26	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2130 B	Bangkok

Guideline : Notification of the National Environmental Board, B.E.2564 : Coastal Water Quality Standard (Class 5)

Sampling By : Narathorn Keawpongsa

Remark :

- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
- Analyte(s) marked * is/are not included in scope of Accreditation ISO/IEC 17025.
- Sampling is not included in scope of accreditation ISO/IEC 17025

Approved by

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TESTING
No.0166

Client : PTTEP International Limited
222 Moo 1, Tambon Huakao, Amphur Singhanakorn, Songkhla Thailand 90280
P/O : 3450040615
Project Name : PSB Songkhla
Project Location :

Lot ID: 2596729
Date Received : Dec 03, 2025
Date Reported : Dec 16, 2025
Report Number : 3464518-1 Rev. No.1

Page 3 of 8

Sample Number	2596729-2
Sampled Date	Dec 03, 2025 9:10 AM
Sample Description	Seawater
Location	สถานีที่ 2 บริเวณที่มีการเพาะเลี้ยงสัตว์น้ำในกระชัง ด้านชุมชนบ้านเล
Date Analysis Commenced	Dec 04, 2025
Condition of Sample	Contained in one amber glass bottle and five plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Microbiological Testing							
Fecal Coliform	CFU/100mL	-	-	510	≤100	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 9222 D	Songkhla
Total Coliform	MPN/100mL	-	-	3300.0	≤1000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 9221 B	Songkhla
Water Testing							
BOD (5 days at 20 degree C) *	mg/L	-	2.0	<2.0	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5210 B, part 4500 - O G	Bangkok
Dissolved Oxygen (on site) *	mg/L	-	-	5.1	≥4	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-O (G)	Bangkok
Nitrate as N *	mg/L	0.003	0.02	<0.02	≤0.06	Based on Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-NO3 E	Bangkok
Oil & Grease *	mg/L	-	3	<3	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5520 B	Bangkok
pH at 25 degree C *		-	-	7.3	7.0-8.5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B)	Bangkok
Phosphate as P *	mg/L	0.005	0.01	<0.01	≤0.045	Based on Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-P (E)	Bangkok
Salinity *	ppt	-	0.1	1.2	Change from lower salinity not more than 10%	Based on Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2520 B	Bangkok

Approved by

Chompoonuch F.

Chompoonuch Funtha
Supervisor

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TESTING
No.0166

Client : PTTEP International Limited
222 Moo 1, Tambon Huakao, Amphur Singhanakorn, Songkhla Thailand 90280
P/O : 3450040615
Project Name : PSB Songkhla
Project Location :

Lot ID: 2596729

Date Received : Dec 03, 2025

Date Reported : Dec 16, 2025

Report Number : 3464518-1 Rev. No.1

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Sample Number	2596729-2						
Sampled Date	Dec 03, 2025 9:10 AM						
Sample Description	Seawater						
Location	สถานีที่ 2 บริเวณที่มีการเพาะเลี้ยงสัตว์น้ำในกระชัง ด้านชุมชนบ้านเล						
Date Analysis Commenced	Dec 04, 2025						
Condition of Sample	Contained in one amber glass bottle and five plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Sulfide as H ₂ S *	mg/L	-	0.01	<0.01	≤0.01	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-S ₂ (D)	Bangkok
Temperature *	Degree C	-	-	29.9	Change from natural condition not more than 2 degree C	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2550 B	Bangkok
Total Suspended Solids Dried at 103-105 degree C *	mg/L	-	2	15	≤18	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 D	Bangkok
Transparency *	m	-	-	0.40	Change from Natural condition not more than 10% of the lowest transparency	Visual Method	Bangkok
Turbidity *	NTU	-	0.1	22	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2130 B	Bangkok

Guideline : Notification of the National Environmental Board, B.E.2564 : Coastal Water Quality Standard (Class 5)

Sampling By : Narathorn Keawpongsa

Remark :

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- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
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No.0166

Client : PTTEP International Limited
222 Moo 1, Tambon Huakao, Amphur Singhanakorn, Songkhla Thailand 90280
P/O : 3450040615
Project Name : PSB Songkhla
Project Location :

Lot ID: 2596729
Date Received : Dec 03, 2025
Date Reported : Dec 16, 2025
Report Number : 3464518-1 Rev. No.1

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Sample Number	2596729-3
Sampled Date	Dec 03, 2025 9:00 AM
Sample Description	Seawater
Location	สถานีที่ 3 บริเวณแหล่งน้ำธรรมชาติ ด้านสะพานรับ-ส่งน้ำมันของ ปตท.
Date Analysis Commenced	Dec 04, 2025
Condition of Sample	Contained in one amber glass bottle and five plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Microbiological Testing							
Fecal Coliform	CFU/100mL	-	-	72	≤100	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 9222 D	Songkhla
Total Coliform	MPN/100mL	-	-	1300.0	≤1000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 9221 B	Songkhla
Water Testing							
BOD (5 days at 20 degree C) *	mg/L	-	2.0	<2.0	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5210 B, part 4500 - O G	Bangkok
Dissolved Oxygen (on site) *	mg/L	-	-	5.3	≥4	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-O (G)	Bangkok
Nitrate as N *	mg/L	0.003	0.02	0.02	≤0.06	Based on Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-NO3 E	Bangkok
Oil & Grease *	mg/L	-	3	<3	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5520 B	Bangkok
pH at 25 degree C *		-	-	7.2	7.0-8.5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B)	Bangkok
Phosphate as P *	mg/L	0.005	0.01	<0.01	≤0.045	Based on Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-P (E)	Bangkok
Salinity *	ppt	-	0.1	1.1	Change from lower salinity not more than 10%	Based on Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2520 B	Bangkok

Approved by

Chompoonuch F.

Chompoonuch Funtha
Supervisor

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P/O : 3450040615
Project Name : PSB Songkhla
Project Location :

Lot ID: 2596729
Date Received : Dec 03, 2025
Date Reported : Dec 16, 2025
Report Number : 3464518-1 Rev. No.1

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Sample Number	2596729-3
Sampled Date	Dec 03, 2025 9:00 AM
Sample Description	Seawater
Location	สถานีที่ 3 บริเวณแหล่งน้ำธรรมชาติ ด้านสะพานรับ-ส่งน้ำมันของ ปตท.
Date Analysis Commenced	Dec 04, 2025
Condition of Sample	Contained in one amber glass bottle and five plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Sulfide as H ₂ S *	mg/L	-	0.01	<0.01	≤0.01	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-S ₂ (D)	Bangkok
Temperature *	Degree C	-	-	29.7	Change from natural condition not more than 2 degree C	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2550 B	Bangkok
Total Suspended Solids Dried at 103-105 degree C *	mg/L	-	2	21	≤21	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 D	Bangkok
Transparency *	m	-	-	0.50	Change from Natural condition not more than 10% of the lowest transparency	Visual Method	Bangkok
Turbidity *	NTU	-	0.1	27	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2130 B	Bangkok

Guideline : Notification of the National Environmental Board, B.E.2564 : Coastal Water Quality Standard (Class 5)

Sampling By : Narathorn Keawpongsa

Remark :

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- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
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Client : PTTEP International Limited
222 Moo 1, Tambon Huakao, Amphur Singhanakorn, Songkhla Thailand 90280
P/O : 3450040615
Project Name : PSB Songkhla
Project Location :

Lot ID: 2596729
Date Received : Dec 03, 2025
Date Reported : Dec 16, 2025
Report Number : 3464518-1 Rev. No.1

Page 7 of 8

Sample Number	2596729-4
Sampled Date	Dec 03, 2025 9:30 AM
Sample Description	Seawater
Location	สถานีที่ 4 บริเวณที่มีการเพาะเลี้ยงสัตว์น้ำ ด้านชุมชนฝั่งคลองน้ำมัน ปตท.
Date Analysis Commenced	Dec 04, 2025
Condition of Sample	Contained in one amber glass bottle and five plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Microbiological Testing							
Fecal Coliform	CFU/100mL	-	-	110	≤100	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 9222 D	Songkhla
Total Coliform	MPN/100mL	-	-	1300.0	≤1000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 9221 B	Songkhla
Water Testing							
BOD (5 days at 20 degree C) *	mg/L	-	2.0	<2.0	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5210 B, part 4500 - O G	Bangkok
Dissolved Oxygen (on site) *	mg/L	-	-	5.0	≥4	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-O (G)	Bangkok
Nitrate as N *	mg/L	0.003	0.02	<0.02	≤0.06	Based on Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-NO3 E	Bangkok
Oil & Grease *	mg/L	-	3	<3	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5520 B	Bangkok
pH at 25 degree C *		-	-	7.2	7.0-8.5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B)	Bangkok
Phosphate as P *	mg/L	0.005	0.01	<0.01	≤0.045	Based on Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-P (E)	Bangkok
Salinity *	ppt	-	0.1	1.3	Change from lower salinity not more than 10%	Based on Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2520 B	Bangkok

Approved by

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Supervisor

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Project Name : PSB Songkhla
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Lot ID: 2596729
Date Received : Dec 03, 2025
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Page 8 of 8

Sample Number	2596729-4						
Sampled Date	Dec 03, 2025 9:30 AM						
Sample Description	Seawater						
Location	สถานีที่ 4 บริเวณที่มีการเพาะเลี้ยงสัตว์น้ำ ด้านชุมชนฝั่งคลองน้ำมัน ปตท.						
Date Analysis Commenced	Dec 04, 2025						
Condition of Sample	Contained in one amber glass bottle and five plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Sulfide as H ₂ S *	mg/L	-	0.01	<0.01	≤0.01	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-S ₂ (D)	Bangkok
Temperature *	Degree C	-	-	29.6	Change from natural condition not more than 2 degree C	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2550 B	Bangkok
Total Suspended Solids Dried at 103-105 degree C *	mg/L	-	2	19	≤24	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 D	Bangkok
Transparency *	m	-	-	0.40	Change from Natural condition not more than 10% of the lowest transparency	Visual Method	Bangkok
Turbidity *	NTU	-	0.1	31	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2130 B	Bangkok

Guideline : Notification of the National Environmental Board, B.E.2564 : Coastal Water Quality Standard (Class 5)

Sampling By : Narathorn Keawpongsa

Remark :

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101/12 หมู่ 9 ต. บางพระ

อ. ศรีราชา จ. ชลบุรี 20110

โทร./โทรสาร. (038) 311379

Client : PTTEP International Limited

Address : 222 Moo 1 Tambon Huakao, Amphur Singhanakorn, Songkhla, Thailand, 90280

Project Name : PSB Songkhla

รายงานผลการวิเคราะห์แพลงก์ตอนพืช

ตาราง ผลการวิเคราะห์แพลงก์ตอนพืช (เก็บตัวอย่างวันที่ 5 กันยายน 2568)

ชนิดแพลงก์ตอนพืช	ปริมาณแพลงก์ตอนพืช (หน่วยต่อลูกบาศก์เมตร)			
	2572193-1	2572193-2	2572193-3	2572193-4
Division Cyanophyta				
Class Cyanophyceae				
Order Nostocales				
Family Oscillatoriaceae				
1. <i>Oscillatoria</i> sp.	-	26,000	-	-
2. <i>Oscillatoria tenuis</i>	-	-	52,000	-
Family Nostocaceae				
3. <i>Pseudanabaena</i> sp.	26,000	26,000	-	-
4. <i>Richelia intracellularis</i>	-	26,000	-	-
Division Chromophyta				
Class Bacillariophyceae				
Order Biddulphiales				
Suborder Coscinodiscineae				
Family Thalassiosiraceae				
5. <i>Cyclotella meneghiniana</i>	-	263,000	-	-

ตาราง ผลการวิเคราะห์แพลงก์ตอนพืช (เก็บตัวอย่างวันที่ 5 กันยายน 2568)

(ต่อ)

ชนิดแพลงก์ตอนพืช	ปริมาณแพลงก์ตอนพืช (หน่วยต่อลูกบาศก์เมตร)			
	2572193-1	2572193-2	2572193-3	2572193-4
6. <i>Cyclotella striata</i>	2,640,000	2,367,000	3,406,000	1,644,000
7. <i>Lauderia annulata</i>	79,000	-	26,000	-
8. <i>Planktoniella blanda</i>	-	-	26,000	-
9. <i>Stephanodiscus rotula</i>	26,000	-	76,000	-
Family Melosiraceae				
10. <i>Paralia sulcata</i>	-	-	183,000	-
Family Coscinodiscaceae				
11. <i>Coscinodiscus granii</i>	26,000	-	-	-
12. <i>Coscinodiscus radiatus</i>	-	-	26,000	-
13. <i>Coscinodiscus</i> sp.	106,000	79,000	52,000	-
14. <i>Coscinodiscus wailesii</i>	26,000	-	131,000	-
Family Asterolampraceae				
15. <i>Asteromphalus flabellatus</i>	158,000	53,000	105,000	52,000
Family Heliopeltaceae				
16. <i>Actinoptychus</i> sp.	79,000	26,000	-	-
Suborder Rhizosoleniineae				
Family Rhizosoleniaceae				
17. <i>Dactyliosolen antarcticus</i>	-	526,000	498,000	265,000
18. <i>Dactyliosolen phuketensis</i>	317,000	1,841,000	131,000	52,000
19. <i>Guinardia flaccida</i>	14,256,000	24,459,000	26,986,000	13,833,000
20. <i>Guinardia striata</i>	739,000	2,893,000	1,572,000	496,000
21. <i>Proboscia alata</i>	370,000	1,315,000	419,000	392,000
22. <i>Pseudosolenia calcar-avis</i>	422,000	736,000	838,000	522,000
23. <i>Rhizosolenia acuminata</i>	106,000	79,000	157,000	78,000
24. <i>Rhizosolenia formosa</i>	26,000	26,000	-	-
25. <i>Rhizosolenia imbricata</i>	106,000	184,000	26,000	-
26. <i>Rhizosolenia pungens</i>	-	26,000	-	-

ตาราง ผลการวิเคราะห์แพลงก์ตอนพืช (เก็บตัวอย่างวันที่ 5 กันยายน 2568)

(ต่อ)

ชนิดแพลงก์ตอนพืช	ปริมาณแพลงก์ตอนพืช (หน่วยต่อลูกบาศก์เมตร)			
	2572193-1	2572193-2	2572193-3	2572193-4
27. <i>Rhizosolenia robusta</i>	26,000	26,000	-	-
28. <i>Rhizosolenia setigera</i>	53,000	26,000	79,000	-
29. <i>Rhizosolenia</i> sp.	-	26,000	-	-
30. <i>Rhizosolenia striata</i>	79,000	79,000	52,000	-
31. <i>Rhizosolenia styliformis</i>	79,000	184,000	79,000	-
Suborder Biddulphiineae				
Family Hemiaulaceae				
32. <i>Cerataulina bicornis</i>	396,000	105,000	288,000	-
33. <i>Cerataulina pelagica</i>	53,000	-	367,000	26,000
34. <i>Climacodium frauenfeldianum</i>	290,000	1,447,000	1,598,000	-
35. <i>Hemiaulus hauckii</i>	106,000	-	-	-
36. <i>Hemiaulus indicus</i>	317,000	421,000	314,000	104,000
37. <i>Hemiaulus membranaceus</i>	26,000	1,210,000	157,000	52,000
38. <i>Hemiaulus sisensis</i>	-	-	1,231,000	-
Family Chaetoceraceae				
39. <i>Bacteriastrum delicatulum</i>	-	-	262,000	26,000
40. <i>Bacteriastrum elongatum</i>	-	26,000	-	-
41. <i>Bacteriastrum furcatum</i>	26,000	79,000	419,000	-
42. <i>Bacteriastrum</i> sp.	26,000	53,000	-	-
43. <i>Chaetoceros borealis</i>	53,000	-	-	-
44. <i>Chaetoceros coarctatus</i>	-	79,000	52,000	-
45. <i>Chaetoceros compressus</i>	-	79,000	52,000	-
46. <i>Chaetoceros curvisetus</i>	290,000	105,000	157,000	52,000
47. <i>Chaetoceros densus</i>	26,000	263,000	-	-
48. <i>Chaetoceros diversus</i>	106,000	79,000	26,000	-
49. <i>Chaetoceros laciniosus</i>	26,000	43,000	52,000	-
50. <i>Chaetoceros lorenzianus</i>	79,000	1,315,000	524,000	339,000
51. <i>Chaetoceros mitra</i>	53,000	79,000	-	-

ตาราง ผลการวิเคราะห์แพลงก์ตอนพืช (เก็บตัวอย่างวันที่ 5 กันยายน 2568)

(ต่อ)

ชนิดแพลงก์ตอนพืช	ปริมาณแพลงก์ตอนพืช (หน่วยต่อลูกบาศก์เมตร)			
	2572193-1	2572193-2	2572193-3	2572193-4
52. <i>Chaetoceros peruvianus</i>	79,000	26,000	52,000	-
53. <i>Chaetoceros pseudocurvisetus</i>	211,000	105,000	367,000	-
54. <i>Chaetoceros radicans</i>	-	158,000	79,000	-
55. <i>Chaetoceros</i> sp.	26,000	184,000	52,000	104,000
Family Lithodesmaceae				
56. <i>Ditylum brightwellii</i>	-	53,000	52,000	-
57. <i>Ditylum sol</i>	-	53,000	105,000	-
Family Eupodiscaceae				
58. <i>Odontella sinensis</i>	106,000	395,000	288,000	104,000
Order Bacillariales				
Suborder Fragilariineae				
Family Thalassionemataceae				
59. <i>Thalassionema frauenfeldii</i>	343,000	605,000	1,834,000	183,000
60. <i>Thalassionema nitzschioides</i>	634,000	132,000	786,000	287,000
Family Licmophoriaceae				
61. <i>Licmophora abbreviata</i>	-	26,000	26,000	-
Suborder Bacillariineae				
Family Lyrellaceae				
62. <i>Lyrella lyra</i>	26,000	-	-	-
Family Naviculaceae				
63. <i>Amphora</i> sp.	53,000	26,000	26,000	-
64. <i>Diploneis smithii</i>	238,000	-	-	26,000
65. <i>Haslea trompii</i>	-	53,000	105,000	26,000
66. <i>Meuniera membranacea</i>	26,000	368,000	-	-
67. <i>Pinnularia</i> sp.	53,000	-	-	-
68. <i>Pleurosigma aestuarii</i>	106,000	79,000	52,000	104,000
69. <i>Pleurosigma anguatum</i>	53,000	26,000	79,000	52,000

ตาราง ผลการวิเคราะห์แพลงก์ตอนพืช (เก็บตัวอย่างวันที่ 5 กันยายน 2568)

(ต่อ)

ชนิดแพลงก์ตอนพืช	ปริมาณแพลงก์ตอนพืช (หน่วยต่อลูกบาศก์เมตร)			
	2572193-1	2572193-2	2572193-3	2572193-4
70. <i>Pleurosigma balticum</i>	132,000	105,000	131,000	52,000
71. <i>Pleurosigma elongatum</i>	634,000	53,000	445,000	548,000
72. <i>Pleurosigma narmanii</i>	26,000	53,000	26,000	-
73. <i>Pleurosigma</i> sp.	-	-	52,000	-
Family Bacillariaceae				
74. <i>Cylindrotheca closterium</i>	-	26,000	-	-
75. <i>Nitzschia lorenziana</i>	26,000	-	52,000	-
Family Surirellaceae				
76. <i>Entomoneis robusta</i>	-	26,000	-	-
77. <i>Entomoneis alata</i>	53,000	-	-	-
78. <i>Surirella ovata</i>	1,848,000	3,156,000	2,620,000	835,000
Class Dinophyceae				
Order Gonyaulales				
Family Ceratiaceae				
79. <i>Ceratium porrectum</i>	-	-	26,000	-
Family Gonyaulacaceae				
80. <i>Gonyaulax</i> sp.	-	-	26,000	26,000
Order Peridiniales				
Family Protoperidiniaceae				
81. <i>Protoperidinium punctulatum</i>	-	26,000	26,000	26,000
82. <i>Protoperidinium</i> sp.	-	26,000	52,000	26,000
ชนิดแพลงก์ตอนพืช	55	61	59	29
ปริมาณแพลงก์ตอนพืช	26,291,000	46,435,000	47,778,000	20,332,000
ดัชนีความหลากหลายแพลงก์ตอนพืช	2.0900	2.1217	2.0364	1.4625
ดัชนีความสม่ำเสมอแพลงก์ตอนพืช	0.5215	0.5161	0.4994	0.4343

- Sample Location :**
1. สถานี 2572193-1 : สถานีที่ 1 บริเวณพื้นที่วางท่อน้ำมัน ด้านใกล้แนววางท่อน้ำมัน
 2. สถานี 2572193-2 : สถานีที่ 2 บริเวณที่มีการเพาะเลี้ยงสัตว์น้ำในกระชัง ด้านชุมชนบ้านเล
 3. สถานี 2572193-3 : สถานีที่ 3 บริเวณแหล่งน้ำธรรมชาติ ด้านสะพานรับ-ส่งน้ำมันของ ปตท.
 4. สถานี 2572193-4 : บริเวณที่มีการเพาะเลี้ยงสัตว์น้ำ ด้านชุมชนฝั่งกล้งน้ำมัน ปตท.

Condition of Sample : contained in one plastic bottle, sample containers comply to pretreatment-preservation standards (APHA, USEPA)



(นางสาวกนกวรรณ ขาวดอน)
ผู้วิเคราะห์



(นายอลงกต อินทรชาติ)
หัวหน้าสถานีวิจัยประมงศรีราชา



สถานีวิจัยประมงศรีราชา

101/12 หมู่ 9 ต. บางพระ

อ. ศรีราชา จ. ชลบุรี 20110

โทร./โทรสาร. (038) 311379

Client : PTTEP International Limited

Address : 222 Moo 1 Tambon Huakao, Amphur Singhanakorn, Songkhla, Thailand, 90280

Project Name : PSB Songkhla

รายงานผลการวิเคราะห์แพลงก์ตอนสัตว์

ตาราง ผลการวิเคราะห์แพลงก์ตอนสัตว์ (เก็บตัวอย่างวันที่ 5 กันยายน 2568)

ชนิดแพลงก์ตอนสัตว์	ปริมาณแพลงก์ตอนสัตว์ (หน่วยต่อลูกบาศก์เมตร)			
	2572193-1	2572193-2	2572193-3	2572193-4
Phylum Protozoa				
Subphylum Ciliophora				
Class Ciliata				
Subclass Spirotricha				
Order Tintinnida				
Family Tintinnididae				
1. <i>Leprotintinnus nordquisti</i>	185,000	26,000	79,000	287,000
Family Codonellidae				
2. <i>Tintinnopsis cylindrica</i>	26,000	53,000	52,000	-
3. <i>Tintinnopsis fimbriata</i>	-	26,000	-	-
4. <i>Tintinnopsis tocaninensis</i>	106,000	158,000	262,000	418,000
5. <i>Tintinnopsis urnula</i>	26,000	26,000	-	-
Family Codonellopsidae				
6. <i>Codonellopsis ostensfeldi</i>	-	26,000	26,000	-
7. <i>Stenosemella nivalis</i>	132,000	105,000	183,000	392,000

ตาราง ผลการวิเคราะห์แพลงก์ตอนสัตว์ (เก็บตัวอย่างวันที่ 5 กันยายน 2568)

(ต่อ)

ชนิดแพลงก์ตอนสัตว์	ปริมาณแพลงก์ตอนสัตว์ (หน่วยต่อลูกบาศก์เมตร)			
	2572193-1	2572193-2	2572193-3	2572193-4
Family Tintinnidae				
8. <i>Amphorella infundibulum</i>	-	-	26,000	-
9. <i>Eutintinnus fraknoi</i>	26,000	-	-	-
Phylum Annelida				
Class Polychaeta				
10. Polychaete larvae	-	-	-	52,000
Phylum Arthropoda				
Class Crustacea				
Subclass Copepoda				
11. Copepod nauplius	317,000	523,000	681,000	444,000
Order Calanoida				
12. Calanoid copepod	26,000	-	79,000	52,000
Order Harpacticoida				
13. Harpacticoid copepod	79,000	79,000	131,000	52,000
Subclass Cirripedia				
14. Cirripede nauplius	-	-	-	26,000
Phylum Mollusca				
Class Bivalvia				
15. Pelecypod larvae	26,000	-	-	52,000
ชนิดแพลงก์ตอนสัตว์	10	9	9	9
ปริมาณแพลงก์ตอนสัตว์	949,000	1,022,000	1,519,000	1,775,000
ดัชนีความหลากหลายแพลงก์ตอนสัตว์	1.9040	1.5902	1.6914	1.7909
ดัชนีความสม่ำเสมอแพลงก์ตอนสัตว์	0.8269	0.7237	0.7698	0.8151

- Sample Location :**
1. สถานี 2572193-1 : สถานีที่ 1 บริเวณพื้นที่วางท่อน้ำมัน ด้านใกล้แนววางท่อน้ำมัน
 2. สถานี 2572193-2 : สถานีที่ 2 บริเวณที่มีการเพาะเลี้ยงสัตว์น้ำในกระชัง ด้านชุมชนบ้านเล
 3. สถานี 2572193-3 : สถานีที่ 3 บริเวณแหล่งน้ำธรรมชาติ ด้านสะพานรับ-ส่งน้ำมันของ ปตท.
 4. สถานี 2572193-4 : บริเวณที่มีการเพาะเลี้ยงสัตว์น้ำ ด้านชุมชนฝั่งคลังน้ำมัน ปตท.

Condition of Sample : contained in one plastic bottle, sample containers comply to pretreatment-preservation standards (APHA, USEPA)



(นางสาวกนกวรรณ ขาวดอน)
ผู้วิเคราะห์



(นายอลงกต อินทรชาติ)
หัวหน้าสถานีวิจัยประมงศรีราชา



สถานีวิจัยประมงศรีราชา

101/12 หมู่ 9 ต. บางพระ

อ. ศรีราชา จ. ชลบุรี 20110

โทร./โทรสาร. (038) 311379

Client : PTTEP International Limited

Address : 222 Moo 1 Tambon Huakao, Amphur Singhanakorn, Songkhla, Thailand, 90280

Project Name : PSB Songkhla

รายงานผลการวิเคราะห์แพลงก์ตอนพืช

ตาราง ผลการวิเคราะห์แพลงก์ตอนพืช (เก็บตัวอย่างวันที่ 3 ธันวาคม 2568)

ชนิดแพลงก์ตอนพืช	ปริมาณแพลงก์ตอนพืช (หน่วยต่อลูกบาศก์เมตร)			
	2596730-1	2596730-2	2596730-3	2596730-4
Division Cyanophyta				
Class Cyanophyceae				
Order Chroococcales				
Family Chroococcaceae				
1. <i>Coelosphaerium naegelianum</i>	52,000	78,000	-	-
2. <i>Merismopedia</i> sp.	-	311,000	-	-
3. <i>Microcystis aeruginosa</i>	-	78,000	-	-
Order Nostocales				
Family Oscillatoriaceae				
4. <i>Oscillatoria brevis</i>	-	26,000	-	26,000
5. <i>Oscillatoria limnetica</i>	7,830,000	2,901,000	1,462,000	7,113,000
6. <i>Oscillatoria princeps</i>	78,000	-	-	314,000
7. <i>Oscillatoria</i> sp.	-	414,000	52,000	785,000
8. <i>Oscillatoria tenuis</i>	-	26,000	78,000	52,000
9. <i>Spirulina platensis</i>	209,000	233,000	157,000	183,000

ตาราง ผลการวิเคราะห์แฟลงก์ตอนพืช (เก็บตัวอย่างวันที่ 3 ธันวาคม 2568)

(ต่อ)

ชนิดแฟลงก์ตอนพืช	ปริมาณแฟลงก์ตอนพืช (หน่วยต่อลูกบาศก์เมตร)			
	2596730-1	2596730-2	2596730-3	2596730-4
Family Nostocaceae				
9. <i>Raphidiopsis</i> sp.	2,506,000	1,036,000	522,000	732,000
Division Chlorophyta				
Class Chlorophyceae				
Order Volvocales				
Family Volvocaceae				
11. <i>Pandorina morum</i>	-	26,000	-	26,000
Order Tetrasporales				
Family Palmellaceae				
12. <i>Sphaerocystis shroeteri</i>	26,000	-	-	-
Order Chlorococcales				
Family Hydrodictyaceae				
13. <i>Pediastrum duplex</i>	-	26,000	-	-
14. <i>Pediastrum simplex</i>	-	26,000	-	-
Family Coelastraceae				
15. <i>Coelastrum microporum</i>	78,000	-	26,000	-
Family Oocystaceae				
16. <i>Ankistrodesmus falcatus</i>	392,000	-	26,000	-
17. <i>Dictyosphaerium pulchellum</i>	26,000	26,000	78,000	-
18. <i>Oocystis elliptica</i>	52,000	-	-	-
19. <i>Oocystis parva</i>	-	26,000	-	-
Family Scenedesmaceae				
20. <i>Actinastrum hantzschii</i>	26,000	-	-	-
21. <i>Crucigenia apiculata</i>	52,000	78,000	-	-
22. <i>Scenedesmus acuminatus</i>	104,000	389,000	-	157,000
23. <i>Scenedesmus armatus</i>	52,000	52,000	-	-
24. <i>Scenedesmus dimorphus</i>	418,000	78,000	52,000	26,000

ตาราง ผลการวิเคราะห์แฟลงก์ตอนพืช (เก็บตัวอย่างวันที่ 3 ธันวาคม 2568)

(ต่อ)

ชนิดแฟลงก์ตอนพืช	ปริมาณแฟลงก์ตอนพืช (หน่วยต่อลูกบาศก์เมตร)			
	2596730-1	2596730-2	2596730-3	2596730-4
25. <i>Scenedesmus opoliensis</i>	78,000	52,000	104,000	-
26. <i>Scenedesmus quadricauda</i>	26,000	-	-	26,000
27. <i>Scenedesmus</i> sp.	-	-	-	52,000
Order Ulotrichales				
Family Ulotrichaceae				
28. <i>Geminella</i> sp.	157,000	26,000	-	26,000
Order Zygematales				
Family Desmidiaceae				
29. <i>Closterium gracile</i>	26,000	-	-	-
30. <i>Closterium lineatum</i>	52,000	-	-	-
31. <i>Staurastrum gracile</i>	-	-	-	26,000
32. <i>Staurastrum</i> sp.	26,000	-	52,000	52,000
Class Euglenophyceae				
Order Euglenales				
Family Euglenaceae				
33. <i>Euglena acus</i>	-	-	-	105,000
34. <i>Euglena oxyuris</i>	-	-	-	52,000
35. <i>Lepocinclis ovum</i>	104,000	52,000	-	-
36. <i>Phacus platylea</i>	-	-	26,000	-
37. <i>Phacus ranula</i>	-	-	-	52,000
38. <i>Strombomonas acuminata</i>	-	26,000	-	-
39. <i>Strombomonas gibberosa</i>	52,000	-	-	-
40. <i>Strombomonas girardiana</i>	26,000	-	-	-
41. <i>Strombomonas</i> sp.	183,000	78,000	-	26,000
42. <i>Trachelomonas crebea</i>	26,000	-	-	-
43. <i>Trachelomonas daugerdiana</i>	78,000	130,000	78,000	-
44. <i>Trachelomonas hispida</i>	78,000	78,000	235,000	-

ตาราง ผลการวิเคราะห์แพลงก์ตอนพืช (เก็บตัวอย่างวันที่ 3 ธันวาคม 2568)

(ต่อ)

ชนิดแพลงก์ตอนพืช	ปริมาณแพลงก์ตอนพืช (หน่วยต่อลูกบาศก์เมตร)			
	2596730-1	2596730-2	2596730-3	2596730-4
45. <i>Trachelomonas mirabilis</i>	-	-	52,000	-
46. <i>Trachelomonas rugulosa</i>	52,000	-	-	-
47. <i>Trachelomonas</i> sp.	-	52,000	-	-
48. <i>Trachelomonas superba</i>	-	-	26,000	-
Division Chromophyta				
Class Bacillariophyceae				
Order Biddulphiales				
Suborder Coscinodiscineae				
Family Thalassiosiraceae				
49. <i>Cyclotella meneghiniana</i>	2,297,000	829,000	1,253,000	366,000
50. <i>Cyclotella stelligera</i>	52,000	26,000	183,000	26,000
Family Aulacoseiraceae				
51. <i>Aulacoseira baicalensis</i>	78,000	26,000	418,000	105,000
Family Coscinodiscaceae				
52. <i>Coscinodiscus</i> sp.	26,000	-	-	52,000
Order Bacillariales				
Suborder Fragilariineae				
Family Fragilariaceae				
53. <i>Diatoma ehrenbergii</i>	52,000	-	-	-
54. <i>Diatoma vulgare</i>	-	52,000	-	-
55. <i>Synedra ulna</i>	26,000	-	26,000	26,000
Suborder Bacillariineae				
Family Eunotiaceae				
56. <i>Eunotia formica</i>	-	26,000	-	-
Family Naviculaceae				
57. <i>Amphora ovalis</i>	26,000	-	-	-
58. <i>Amphora</i> sp.	-	-	26,000	-

ตาราง ผลการวิเคราะห์แพลงก์ตอนพืช (เก็บตัวอย่างวันที่ 3 ธันวาคม 2568)

(ต่อ)

ชนิดแพลงก์ตอนพืช	ปริมาณแพลงก์ตอนพืช (หน่วยต่อลูกบาศก์เมตร)			
	2596730-1	2596730-2	2596730-3	2596730-4
59. <i>Gyrosigma acuminatum</i>	-	-	26,000	157,000
60. <i>Gyrosigma attenuatum</i>	1,984,000	130,000	52,000	863,000
61. <i>Navicula lanceolata</i>	26,000	-	-	-
62. <i>Navicula</i> sp.	26,000	-	-	26,000
63. <i>Pinnularia viridis</i>	-	-	-	52,000
Family Bacillariaceae				
64. <i>Nitzschia acicularis</i>	-	26,000	-	-
65. <i>Nitzschia lorenziana</i>	52,000	-	-	-
66. <i>Nitzschia</i> sp.	-	26,000	-	-
Family Rhopalodiaceae				
67. <i>Epithemia argus</i>	52,000	-	-	-
Family Surirellaceae				
68. <i>Surirella robusta</i>	-	-	26,000	-
ชนิดแพลงก์ตอนพืช	41	34	24	28
ปริมาณแพลงก์ตอนพืช	17,562,000	7,465,000	5,036,000	11,504,000
ดัชนีความหลากหลายแพลงก์ตอนพืช	1.9868	2.3164	2.2457	1.6354
ดัชนีความสม่ำเสมอแพลงก์ตอนพืช	0.5350	0.6569	0.7066	0.4908

- Sample Location :**
1. สถานี 2596730-1 : สถานีที่ 1 บริเวณพื้นที่วางท่อน้ำมัน ด้านใกล้แนววางท่อน้ำมัน
 2. สถานี 2596730-2 : สถานีที่ 2 บริเวณที่มีการเพาะเลี้ยงสัตว์น้ำในกระชัง ด้านชุมชนบ้านเล
 3. สถานี 2596730-3 : สถานีที่ 3 บริเวณแหล่งน้ำธรรมชาติ ด้านสะพานรับ-ส่งน้ำมันของ ปตท.
 4. สถานี 2596730-4 : บริเวณที่มีการเพาะเลี้ยงสัตว์น้ำ ด้านชุมชนฝั่งคลองน้ำมัน ปตท.

Condition of Sample : contained in one plastic bottle, sample containers comply to pretreatment-preservation standards (APHA, USEPA)



(นางสาวกนกวรรณ ขาวดอน)

ผู้วิเคราะห์



(นายอลงกต อินทรชาติ)

หัวหน้าสถานีวิจัยประมงศรีราชา



สถานีวิจัยประมงศรีราชา

101/12 หมู่ 9 ต. บางพระ

อ. ศรีราชา จ. ชลบุรี 20110

โทร./โทรสาร. (038) 311379

Client : PTTEP International Limited

Address : 222 Moo 1 Tambon Huakao, Amphur Singhanakorn, Songkhla, Thailand, 90280

Project Name : PSB Songkhla

รายงานผลการวิเคราะห์แพลงก์ตอนสัตว์

ตาราง ผลการวิเคราะห์แพลงก์ตอนสัตว์ (เก็บตัวอย่างวันที่ 3 ธันวาคม 2568)

ชนิดแพลงก์ตอนสัตว์	ปริมาณแพลงก์ตอนสัตว์ (หน่วยต่อลูกบาศก์เมตร)			
	2596730-1	2596730-2	2596730-3	2596730-4
Phylum Protozoa				
Subphylum Ciliophora				
Class Ciliata				
Subclass Spirotricha				
Order Tintinnida				
Family Tintinnididae				
1. <i>Arcella conica</i>	1,148,000	440,000	78,000	1,046,000
2. <i>Arcella</i> sp.	-	285,000	235,000	601,000
3. <i>Arcella vulgaris</i>	1,122,000	855,000	52,000	1,935,000
Family Diffugiidae				
4. <i>Diffugia lobostoma</i>	-	-	26,000	-
Family Euglyphidae				
5. <i>Euglypha</i> sp.	26,000	-	-	-

ตาราง ผลการวิเคราะห์แฟลงก์ตอนสัตว์ (เก็บตัวอย่างวันที่ 3 ธันวาคม 2568)

(ต่อ)

ชนิดแฟลงก์ตอนสัตว์	ปริมาณแฟลงก์ตอนสัตว์ (หน่วยต่อลูกบาศก์เมตร)			
	2596730-1	2596730-2	2596730-3	2596730-4
Subclass Actinopoda				
Order Heliozoida				
Family Actinophryidae				
6. <i>Actinophrys sol</i>	78,000	-	-	-
Subphylum Ciliophora				
Class Ciliata				
Subclass Holotricha				
Order Gymnostomatida				
7. <i>Coleps</i> sp.	131,000	-	-	-
Subclass Spirotricha				
Order Tintinnida				
Family Codonellidae				
8. <i>Tintinnopsis fimbriata</i>	470,000	130,000	52,000	706,000
9. <i>Tintinnopsis</i> sp.	26,000	-	-	-
Subclass Peritricha				
Order Peritrichida				
10. <i>Vorticella</i> sp.	-	52,000	-	26,000
11. <i>Zoothamnium</i> sp.	-	104,000	-	-
Phylum Rotifera				
Class Monogononta				
Order Ploima				
Family Brachionidae				
12. <i>Anuraeopsis fissa</i>	-	26,000	-	-
13. <i>Brachionus quadridentatus</i>	-	-	-	26,000
14. <i>Brachionus</i> sp.	-	26,000	26,000	-
15. <i>Brachionus urceolaris</i>	52,000	78,000	-	26,000
16. <i>Colurella</i> sp.	-	-	-	26,000

ตาราง ผลการวิเคราะห์แพลงก์ตอนสัตว์ (เก็บตัวอย่างวันที่ 3 ธันวาคม 2568)

(ต่อ)

ชนิดแพลงก์ตอนสัตว์	ปริมาณแพลงก์ตอนสัตว์ (หน่วยต่อลูกบาศก์เมตร)			
	2596730-1	2596730-2	2596730-3	2596730-4
17. <i>Keratella vulga</i> Family Lecanidae	26,000	-	-	-
18. <i>Lecane bulla</i>	-	78,000	26,000	-
19. <i>Lecane elegans</i>	104,000	26,000	-	-
20. <i>Lecane furcata</i>	-	26,000	26,000	-
21. <i>Lecane hamata</i> Family Notommatidae	131,000	207,000	-	-
22. <i>Cephalodella gibba</i> Family Gastropodidae	-	26,000	104,000	-
23. <i>Asplanchna priodonta</i> Class Digononta Family Philodinidae	52,000	26,000	-	-
24. <i>Philodina</i> sp.	-	52,000	-	-
Phylum Arthropoda Class Crustacea Subclass Copepoda				
25. Copepod nauplius	131,000	-	-	26,000
ชนิดแพลงก์ตอนสัตว์	13	16	9	9
ปริมาณแพลงก์ตอนสัตว์	3,497,000	2,437,000	625,000	4,418,000
ดัชนีความหลากหลายแพลงก์ตอนสัตว์	1.7931	2.1031	1.8688	1.4182
ดัชนีความสม่ำเสมอแพลงก์ตอนสัตว์	0.6991	0.7585	0.8505	0.6455

Sample Location :

1. สถานี 2596730-1 : สถานีที่ 1 บริเวณพื้นที่วางท่อน้ำมัน ด้านใกล้แนววางท่อน้ำมัน
2. สถานี 2596730-2 : สถานีที่ 2 บริเวณที่มีการเพาะเลี้ยงสัตว์น้ำในกระชัง ด้านชุมชนบ้านเล

3. สถานี 2596730-3 : สถานีที่ 3 บริเวณแหล่งน้ำธรรมชาติ ด้านสะพานรับ-ส่งน้ำมันของ ปตท.
4. สถานี 2596730-4 : บริเวณที่มีการเพาะเลี้ยงสัตว์น้ำ ด้านชุมชนฝั่งคลังน้ำมัน ปตท.

Condition of Sample : contained in one plastic bottle, sample containers comply to pretreatment-preservation standards (APHA, USEPA)



(นางสาวกนกวรรณ ขาวดอน)

ผู้วิเคราะห์



(นายอลงกต อินทรชาติ)

หัวหน้าสถานีวิจัยประมงศรีราชา



สถานีวิจัยประมงศรีราชา

101/12 หมู่ 9 ต. บางพระ

อ. ศรีราชา จ. ชลบุรี 20110

โทร./โทรสาร. (038) 311379

Client : PTTEP International Limited

Address : 222 Moo 1 Tambon Huakao, Amphur Singhanakorn, Songkhla, Thailand, 90280

Project Name : PSB Songkhla

รายงานผลการวิเคราะห์สัตว์หน้าดิน

ตาราง ผลการวิเคราะห์สัตว์หน้าดิน (เก็บตัวอย่างวันที่ 5 กันยายน 2568)

สกุลสัตว์หน้าดิน	ปริมาณสัตว์หน้าดิน (ตัวต่อตารางเมตร)			
	2572194-1	2572194-2	2572194-3	2572194-4
Phylum Arthropoda Class Malacostraca Order Decapoda Family Diogenidae <i>Diogenes</i> sp. (ปูเสฉวน)	193	-	-	-
Phylum Mollusca Class Gastropoda Order Cycloneritida Family Neritidae <i>Clithon</i> sp. (หอยถั่วเขียว)	15	-	-	-
Class Bivalvia Order Myida Family Corbulidae <i>Potamocorbula</i> sp. (หอยสองฝาชนิดหนึ่ง)	-	-	30	-

ตาราง ผลการวิเคราะห์สัตว์หน้าดิน (เก็บตัวอย่างวันที่ 5 กันยายน 2568) (ต่อ)

สกุลสัตว์หน้าดิน	ปริมาณสัตว์หน้าดิน (ตัวต่อตารางเมตร)			
	2572194-1	2572194-2	2572194-3	2572194-4
Order Nuculanida				
Family Nuculanidae				
<i>Nuculana</i> sp. (หอยสองฝาชนิดหนึ่ง)	-	-	-	45
สกุลสัตว์หน้าดิน	2	-	1	1
ปริมาณสัตว์หน้าดิน	208	-	30	45
ค่าดัชนีความหลากหลายสัตว์หน้าดิน	0.2591	-	0.0000	0.0000

Sample Location :

1. สถานี 2572194-1 : สถานีที่ 1 บริเวณพื้นที่วางท่อน้ำมัน ด้านใกล้แนววางท่อน้ำมัน
2. สถานี 2572194-2 : สถานีที่ 2 บริเวณที่มีการเพาะเลี้ยงสัตว์น้ำในกระชัง ด้านชุมชนบ้านเล
3. สถานี 2572194-3 : สถานีที่ 3 บริเวณแหล่งน้ำธรรมชาติ ด้านสะพานรับ-ส่งน้ำมันของ ปตท.
4. สถานี 2572194-4 : สถานีที่ 4 บริเวณที่มีการเพาะเลี้ยงสัตว์น้ำ ด้านชุมชนฝั่งคลังน้ำมัน ปตท.

Condition of Sample : contained in one plastic zip bag



(นายอรรณวุฒิ กันทะวงศ์)
ผู้วิเคราะห์



(นายอลงกต อินทรชาติ)
หัวหน้าสถานีวิจัยประมงศรีราชา



สถานีวิจัยประมงศรีราชา

101/12 หมู่ 9 ต. บางพระ

อ. ศรีราชา จ. ชลบุรี 20110

โทร./โทรสาร. (038) 311379

Client : PTTEP International Limited

Address : 222 Moo 1 Tambon Huakao, Amphur Singhanakorn, Songkhla, Thailand, 90280

Project Name : PSB Songkhla

รายงานผลการวิเคราะห์สัตว์หน้าดิน

ตาราง ผลการวิเคราะห์สัตว์หน้าดิน (เก็บตัวอย่างวันที่ 3 ธันวาคม 2568)

สกุลสัตว์หน้าดิน	ปริมาณสัตว์หน้าดิน (ตัวต่อตารางเมตร)			
	2596731-1	2596731-2	2596731-3	2596731-4
Phylum Mollusca				
Class Gastropoda				
Order Caenogastropoda				
Family Potamididae				
<i>Cerithidea</i> sp. (หอยจู้บแข็ง)	-	30	-	-
Order Cycloneritida				
Family Neritidae				
<i>Clithon</i> sp. (หอยถั่วเขียว)	-	30	-	-
Class Bivalvia				
Order Cardiida				
Family Donacidae				
<i>Donax</i> sp. (หอยเสียบ)	45	-	-	-
Family Tellinidae				
<i>Tellina</i> sp. (หอยสองฝาชนิดหนึ่ง)	15	-	-	-

ตาราง ผลการวิเคราะห์สัตว์หน้าดิน (เก็บตัวอย่างวันที่ 3 ธันวาคม 2568) (ต่อ)

สกุลสัตว์หน้าดิน	ปริมาณสัตว์หน้าดิน (ตัวต่อตารางเมตร)			
	2596731-1	2596731-2	2596731-3	2596731-4
Order Nuculanida				
Family Nuculanidae				
<i>Nuculana</i> sp. (หอยสองฝาชนิดหนึ่ง)	-	-	30	15
สกุลสัตว์หน้าดิน	2	2	1	1
ปริมาณสัตว์หน้าดิน	60	60	30	15
ค่าดัชนีความหลากหลายสัตว์หน้าดิน	0.5623	0.6931	0.0000	0.0000

Sample Location :

1. สถานี 2596731-1 : สถานีที่ 1 บริเวณพื้นที่วางท่อน้ำมัน ด้านใกล้แนววางท่อน้ำมัน
2. สถานี 2596731-2 : สถานีที่ 2 บริเวณที่มีการเพาะเลี้ยงสัตว์น้ำในกระชัง ด้านชุมชนบ้านเล
3. สถานี 2596731-3 : สถานีที่ 3 บริเวณแหล่งน้ำธรรมชาติ ด้านสะพานรับ-ส่งน้ำมันของ ปตท.
4. สถานี 2596731-4 : สถานีที่ 4 บริเวณที่มีการเพาะเลี้ยงสัตว์น้ำ ด้านชุมชนฝั่งคลังน้ำมัน ปตท.

Condition of Sample : contained in one plastic zip bag



(นายอรรณวุฒิ กันทะวงศ์)
ผู้วิเคราะห์



(นายอลงกต อินทรชาติ)
หัวหน้าสถานีวิจัยประมงศรีราชา

ภาคผนวก ค-5

คุณภาพน้ำทิ้ง



Analysis / Test Report

TESTING
No.0166

Client : PTTEP International Limited
222 Moo 1, Tambon Huakao, Amphur Singhanakorn, Songkhla Thailand 90280

P/O : 3450040615

Project Name : PSB Songkhla

Project Location :

Lot ID: 2551197

Date Received : Jul 09, 2025

Date Reported : Jul 17, 2025

Report Number : 3317445-1

Page 1 of 2

Sample Number	2551197-1
Sampled Date	Jul 09, 2025 11:46 AM
Sample Description	Wastewater
Location	บริเวณอาคารบัญชาการ
Date Analysis Commenced	Jul 09, 2025
Condition of Sample	Contained in one amber glass bottle and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 degree C)	mg/L	-	2.0	18.0	≤40	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5210 B, part 4500 - O G	Songkhla
COD	mg/L	-	25	86	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5220 D	Songkhla
Oil & Grease	mg/L	-	3	3	≤20	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5520 B	Songkhla
pH at 25 degree C		-	-	7.8	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B)	Songkhla
Total Dissolved solids Dried at 180 degree C	mg/L	-	5	314	≤1300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 C	Songkhla
Total Suspended Solids	mg/L	-	5	13	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 D	Songkhla

Guideline : Notification of Ministry of Natural Resources and Environment B.E. 2567 on Effluent Control Standard from Types and Sized of Buildings, Type C.

Sampling By : Sirichai Kleangkerd

Remark :

- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
- Analyte(s) marked * is/are not included in scope of Accreditation ISO/IEC 17025.
- Sampling is not included in scope of accreditation ISO/IEC 17025

Approved by

Ananta B.

Ananta Boonphet
Scientist (2)

Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. The report shall not be reproduced except in full without the written approval of the laboratory.

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Analysis / Test Report

TESTING
No.0166

Client : PTTEP International Limited
222 Moo 1, Tambon Huakao, Amphur Singhanakorn, Songkhla Thailand 90280
P/O : 3450040615
Project Name : PSB Songkhla
Project Location :

Lot ID: 2551197

Date Received : Jul 09, 2025

Date Reported : Jul 17, 2025

Report Number : 3317445-1

Page 2 of 2

Sample Number	2551197-2						
Sampled Date	Jul 09, 2025 11:35 AM						
Sample Description	Wastewater						
Location	จุดรวมน้ำทิ้งจากอาคารบัญชาการและโรงอาหาร						
Date Analysis Commenced	Jul 09, 2025						
Condition of Sample	Contained in one amber glass bottle and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 degree C)	mg/L	-	2.0	18.8	≤40	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5210 B, part 4500 - O G	Songkhla
COD	mg/L	-	25	152	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5220 D	Songkhla
Oil & Grease	mg/L	-	3	4	≤20	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5520 B	Songkhla
pH at 25 degree C		-	-	8.0	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B)	Songkhla
Total Dissolved solids Dried at 180 degree C	mg/L	-	5	408	≤1300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 C	Songkhla
Total Suspended Solids	mg/L	-	5	32	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 D	Songkhla

Guideline : Notification of Ministry of Natural Resources and Environment B.E. 2567 on Effluent Control Standard from Types and Sized of Buildings, Type C.

Sampling By : Sirichai Kleangkerd

Remark :

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- Sampling is not included in scope of accreditation ISO/IEC 17025

Approved by

Ananta B.

Ananta Boonphet
Scientist (2)

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Analysis / Test Report

TESTING
No.0166

Client : PTTEP International Limited
222 Moo 1, Tambon Huakao, Amphur Singhanakorn, Songkhla Thailand 90280

P/O : 3450040615

Project Name : PSB Songkhla

Project Location :

Lot ID: 2557801

Date Received : Aug 01, 2025

Date Reported : Aug 08, 2025

Report Number : 3336119-1

Page 1 of 2

Sample Number	2557801-1
Sampled Date	Aug 01, 2025 10:52 AM
Sample Description	Wastewater
Location	บริเวณอาคารบัญชาการ
Date Analysis Commenced	Aug 01, 2025
Condition of Sample	Contained in one amber glass bottle and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 degree C)	mg/L	-	2.0	36.9	≤40	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5210 B, part 4500 - O G	Songkhla
COD	mg/L	-	25	147	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5220 D	Songkhla
Oil & Grease	mg/L	-	3	10	≤20	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5520 B	Songkhla
pH at 25 degree C		-	-	8.0	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B)	Songkhla
Total Dissolved solids Dried at 180 degree C	mg/L	-	5	400	≤1300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 C	Songkhla
Total Suspended Solids	mg/L	-	5	38	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 D	Songkhla

Guideline : Notification of Ministry of Natural Resources and Environment B.E. 2567 on Effluent Control Standard from Types and Sized of Buildings, Type C.

Sampling By : Somsak Junkong

Remark :

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Ananta Boonphet
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Analysis / Test Report

TESTING
No.0166

Client : PTTEP International Limited
222 Moo 1, Tambon Huakao, Amphur Singhanakorn, Songkhla Thailand 90280
P/O : 3450040615
Project Name : PSB Songkhla
Project Location :

Lot ID: 2557801

Date Received : Aug 01, 2025

Date Reported : Aug 08, 2025

Report Number : 3336119-1

Page 2 of 2

Sample Number	2557801-2						
Sampled Date	Aug 01, 2025 11:08 AM						
Sample Description	Wastewater						
Location	จุดรวมน้ำทิ้งจากอาคารบัญชาการและโรงอาหาร						
Date Analysis Commenced	Aug 01, 2025						
Condition of Sample	Contained in one amber glass bottle and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 degree C)	mg/L	-	2.0	5.5	≤40	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5210 B, part 4500 - O G	Songkhla
COD	mg/L	-	25	36	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5220 D	Songkhla
Oil & Grease	mg/L	-	3	<3	≤20	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5520 B	Songkhla
pH at 25 degree C		-	-	7.9	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B)	Songkhla
Total Dissolved solids Dried at 180 degree C	mg/L	-	5	208	≤1300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 C	Songkhla
Total Suspended Solids	mg/L	-	5	9	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 D	Songkhla

Guideline : Notification of Ministry of Natural Resources and Environment B.E. 2567 on Effluent Control Standard from Types and Sized of Buildings, Type C.

Sampling By : Somsak Junkong

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Ananta Boonphet
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Analysis / Test Report

TESTING
No.0166

Client : PTTEP International Limited
222 Moo 1, Tambon Huakao, Amphur Singhanakorn, Songkhla Thailand 90280
P/O : 3450040615
Project Name : PSB Songkhla
Project Location :

Lot ID: 2572198

Date Received : Sep 03, 2025

Date Reported : Dec 12, 2025

Report Number : 3469736-1

Page 1 of 1

Sample Number	2572198-1						
Sampled Date	Sep 03, 2025 11:10 AM						
Sample Description	Wastewater						
Location	บริเวณอาคารบัญชาการ						
Date Analysis Commenced	Sep 03, 2025						
Condition of Sample	Contained in one amber glass bottle and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
COD	mg/L	-	25	157	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5220 D	Songkhla
Oil & Grease	mg/L	-	3	8	≤20	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5520 B	Songkhla
pH at 25 degree C		-	-	8.2	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B)	Songkhla
Total Dissolved solids Dried at 180 degree C	mg/L	-	5	316	≤1300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 C	Songkhla
Total Suspended Solids	mg/L	-	5	40	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 D	Songkhla

Guideline : Notification of Ministry of Natural Resources and Environment B.E. 2567 on Effluent Control Standard from Types and Sized of Buildings, Type C.

Note : This Analysis test report is reissued to supersede report No.3371439-1, Date Reported : Sep 10, 2025 due to revise guideline/specification

Sampling By : Somsak Junkong

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Analysis / Test Report

TESTING
No.0166

Client : PTTEP International Limited
222 Moo 1, Tambon Huakao, Amphur Singhanakorn, Songkhla Thailand 90280
P/O : 3450040615
Project Name : PSB Songkhla
Project Location :

Lot ID: 2572198

Date Received : Sep 03, 2025

Date Reported : Dec 12, 2025

Report Number : 3469737-1

Page 1 of 1

Sample Number	2572198-2						
Sampled Date	Sep 03, 2025 11:17 AM						
Sample Description	Wastewater						
Location	จุดรวมน้ำทิ้งจากอาคารบัญชาการและโรงอาหาร						
Date Analysis Commenced	Sep 03, 2025						
Condition of Sample	Contained in one amber glass bottle and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
COD	mg/L	-	25	123	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5220 D	Songkhla
Oil & Grease	mg/L	-	3	4	≤20	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5520 B	Songkhla
pH at 25 degree C		-	-	8.1	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B)	Songkhla
Total Dissolved solids Dried at 180 degree C	mg/L	-	5	308	≤1300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 C	Songkhla
Total Suspended Solids	mg/L	-	5	26	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 D	Songkhla

Guideline : Notification of Ministry of Natural Resources and Environment B.E. 2567 on Effluent Control Standard from Types and Sized of Buildings, Type C.

Note : This Analysis test report is reissued to supersede report No.3371439-1, Date Reported : Sep 10, 2025 due to revise guideline/specification

Sampling By : Somsak Junkong

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Analysis / Test Report

TESTING
No.0166

Client : PTTEP International Limited
222 Moo 1, Tambon Huakao, Amphur Singhanakorn, Songkhla Thailand 90280

P/O :

Project Name : PSB Songkhla

Project Location :

Lot ID: 2586443

Date Received : Sep 16, 2025

Date Reported : Sep 23, 2025

Report Number : 3405698-1

Page 1 of 2

Sample Number 2586443-1
Sampled Date Sep 16, 2025 9:28 AM
Sample Description Wastewater
Location บริเวณอาคารบัญชาการ
Date Analysis Commenced Sep 17, 2025
Condition of Sample Contained in one plastic bottle, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 degree C)	mg/L	-	2.0	29.8	≤40	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5210 B, part 4500 - O G	Songkhla

Guideline : Notification of Ministry of Natural Resources and Environment B.E. 2567 on Effluent Control Standard from Types and Sized of Buildings, Type C.

Sampling By : Sirichai Kleangkerd

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Analysis / Test Report

TESTING
No.0166

Client : PTTEP International Limited
222 Moo 1, Tambon Huakao, Amphur Singhanakorn, Songkhla Thailand 90280

P/O :

Project Name : PSB Songkhla

Project Location :

Lot ID: 2586443

Date Received : Sep 16, 2025

Date Reported : Sep 23, 2025

Report Number : 3405698-1

Page 2 of 2

Sample Number	2586443-2
Sampled Date	Sep 16, 2025 9:35 AM
Sample Description	Wastewater
Location	จุดรวมน้ำทิ้งจากอาคารบัญชาการและโรงอาหาร
Date Analysis Commenced	Sep 17, 2025
Condition of Sample	Contained in one plastic bottle, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 degree C)	mg/L	-	2.0	38.9	≤40	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5210 B, part 4500 - O G	Songkhla

Guideline : Notification of Ministry of Natural Resources and Environment B.E. 2567 on Effluent Control Standard from Types and Sized of Buildings, Type C.

Sampling By : Sirichai Kleangkerd

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Analysis / Test Report

TESTING
No.0166

Client : PTTEP International Limited
222 Moo 1, Tambon Huakao, Amphur Singhanakorn, Songkhla Thailand 90280
P/O : 3450040615
Project Name : PSB Songkhla
Project Location :

Lot ID: 2586663

Date Received : Oct 03, 2025

Date Reported : Dec 12, 2025

Report Number : 3469741-1

Page 1 of 1

Sample Number	2586663-1						
Sampled Date	Oct 03, 2025 11:40 AM						
Sample Description	Wastewater						
Location	บริเวณอาคารบัญชาการ						
Date Analysis Commenced	Oct 03, 2025						
Condition of Sample	Contained in one amber glass bottle and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
COD	mg/L	-	25	145	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5220 D	Songkhla
Oil & Grease	mg/L	-	3	5	≤20	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5520 B	Songkhla
pH at 25 degree C		-	-	8.1	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B)	Songkhla
Total Dissolved solids Dried at 180 degree C	mg/L	-	5	284	≤1300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 C	Songkhla

Guideline : Notification of Ministry of Natural Resources and Environment B.E. 2567 on Effluent Control Standard from Types and Sized of Buildings, Type C.

Note : This Analysis test report is reissued to supersede report No.3406452-1, Date Reported : Oct 09, 2025 due to revise analytical information.

Sampling By : Somsak Junkong

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Analysis / Test Report

TESTING
No.0166

Client : PTTEP International Limited
222 Moo 1, Tambon Huakao, Amphur Singhanakorn, Songkhla Thailand 90280
P/O : 3450040615
Project Name : PSB Songkhla
Project Location :

Lot ID: 2586663

Date Received : Oct 03, 2025

Date Reported : Dec 12, 2025

Report Number : 3469742-1

Page 1 of 1

Sample Number	2586663-2						
Sampled Date	Oct 03, 2025 11:45 AM						
Sample Description	Wastewater						
Location	จุดรวมน้ำทิ้งจากอาคารบัญชาการและโรงอาหาร						
Date Analysis Commenced	Oct 03, 2025						
Condition of Sample	Contained in one amber glass bottle and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 degree C)	mg/L	-	2.0	15.7	≤40	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5210 B, part 4500 - O G	Songkhla
COD	mg/L	-	25	58	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5220 D	Songkhla
Oil & Grease	mg/L	-	3	4	≤20	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5520 B	Songkhla
pH at 25 degree C		-	-	7.7	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B)	Songkhla
Total Dissolved solids Dried at 180 degree C	mg/L	-	5	160	≤1300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 C	Songkhla
Total Suspended Solids	mg/L	-	5	13	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 D	Songkhla

Guideline : Notification of Ministry of Natural Resources and Environment B.E. 2567 on Effluent Control Standard from Types and Sized of Buildings, Type C.

Note : This Analysis test report is reissued to supersede report No.3406452-1, Date Reported : Oct 09, 2025 due to revise analytical information.

Sampling By : Somsak Junkong

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Ananta Boonphet
Scientist (2)

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Analysis / Test Report

TESTING
No.0166

Client : PTTEP International Limited
222 Moo 1, Tambon Huakao, Amphur Singhanakorn, Songkhla Thailand 90280

P/O : 3450040615

Project Name : PSB Songkhla

Project Location :

Lot ID: 2596725

Date Received : Nov 04, 2025

Date Reported : Nov 11, 2025

Report Number : 3430241-1

Page 1 of 2

Sample Number	2596725-1
Sampled Date	Nov 04, 2025 11:40 AM
Sample Description	Wastewater
Location	บริเวณอาคารบัญชาการ
Date Analysis Commenced	Nov 04, 2025
Condition of Sample	Contained in one amber glass bottle and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 degree C)	mg/L	-	2.0	25.4	≤40	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5210 B, part 4500 - O G	Songkhla
COD	mg/L	-	25	123	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5220 D	Songkhla
Oil & Grease	mg/L	-	3	8	≤20	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5520 B	Songkhla
pH at 25 degree C		-	-	8.1	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B)	Songkhla
Total Dissolved solids Dried at 180 degree C	mg/L	-	5	404	≤1300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 C	Songkhla
Total Suspended Solids	mg/L	-	5	24	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 D	Songkhla

Guideline : Notification of Ministry of Natural Resources and Environment B.E. 2567 on Effluent Control Standard from Types and Sized of Buildings, Type C.

Sampling By : Yongsil Rangsee

Remark :

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- Sampling is not included in scope of accreditation ISO/IEC 17025

Approved by

Ananta B.

Ananta Boonphet
Scientist (2)

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Analysis / Test Report

TESTING
No.0166

Client : PTTEP International Limited
222 Moo 1, Tambon Huakao, Amphur Singhanakorn, Songkhla Thailand 90280

P/O : 3450040615

Project Name : PSB Songkhla

Project Location :

Lot ID: 2596725

Date Received : Nov 04, 2025

Date Reported : Nov 11, 2025

Report Number : 3430241-1

Page 2 of 2

Sample Number	2596725-2						
Sampled Date	Nov 04, 2025 11:50 AM						
Sample Description	Wastewater						
Location	จุดรวมน้ำทิ้งจากอาคารบัญชาการและโรงอาหาร						
Date Analysis Commenced	Nov 04, 2025						
Condition of Sample	Contained in one amber glass bottle and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 degree C)	mg/L	-	2.0	14.1	≤40	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5210 B, part 4500 - O G	Songkhla
COD	mg/L	-	25	58	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5220 D	Songkhla
Oil & Grease	mg/L	-	3	<3	≤20	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5520 B	Songkhla
pH at 25 degree C		-	-	8.1	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B)	Songkhla
Total Dissolved solids Dried at 180 degree C	mg/L	-	5	288	≤1300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 C	Songkhla
Total Suspended Solids	mg/L	-	5	10	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 D	Songkhla

Guideline : Notification of Ministry of Natural Resources and Environment B.E. 2567 on Effluent Control Standard from Types and Sized of Buildings, Type C.

Sampling By : Yongsil Rangsee

Remark :

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- Sampling is not included in scope of accreditation ISO/IEC 17025

Approved by

Ananta B.

Ananta Boonphet
Scientist (2)

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Analysis / Test Report

TESTING
No.0166

Client : PTTEP International Limited
222 Moo 1, Tambon Huakao, Amphur Singhanakorn, Songkhla Thailand 90280
P/O : 3450040615
Project Name : PSB Songkhla
Project Location :

Lot ID: 2596734

Date Received : Dec 09, 2025

Date Reported : Dec 17, 2025

Report Number : 3430290-1

Page 1 of 2

Sample Number	2596734-1						
Sampled Date	Dec 09, 2025 11:30 AM						
Sample Description	Wastewater						
Location	บริเวณอาคารบัญชาการ						
Date Analysis Commenced	Dec 09, 2025						
Condition of Sample	Contained in one amber glass bottle and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 degree C)	mg/L	-	2.0	18.5	≤40	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5210 B, part 4500 - O G	Songkhla
COD	mg/L	-	25	104	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5220 D	Songkhla
Oil & Grease	mg/L	-	3	4	≤20	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5520 B	Songkhla
pH at 25 degree C		-	-	7.8	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B)	Songkhla
Total Dissolved solids Dried at 180 degree C	mg/L	-	5	452	≤1300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 C	Songkhla
Total Suspended Solids	mg/L	-	5	13	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 D	Songkhla

Guideline : Notification of Ministry of Natural Resources and Environment B.E. 2567 on Effluent Control Standard from Types and Sized of Buildings, Type C.

Sampling By : WutthichaiTaucharoen

Remark :

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- Sampling is not included in scope of accreditation ISO/IEC 17025

Approved by

Ananta B.

Ananta Boonphet
Scientist (2)

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Analysis / Test Report

TESTING
No.0166

Client : PTTEP International Limited
222 Moo 1, Tambon Huakao, Amphur Singhanakorn, Songkhla Thailand 90280
P/O : 3450040615
Project Name : PSB Songkhla
Project Location :

Lot ID: 2596734

Date Received : Dec 09, 2025

Date Reported : Dec 17, 2025

Report Number : 3430290-1

Page 2 of 2

Sample Number	2596734-2						
Sampled Date	Dec 09, 2025 11:40 AM						
Sample Description	Wastewater						
Location	จุดรวมน้ำทิ้งจากอาคารบัญชาการและโรงอาหาร						
Date Analysis Commenced	Dec 09, 2025						
Condition of Sample	Contained in one amber glass bottle and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 degree C)	mg/L	-	2.0	8.2	≤40	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5210 B, part 4500 - O G	Songkhla
COD	mg/L	-	25	40	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5220 D	Songkhla
Oil & Grease	mg/L	-	3	3	≤20	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5520 B	Songkhla
pH at 25 degree C		-	-	7.7	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B)	Songkhla
Total Dissolved solids Dried at 180 degree C	mg/L	-	5	262	≤1300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 C	Songkhla
Total Suspended Solids	mg/L	-	5	6	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 D	Songkhla

Guideline : Notification of Ministry of Natural Resources and Environment B.E. 2567 on Effluent Control Standard from Types and Sized of Buildings, Type C.

Sampling By : Wutthichai Taucharoen

Remark :

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Approved by

Ananta B.

Ananta Boonphet
Scientist (2)

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Analysis / Test Report

TESTING
No.0166

Client : PTTEP International Limited
222 Moo 1, Tambon Huakao, Amphur Singhanakorn, Songkhla Thailand 90280

P/O :

Project Name : PSB Songkhla

Project Location :

Lot ID: 2597881

Date Received : Oct 31, 2025

Date Reported : Nov 07, 2025

Report Number : 3432933-1

Page 1 of 1

Sample Number 2597881-1
Sampled Date Oct 31, 2025 9:30 AM
Sample Description Wastewater
Location บริเวณอาคารบัญชาการ
Date Analysis Commenced Oct 31, 2025
Condition of Sample Contained in two plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 degree C)	mg/L	-	2.0	17.9	≤40	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5210 B, part 4500 - O G	Songkhla
Total Suspended Solids	mg/L	-	5	24	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 D	Songkhla

Guideline : Notification of Ministry of Natural Resources and Environment B.E. 2567 on Effluent Control Standard from Types and Sized of Buildings, Type C.

Sampling By : Somsak Junkong

Remark :

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Approved by

Ananta B.

Ananta Boonphet
Scientist (2)

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Analysis / Test Report

TESTING
No.0166

Client : PTTEP International Limited
222 Moo 1, Tambon Huakao, Amphur Singhanakorn, Songkhla Thailand 90280
P/O : 3450040615
Project Name : PSB Songkhla
Project Location :

Lot ID: 2551168

Date Received : Jul 09, 2025

Date Reported : Jul 17, 2025

Report Number : 3317444-1

Page 1 of 3

Sample Number	2551168-1
Sampled Date	Jul 09, 2025 9:49 AM
Sample Description	Wastewater
Location	บ่อกักน้ำทิ้งบริเวณท่าเทียบเรือ 1 (Manhole 1)
Date Analysis Commenced	Jul 09, 2025
Condition of Sample	Contained in one amber glass bottle and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 degree C)	mg/L	-	2.0	<2.0	≤20	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5210 B, part 4500 - O G	Songkhla
COD	mg/L	-	25	<25	≤120	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5220 D	Songkhla
Oil & Grease	mg/L	-	3	<3	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5520 B	Songkhla
pH at 25 degree C		-	-	8.0	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B)	Songkhla
Total Dissolved solids Dried at 180 degree C	mg/L	-	5	108	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 C	Songkhla
Total Suspended Solids	mg/L	-	5	<5	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 D	Songkhla

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).

Sampling By : Sirichai Kleangkerd ทะเบียนเลขที่ ว-267-จ-0010

Remark :

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Technical Management

Ananta B.

Ananta Boonphet
Scientist (2)

ทะเบียนเลขที่ ว-267-จ-0004

Approved by

Kanitta H.

Kanitta Hemprasatporn
Section Head

ทะเบียนเลขที่ ว-267-ค-0001

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Analysis / Test Report

TESTING
No.0166

Client : PTTEP International Limited
222 Moo 1, Tambon Huakao, Amphur Singhanakorn, Songkhla Thailand 90280
P/O : 3450040615
Project Name : PSB Songkhla
Project Location :

Lot ID: 2551168
Date Received : Jul 09, 2025
Date Reported : Jul 17, 2025
Report Number : 3317444-1

Page 2 of 3

Sample Number	2551168-2						
Sampled Date	Jul 09, 2025 9:42 AM						
Sample Description	Wastewater						
Location	บ่อกักน้ำทิ้งบริเวณท่าเทียบเรือ 2 (Manhole 2)						
Date Analysis Commenced	Jul 09, 2025						
Condition of Sample	Contained in one amber glass bottle and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 degree C)	mg/L	-	2.0	<2.0	≤20	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5210 B, part 4500 - O G	Songkhla
COD	mg/L	-	25	<25	≤120	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5220 D	Songkhla
Oil & Grease	mg/L	-	3	<3	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5520 B	Songkhla
pH at 25 degree C		-	-	7.9	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B)	Songkhla
Total Dissolved solids Dried at 180 degree C	mg/L	-	5	520	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 C	Songkhla
Total Suspended Solids	mg/L	-	5	10	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 D	Songkhla

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).

Sampling By : Sirichai Kleangkerd ทะเบียนเลขที่ ว-267-จ-0010

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Technical Management

Ananta B.

Ananta Boonphet
Scientist (2)

ทะเบียนเลขที่ ว-267-จ-0004

Approved by

Kanitta H.

Kanitta Hemprasatporn
Section Head

ทะเบียนเลขที่ ว-267-ค-0001

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Analysis / Test Report

TESTING
No.0166

Client : PTTEP International Limited
222 Moo 1, Tambon Huakao, Amphur Singhanakorn, Songkhla Thailand 90280
P/O : 3450040615
Project Name : PSB Songkhla
Project Location :

Lot ID: 2551168

Date Received : Jul 09, 2025

Date Reported : Jul 17, 2025

Report Number : 3317444-1

Page 3 of 3

Sample Number	2551168-3
Sampled Date	Jul 09, 2025 9:38 AM
Sample Description	Wastewater
Location	บ่อกักน้ำทิ้งบริเวณท่าเทียบเรือ 3 (Manhole 3)
Date Analysis Commenced	Jul 09, 2025
Condition of Sample	Contained in one amber glass bottle and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 degree C)	mg/L	-	2.0	3.9	≤20	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5210 B, part 4500 - O G	Songkhla
COD	mg/L	-	25	38	≤120	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5220 D	Songkhla
Oil & Grease	mg/L	-	3	<3	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5520 B	Songkhla
pH at 25 degree C		-	-	7.8	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B)	Songkhla
Total Dissolved solids Dried at 180 degree C	mg/L	-	5	264	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 C	Songkhla
Total Suspended Solids	mg/L	-	5	<5	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 D	Songkhla

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).

Sampling By : Sirichai Kleangkerd ทะเบียนเลขที่ ว-267-จ-0010

Remark :

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Technical Management

Ananta B.

Ananta Boonphet
Scientist (2)

ทะเบียนเลขที่ ว-267-จ-0004

Approved by

Kanitta H.

Kanitta Hemprasatporn
Section Head

ทะเบียนเลขที่ ว-267-ค-0001

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Analysis / Test Report

TESTING
No.0166

Client : PTTEP International Limited
222 Moo 1, Tambon Huakao, Amphur Singhanakorn, Songkhla Thailand 90280
P/O : 3450040615
Project Name : PSB Songkhla
Project Location :

Lot ID: 2557800

Date Received : Aug 01, 2025

Date Reported : Aug 08, 2025

Report Number : 3336115-1

Page 1 of 3

Sample Number	2557800-1
Sampled Date	Aug 01, 2025 9:48 AM
Sample Description	Wastewater
Location	บ่อกักน้ำทิ้งบริเวณท่าเทียบเรือ 1 (Manhole 1)
Date Analysis Commenced	Aug 01, 2025
Condition of Sample	Contained in one amber glass bottle and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 degree C)	mg/L	-	2.0	<2.0	≤20	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5210 B, part 4500 - O G	Songkhla
COD	mg/L	-	25	<25	≤120	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5220 D	Songkhla
Oil & Grease	mg/L	-	3	<3	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5520 B	Songkhla
pH at 25 degree C		-	-	7.8	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B)	Songkhla
Total Dissolved solids Dried at 180 degree C	mg/L	-	5	86	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 C	Songkhla
Total Suspended Solids	mg/L	-	5	<5	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 D	Songkhla

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).

Sampling By : Somsak Junkong ทะเบียนเลขที่ ว-267-จ-0011

Remark :

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Technical Management

Ananta B.

Ananta Boonphet
Scientist (2)

ทะเบียนเลขที่ ว-267-จ-0004

Approved by

Kanitta H.

Kanitta Hemprasatporn
Section Head

ทะเบียนเลขที่ ว-267-ค-0001

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Analysis / Test Report

TESTING
No.0166

Client : PTTEP International Limited
222 Moo 1, Tambon Huakao, Amphur Singhanakorn, Songkhla Thailand 90280
P/O : 3450040615
Project Name : PSB Songkhla
Project Location :

Lot ID: 2557800

Date Received : Aug 01, 2025

Date Reported : Aug 08, 2025

Report Number : 3336115-1

Page 2 of 3

Sample Number	2557800-2						
Sampled Date	Aug 01, 2025 9:44 AM						
Sample Description	Wastewater						
Location	บ่อกักน้ำทิ้งบริเวณท่าเทียบเรือ 2 (Manhole 2)						
Date Analysis Commenced	Aug 01, 2025						
Condition of Sample	Contained in one amber glass bottle and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 degree C)	mg/L	-	2.0	<2.0	≤20	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5210 B, part 4500 - O G	Songkhla
COD	mg/L	-	25	32	≤120	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5220 D	Songkhla
Oil & Grease	mg/L	-	3	<3	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5520 B	Songkhla
pH at 25 degree C		-	-	8.0	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B)	Songkhla
Total Dissolved solids Dried at 180 degree C	mg/L	-	5	750	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 C	Songkhla
Total Suspended Solids	mg/L	-	5	9	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 D	Songkhla

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).

Sampling By : Somsak Junkong ทะเบียนเลขที่ ว-267-จ-0011

Remark :

- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
- Analyte(s) marked * is/are not included in scope of Accreditation ISO/IEC 17025.
- Sampling is not included in scope of accreditation ISO/IEC 17025

Technical Management

Ananta B.

Ananta Boonphet
Scientist (2)

ทะเบียนเลขที่ ว-267-จ-0004

Approved by

Kanitta H.

Kanitta Hemprasatporn
Section Head

ทะเบียนเลขที่ ว-267-ค-0001

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Analysis / Test Report

TESTING
No.0166

Client : PTTEP International Limited
222 Moo 1, Tambon Huakao, Amphur Singhanakorn, Songkhla Thailand 90280
P/O : 3450040615
Project Name : PSB Songkhla
Project Location :

Lot ID: 2557800

Date Received : Aug 01, 2025

Date Reported : Aug 08, 2025

Report Number : 3336115-1

Page 3 of 3

Sample Number	2557800-3
Sampled Date	Aug 01, 2025 9:38 AM
Sample Description	Wastewater
Location	บ่อกักน้ำทิ้งบริเวณท่าเทียบเรือ 3 (Manhole 3)
Date Analysis Commenced	Aug 01, 2025
Condition of Sample	Contained in one amber glass bottle and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 degree C)	mg/L	-	2.0	<2.0	≤20	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5210 B, part 4500 - O G	Songkhla
COD	mg/L	-	25	<25	≤120	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5220 D	Songkhla
Oil & Grease	mg/L	-	3	<3	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5520 B	Songkhla
pH at 25 degree C		-	-	7.7	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B)	Songkhla
Total Dissolved solids Dried at 180 degree C	mg/L	-	5	144	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 C	Songkhla
Total Suspended Solids	mg/L	-	5	7	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 D	Songkhla

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).

Sampling By : Somsak Junkong ทะเบียนเลขที่ ว-267-จ-0011

Remark :

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- Sampling is not included in scope of accreditation ISO/IEC 17025

Technical Management

Ananta B.

Ananta Boonphet
Scientist (2)

ทะเบียนเลขที่ ว-267-จ-0004

Approved by

Kanitta H.

Kanitta Hemprasatporn
Section Head

ทะเบียนเลขที่ ว-267-ค-0001

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Analysis / Test Report

TESTING
No.0166

Client : PTTEP International Limited
222 Moo 1, Tambon Huakao, Amphur Singhanakorn, Songkhla Thailand 90280
P/O : 3450040615
Project Name : PSB Songkhla
Project Location :

Lot ID: 2572195
Date Received : Sep 03, 2025
Date Reported : Sep 10, 2025
Report Number : 3371434-1

Page 1 of 3

Sample Number	2572195-1						
Sampled Date	Sep 03, 2025 9:40 AM						
Sample Description	Wastewater						
Location	บ่อกักน้ำทิ้งบริเวณท่าเทียบเรือ 1 (Manhole 1)						
Date Analysis Commenced	Sep 03, 2025						
Condition of Sample	Contained in one amber glass bottle and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 degree C)	mg/L	-	2.0	<2.0	≤20	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5210 B, part 4500 - O G	Songkhla
COD	mg/L	-	25	<25	≤120	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5220 D	Songkhla
Oil & Grease	mg/L	-	3	3	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5520 B	Songkhla
pH at 25 degree C		-	-	8.1	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B)	Songkhla
Total Dissolved solids Dried at 180 degree C	mg/L	-	5	68	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 C	Songkhla
Total Suspended Solids	mg/L	-	5	<5	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 D	Songkhla

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).

Sampling By : Somsak Junkong ทะเบียนเลขที่ ว-267-จ-0011

Remark :

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- Sampling is not included in scope of accreditation ISO/IEC 17025

Technical Management

Ananta B.

Ananta Boonphet
Scientist (2)

ทะเบียนเลขที่ ว-267-จ-0004

Approved by

Kanitta H.

Kanitta Hemprasatporn
Section Head

ทะเบียนเลขที่ ว-267-ค-0001

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Analysis / Test Report

TESTING
No.0166

Client : PTTEP International Limited
222 Moo 1, Tambon Huakao, Amphur Singhanakorn, Songkhla Thailand 90280

P/O : 3450040615

Project Name : PSB Songkhla

Project Location :

Lot ID: 2572195

Date Received : Sep 03, 2025

Date Reported : Sep 10, 2025

Report Number : 3371434-1

Page 2 of 3

Sample Number	2572195-2						
Sampled Date	Sep 03, 2025 9:34 AM						
Sample Description	Wastewater						
Location	บ่อกักน้ำทิ้งบริเวณท่าเทียบเรือ 2 (Manhole 2)						
Date Analysis Commenced	Sep 03, 2025						
Condition of Sample	Contained in one amber glass bottle and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 degree C)	mg/L	-	2.0	<2.0	≤20	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5210 B, part 4500 - O G	Songkhla
COD	mg/L	-	25	<25	≤120	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5220 D	Songkhla
Oil & Grease	mg/L	-	3	3	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5520 B	Songkhla
pH at 25 degree C		-	-	8.0	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B)	Songkhla
Total Dissolved solids Dried at 180 degree C	mg/L	-	5	372	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 C	Songkhla
Total Suspended Solids	mg/L	-	5	6	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 D	Songkhla

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).

Sampling By : Somsak Junkong ทะเบียนเลขที่ ว-267-จ-0011

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Technical Management

Ananta B.

Ananta Boonphet
Scientist (2)

ทะเบียนเลขที่ ว-267-จ-0004

Approved by

Kanitta H.

Kanitta Hemprasatporn
Section Head
ทะเบียนเลขที่ ว-267-ค-0001

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Analysis / Test Report

TESTING
No.0166

Client : PTTEP International Limited
222 Moo 1, Tambon Huakao, Amphur Singhanakorn, Songkhla Thailand 90280
P/O : 3450040615
Project Name : PSB Songkhla
Project Location :

Lot ID: 2572195

Date Received : Sep 03, 2025

Date Reported : Sep 10, 2025

Report Number : 3371434-1

Page 3 of 3

Sample Number	2572195-3						
Sampled Date	Sep 03, 2025 9:28 AM						
Sample Description	Wastewater						
Location	บ่อกักน้ำทิ้งบริเวณท่าเทียบเรือ 3 (Manhole 3)						
Date Analysis Commenced	Sep 03, 2025						
Condition of Sample	Contained in one amber glass bottle and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 degree C)	mg/L	-	2.0	<2.0	≤20	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5210 B, part 4500 - O G	Songkhla
COD	mg/L	-	25	<25	≤120	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5220 D	Songkhla
Oil & Grease	mg/L	-	3	3	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5520 B	Songkhla
pH at 25 degree C		-	-	7.7	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B)	Songkhla
Total Dissolved solids Dried at 180 degree C	mg/L	-	5	54	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 C	Songkhla
Total Suspended Solids	mg/L	-	5	<5	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 D	Songkhla

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).

Sampling By : Somsak Junkong ทะเบียนเลขที่ ว-267-จ-0011

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Technical Management

Ananta B.

Ananta Boonphet
Scientist (2)

ทะเบียนเลขที่ ว-267-จ-0004

Approved by

Kanitta H.

Kanitta Hemprasatporn
Section Head

ทะเบียนเลขที่ ว-267-ค-0001

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Analysis / Test Report

TESTING
No.0166

Client : PTTEP International Limited
222 Moo 1, Tambon Huakao, Amphur Singhanakorn, Songkhla Thailand 90280
P/O : 3450040615
Project Name : PSB Songkhla
Project Location :

Lot ID: 2586662

Date Received : Oct 03, 2025

Date Reported : Oct 09, 2025

Report Number : 3406451-1

Page 1 of 3

Sample Number	2586662-1						
Sampled Date	Oct 03, 2025 9:55 AM						
Sample Description	Wastewater						
Location	บ่อกักน้ำทิ้งบริเวณท่าเทียบเรือ 1 (Manhole 1)						
Date Analysis Commenced	Oct 03, 2025						
Condition of Sample	Contained in one amber glass bottle and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 degree C)	mg/L	-	2.0	<2.0	≤20	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5210 B, part 4500 - O G	Songkhla
COD	mg/L	-	25	<25	≤120	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5220 D	Songkhla
Oil & Grease	mg/L	-	3	<3	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5520 B	Songkhla
pH at 25 degree C		-	-	7.0	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B)	Songkhla
Total Dissolved solids Dried at 180 degree C	mg/L	-	5	120	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 C	Songkhla
Total Suspended Solids	mg/L	-	5	5	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 D	Songkhla

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).

Sampling By : Somsak Junkong ทะเบียนเลขที่ ว-267-จ-0011

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- Sampling is not included in scope of accreditation ISO/IEC 17025

Technical Management

Ananta B.

Ananta Boonphet
Scientist (2)

ทะเบียนเลขที่ ว-267-จ-0004

Approved by

Kanitta H.

Kanitta Hemprasatporn
Section Head

ทะเบียนเลขที่ ว-267-ค-0001

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Analysis / Test Report

TESTING
No.0166

Client : PTTEP International Limited
222 Moo 1, Tambon Huakao, Amphur Singhanakorn, Songkhla Thailand 90280
P/O : 3450040615
Project Name : PSB Songkhla
Project Location :

Lot ID: 2586662

Date Received : Oct 03, 2025

Date Reported : Oct 09, 2025

Report Number : 3406451-1

Page 2 of 3

Sample Number	2586662-2
Sampled Date	Oct 03, 2025 9:50 AM
Sample Description	Wastewater
Location	บ่อกักน้ำทิ้งบริเวณท่าเทียบเรือ 2 (Manhole 2)
Date Analysis Commenced	Oct 03, 2025
Condition of Sample	Contained in one amber glass bottle and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 degree C)	mg/L	-	2.0	<2.0	≤20	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5210 B, part 4500 - O G	Songkhla
COD	mg/L	-	25	<25	≤120	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5220 D	Songkhla
Oil & Grease	mg/L	-	3	<3	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5520 B	Songkhla
pH at 25 degree C		-	-	6.9	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B)	Songkhla
Total Dissolved solids Dried at 180 degree C	mg/L	-	5	332	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 C	Songkhla
Total Suspended Solids	mg/L	-	5	6	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 D	Songkhla

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).

Sampling By : Somsak Junkong ทะเบียนเลขที่ ว-267-จ-0011

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Technical Management

Ananta B.

Ananta Boonphet
Scientist (2)

ทะเบียนเลขที่ ว-267-จ-0004

Approved by

Kanitta H.

Kanitta Hemprasatporn
Section Head
ทะเบียนเลขที่ ว-267-ค-0001

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Analysis / Test Report

TESTING
No.0166

Client : PTTEP International Limited
222 Moo 1, Tambon Huakao, Amphur Singhanakorn, Songkhla Thailand 90280
P/O : 3450040615
Project Name : PSB Songkhla
Project Location :

Lot ID: 2586662

Date Received : Oct 03, 2025

Date Reported : Oct 09, 2025

Report Number : 3406451-1

Page 3 of 3

Sample Number	2586662-3
Sampled Date	Oct 03, 2025 9:40 AM
Sample Description	Wastewater
Location	บ่อกักน้ำทิ้งบริเวณท่าเทียบเรือ 3 (Manhole 3)
Date Analysis Commenced	Oct 03, 2025
Condition of Sample	Contained in one amber glass bottle and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 degree C)	mg/L	-	2.0	<2.0	≤20	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5210 B, part 4500 - O G	Songkhla
COD	mg/L	-	25	<25	≤120	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5220 D	Songkhla
Oil & Grease	mg/L	-	3	<3	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5520 B	Songkhla
pH at 25 degree C		-	-	6.9	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B)	Songkhla
Total Dissolved solids Dried at 180 degree C	mg/L	-	5	98	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 C	Songkhla
Total Suspended Solids	mg/L	-	5	<5	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 D	Songkhla

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).

Sampling By : Somsak Junkong ทะเบียนเลขที่ ว-267-จ-0011

Remark :

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- Sampling is not included in scope of accreditation ISO/IEC 17025

Technical Management

Ananta B.

Ananta Boonphet
Scientist (2)

ทะเบียนเลขที่ ว-267-จ-0004

Approved by

Kanitta H.

Kanitta Hemprasatporn
Section Head
ทะเบียนเลขที่ ว-267-ค-0001

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Analysis / Test Report

TESTING
No.0166

Client : PTTEP International Limited
222 Moo 1, Tambon Huakao, Amphur Singhanakorn, Songkhla Thailand 90280

P/O : 3450040615

Project Name : PSB Songkhla

Project Location :

Lot ID: 2596723

Date Received : Nov 04, 2025

Date Reported : Nov 11, 2025

Report Number : 3430239-1

Page 1 of 3

Sample Number	2596723-1
Sampled Date	Nov 04, 2025 9:45 AM
Sample Description	Wastewater
Location	บ่อกักน้ำทิ้งบริเวณท่าเทียบเรือ 1 (Manhole 1)
Date Analysis Commenced	Nov 04, 2025
Condition of Sample	Contained in one amber glass bottle and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 degree C)	mg/L	-	2.0	<2.0	≤20	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5210 B, part 4500 - O G	Songkhla
COD	mg/L	-	25	<25	≤120	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5220 D	Songkhla
Oil & Grease	mg/L	-	3	<3	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5520 B	Songkhla
pH at 25 degree C		-	-	8.2	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B)	Songkhla
Total Dissolved solids Dried at 180 degree C	mg/L	-	5	68	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 C	Songkhla
Total Suspended Solids	mg/L	-	5	<5	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 D	Songkhla

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).

Sampling By : Yongsil Rangsee ทะเบียนเลขที่ ว-267-จ-0008

Remark :

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- Sampling is not included in scope of accreditation ISO/IEC 17025

Technical Management

Ananta B.

Ananta Boonphet
Scientist (2)

ทะเบียนเลขที่ ว-267-จ-0004

Approved by

Kanitta H.

Kanitta Hemprasatporn
Section Head

ทะเบียนเลขที่ ว-267-ค-0001

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Analysis / Test Report

TESTING
No.0166

Client : PTTEP International Limited
222 Moo 1, Tambon Huakao, Amphur Singhanakorn, Songkhla Thailand 90280
P/O : 3450040615
Project Name : PSB Songkhla
Project Location :

Lot ID: 2596723

Date Received : Nov 04, 2025

Date Reported : Nov 11, 2025

Report Number : 3430239-1

Page 2 of 3

Sample Number	2596723-2						
Sampled Date	Nov 04, 2025 9:40 AM						
Sample Description	Wastewater						
Location	บ่อกักน้ำทิ้งบริเวณท่าเทียบเรือ 2 (Manhole 2)						
Date Analysis Commenced	Nov 04, 2025						
Condition of Sample	Contained in one amber glass bottle and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 degree C)	mg/L	-	2.0	<2.0	≤20	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5210 B, part 4500 - O G	Songkhla
COD	mg/L	-	25	<25	≤120	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5220 D	Songkhla
Oil & Grease	mg/L	-	3	<3	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5520 B	Songkhla
pH at 25 degree C		-	-	8.0	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B)	Songkhla
Total Dissolved solids Dried at 180 degree C	mg/L	-	5	62	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 C	Songkhla
Total Suspended Solids	mg/L	-	5	<5	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 D	Songkhla

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).

Sampling By : Yongsil Rangsee ทะเบียนเลขที่ ว-267-จ-0008

Remark :

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- Sampling is not included in scope of accreditation ISO/IEC 17025

Technical Management

Ananta B.

Ananta Boonphet
Scientist (2)

ทะเบียนเลขที่ ว-267-จ-0004

Approved by

Kanitta H.

Kanitta Hemprasatporn
Section Head

ทะเบียนเลขที่ ว-267-ค-0001

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Analysis / Test Report

TESTING
No.0166

Client : PTTEP International Limited
222 Moo 1, Tambon Huakao, Amphur Singhanakorn, Songkhla Thailand 90280
P/O : 3450040615
Project Name : PSB Songkhla
Project Location :

Lot ID: 2596723

Date Received : Nov 04, 2025

Date Reported : Nov 11, 2025

Report Number : 3430239-1

Page 3 of 3

Sample Number	2596723-3						
Sampled Date	Nov 04, 2025 9:35 AM						
Sample Description	Wastewater						
Location	บ่อกักน้ำทิ้งบริเวณท่าเทียบเรือ 3 (Manhole 3)						
Date Analysis Commenced	Nov 04, 2025						
Condition of Sample	Contained in one amber glass bottle and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 degree C)	mg/L	-	2.0	<2.0	≤20	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5210 B, part 4500 - O G	Songkhla
COD	mg/L	-	25	<25	≤120	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5220 D	Songkhla
Oil & Grease	mg/L	-	3	<3	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5520 B	Songkhla
pH at 25 degree C		-	-	7.9	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B)	Songkhla
Total Dissolved solids Dried at 180 degree C	mg/L	-	5	94	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 C	Songkhla
Total Suspended Solids	mg/L	-	5	<5	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 D	Songkhla

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).

Sampling By : Yongsil Rangsee ทะเบียนเลขที่ ว-267-จ-0008

Remark :

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- Sampling is not included in scope of accreditation ISO/IEC 17025

Technical Management

Ananta B.

Ananta Boonphet
Scientist (2)

ทะเบียนเลขที่ ว-267-จ-0004

Approved by

Kanitta H.

Kanitta Hemprasatporn
Section Head

ทะเบียนเลขที่ ว-267-ค-0001

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Analysis / Test Report

TESTING
No.0166

Client : PTTEP International Limited
222 Moo 1, Tambon Huakao, Amphur Singhanakorn, Songkhla Thailand 90280
P/O : 3450040615
Project Name : PSB Songkhla
Project Location :

Lot ID: 2596732
Date Received : Dec 09, 2025
Date Reported : Dec 17, 2025
Report Number : 3430289-1

Page 1 of 3

Sample Number	2596732-1						
Sampled Date	Dec 09, 2025 10:00 AM						
Sample Description	Wastewater						
Location	บ่อพักน้ำทิ้งบริเวณท่าเทียบเรือ 1 (Manhole 1)						
Date Analysis Commenced	Dec 09, 2025						
Condition of Sample	Contained in one amber glass bottle and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 degree C)	mg/L	-	2.0	<2.0	≤20	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5210 B, part 4500 - O G	Songkhla
COD	mg/L	-	25	<25	≤120	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5220 D	Songkhla
Oil & Grease	mg/L	-	3	<3	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5520 B	Songkhla
pH at 25 degree C		-	-	7.2	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B)	Songkhla
Total Dissolved solids Dried at 180 degree C *	mg/L	-	5	58	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 C	Songkhla
Total Suspended Solids	mg/L	-	5	<5	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 D	Songkhla

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).

Sampling By : WutthichaiTaycharoen ทะเบียนเลขที่ ว-267-จ-0007

Remark :

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- Sampling is not included in scope of accreditation ISO/IEC 17025

Technical Management

Ananta B.

Ananta Boonphet
Scientist (2)

ทะเบียนเลขที่ ว-267-จ-0004

Approved by

Kanitta H.

Kanitta Hemprasatporn
Section Head

ทะเบียนเลขที่ ว-267-ค-0001

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Analysis / Test Report

TESTING
No.0166

Client : PTTEP International Limited
222 Moo 1, Tambon Huakao, Amphur Singhanakorn, Songkhla Thailand 90280
P/O : 3450040615
Project Name : PSB Songkhla
Project Location :

Lot ID: 2596732

Date Received : Dec 09, 2025

Date Reported : Dec 17, 2025

Report Number : 3430289-1

Page 2 of 3

Sample Number	2596732-2						
Sampled Date	Dec 09, 2025 9:55 AM						
Sample Description	Wastewater						
Location	บ่อพักน้ำทิ้งบริเวณท่าเทียบเรือ 2 (Manhole 2)						
Date Analysis Commenced	Dec 09, 2025						
Condition of Sample	Contained in one amber glass bottle and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 degree C)	mg/L	-	2.0	<2.0	≤20	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5210 B, part 4500 - O G	Songkhla
COD	mg/L	-	25	<25	≤120	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5220 D	Songkhla
Oil & Grease	mg/L	-	3	<3	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5520 B	Songkhla
pH at 25 degree C		-	-	7.3	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B)	Songkhla
Total Dissolved solids Dried at 180 degree C	mg/L	-	5	118	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 C	Songkhla
Total Suspended Solids	mg/L	-	5	<5	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 D	Songkhla

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).

Sampling By : WutthichaiTaycharoen ทะเบียนเลขที่ ว-267-จ-0007

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Technical Management

Ananta B.

Ananta Boonphet
Scientist (2)

ทะเบียนเลขที่ ว-267-จ-0004

Approved by

Kanitta H.

Kanitta Hemprasatporn
Section Head

ทะเบียนเลขที่ ว-267-ค-0001

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Analysis / Test Report

TESTING
No.0166

Client : PTTEP International Limited
222 Moo 1, Tambon Huakao, Amphur Singhanakorn, Songkhla Thailand 90280
P/O : 3450040615
Project Name : PSB Songkhla
Project Location :

Lot ID: 2596732

Date Received : Dec 09, 2025

Date Reported : Dec 17, 2025

Report Number : 3430289-1

Page 3 of 3

Sample Number	2596732-3						
Sampled Date	Dec 09, 2025 9:52 AM						
Sample Description	Wastewater						
Location	บ่อพักน้ำทิ้งบริเวณท่าเทียบเรือ 3 (Manhole 3)						
Date Analysis Commenced	Dec 09, 2025						
Condition of Sample	Contained in one amber glass bottle and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 degree C)	mg/L	-	2.0	<2.0	≤20	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5210 B, part 4500 - O G	Songkhla
COD	mg/L	-	25	<25	≤120	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5220 D	Songkhla
Oil & Grease	mg/L	-	3	<3	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5520 B	Songkhla
pH at 25 degree C		-	-	7.2	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B)	Songkhla
Total Dissolved solids Dried at 180 degree C	mg/L	-	5	292	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 C	Songkhla
Total Suspended Solids	mg/L	-	5	<5	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 D	Songkhla

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).

Sampling By : WuttichaiTaycharoen ทะเบียนเลขที่ ว-267-จ-0007

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Technical Management

Ananta B.

Ananta Boonphet
Scientist (2)

ทะเบียนเลขที่ ว-267-จ-0004

Approved by

Kanitta H.

Kanitta Hemprasatporn
Section Head

ทะเบียนเลขที่ ว-267-ค-0001

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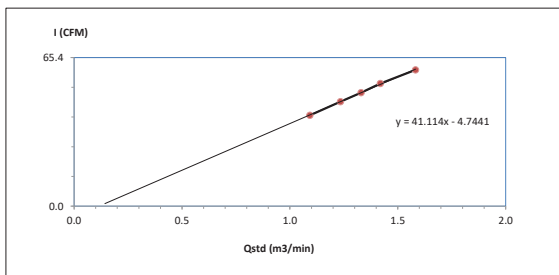
Sample Name	Parameter	Equipment Name	ID No.	Calibrated Date	Next Cal	Freq. Calibrate (Months)
Ambient	Total Suspended Particulate	High Volume	SGK_FS0059	-	-	On site Calibration
Ambient	Total Suspended Particulate	High Volume	SGK_FS0120	-	-	On site Calibration
Ambient	Total Suspended Particulate	Digital Balance	BKK_EN0403	30-May-25	30-May-26	12
Ambient	Particulate Matter (PM-10)	High Volume	SGK_FS0122	-	-	On site Calibration
Ambient	Particulate Matter (PM-10)	High Volume	SGK_FS0064	-	-	On site Calibration
Ambient	Particulate Matter (PM-10)	Digital Balance	BKK_EN0403	30-May-25	30-May-26	12
Ambient	Carbon Monoxide	CO Analyzer	BKK_FS0786	1-Jul-25	1-Jan-26	6
Ambient	Carbon Monoxide	CO Analyzer	SGK_FS0068	1-Jul-25	1-Jan-26	6
Ambient	Total Hydrocarbon as Methane	DRYCAL FLOWMETER	BKK_FS0614	9-Sep-24	9-Sep-25	12
Ambient	Total Hydrocarbon as Methane	DRYCAL FLOWMETER	BKK_FS0619	9-Sep-24	9-Sep-25	12
Ambient	Total Hydrocarbon as Methane	Air Sampling Pump	SGK_FS0164	1-Sep-25	1-Dec-25	3
Ambient	Total Hydrocarbon as Methane	Air Sampling Pump	SGK_FS0165	1-Sep-25	1-Dec-25	3
Ambient	Total Hydrocarbon as Methane	Total Hydrocarbon Analyzer	BKK_FS1068	18-Jun-25	18-Jun-26	12
Ambient	Wind Speed / Wind Direction	Wind Speed / Wind Direction	SGK_FS0088	23-Aug-24	23-Feb-26	18
Ambient	Wind Speed / Wind Direction	Wind Speed / Wind Direction	BKK_FS0919	26-Aug-24	26-Feb-26	18
Noise	Leq 24 hrs	Sound Calibrator	SGK_FS0114	11-Dec-24	11-Dec-25	12
Noise	Leq 24 hrs	Sound Level Meter	SGK_FS0026	9-Jan-25	9-Jan-26	12
Noise	Leq 24 hrs	Sound Level Meter	SGK_FS0133	5-Jun-25	4-Jun-26	12
Noise	Leq 24 hrs	Sound Level Meter	SGK_FS0134	5-Jun-25	4-Jun-26	12
Noise	Leq 8 hrs	Sound Calibrator	SGK_FS0114	11-Dec-24	11-Dec-25	12
Noise	Leq 8 hrs	Sound Level Meter	SGK_FS0026	9-Jan-25	9-Jan-26	12
Sea Water	BOD	Incubator	SGK_CL0028	10-Jan-25	10-Jul-26	18
Sea Water	BOD	DO Meter With Sensor	SGK_CL0101	24-Feb-25	24-Feb-26	12
Sea Water	pH at 25 °C	pH meter	SGK_CL0030	19-Oct-24	19-Apr-26	18
Sea Water	Oil & Grease	Electronic Top-Loading Balance	SGK_CL0045	10-Jan-25	10-Jan-26	12
Sea Water	Oil & Grease	Oven	SGK_CL0024	19-Oct-24	19-Apr-26	18
Sea Water	Oil & Grease	Water Bath	SGK_CL0035	10-Jan-24	10-Jul-26	18
Sea Water	Temperature	pH meter	SGK_FS0019	4-Feb-25	4-Feb-26	12
Sea Water	Dissolved Oxygen (on site)	DO Meter	SGK_FS0018	11-Apr-25	10-Apr-26	12
Sea Water	Total Suspended Solids	Electronic Top-Loading Balance	SGK_CL0045	10-Jan-25	10-Jan-26	12
Sea Water	Total Suspended Solids	Oven	SGK_CL0024	19-Oct-24	19-Apr-26	18
Sea Water	Salinity	Conductivity meter	SGK_CL0032	2-May-25	2-May-26	12
Sea Water	Turbidity	Turbidity Meter	SGK_FS0046	30-May-25	30-May-26	12
Sea Water	Total Coliform	Autoclave	SGK_ML0001	1-Jul-24	1-Jan-26	18
Sea Water	Total Coliform	Incubator	SGK_ML0013	3-Jul-25	3-Jan-27	18
Sea Water	Total Coliform	pH Meter	SGK_ML0016	2-Jul-24	2-Jan-26	18
Sea Water	Total Coliform	Water Bath	SGK_ML0021	1-Jul-24	1-Jan-26	18
Sea Water	Fecal Coliform	Autoclave	SGK_ML0001	1-Jul-24	1-Jan-26	18
Sea Water	Fecal Coliform	Incubator	SGK_ML0013	3-Jul-25	3-Jan-27	18
Sea Water	Fecal Coliform	pH Meter	SGK_ML0016	2-Jul-24	2-Jan-26	18
Sea Water	Fecal Coliform	Water Bath	SGK_ML0021	1-Jul-24	1-Jan-26	18
Sea Water	Sulfide	Burette	BKK_EN0422	3-Sep-25	3-Sep-26	12
Sea Water	Sulfide	Chamber (Cooling Room)	BKK_EN0167	4-Jun-25	4-Dec-26	18
Sea Water	Nitrate	Ion Chromatography	BKK_EN0069	24-Jun-25	24-Jun-26	18
Sea Water	Phosphate	Ion Chromatography	BKK_EN0069	24-Jun-25	24-Jun-26	18
Songkhla Lab	BOD	Incubator	SGK_CL0028	10-Jan-25	10-Jul-26	18
Songkhla Lab	BOD	DO Meter With Sensor	SGK_CL0101	24-Feb-25	24-Feb-26	12
Songkhla Lab	COD	COD Reactor	SGK_CL0085	15-Jan-25	15-Jan-26	12
Songkhla Lab	COD	Spectrophotometer	SGK_CL0100	25-Dec-24	25-Dec-25	12
Songkhla Lab	pH at 25 °C	pH meter	SGK_CL0030	19-Oct-24	19-Apr-26	18
Songkhla Lab	Oil & Grease	Electronic Top-Loading Balance	SGK_CL0045	10-Jan-25	10-Jan-26	12
Songkhla Lab	Oil & Grease	Oven	SGK_CL0024	19-Oct-24	19-Apr-26	18
Songkhla Lab	Oil & Grease	Water Bath	SGK_CL0035	10-Jan-24	10-Jul-26	18
Songkhla Lab	Total Dissolved Solids 180°C	Electronic Top-Loading Balance	SGK_CL0045	10-Jan-25	10-Jan-26	12
Songkhla Lab	Total Dissolved Solids 180°C	Oven	SGK_CL0024	19-Oct-24	19-Apr-26	18
Songkhla Lab	Total Suspended Solids	Electronic Top-Loading Balance	SGK_CL0045	10-Jan-25	10-Jan-26	12
Songkhla Lab	Total Suspended Solids	Oven	SGK_CL0024	19-Oct-24	19-Apr-26	18



High Volume Air Sampler Calibration Worksheet

Project Site :	PTTEP International Limited	Barometric Pressure (mm Hg) :	756.8
Calibrate Location :	บริเวณพื้นที่โครงการ	Temperature (°C) :	30.2
Calibrate Date :	16-Oct-25	High Volume ID :	SGK_FS0059
CalibrationSheet No.:	C-161025-SGK_FS0059	High Volume Model :	TE-5170D
Calibrator ID:	SGK_FS0034	High Volume S/N :	5585
Calibrator Model :	TE-5028A	Calibrator Slope :	1.56856
Calibrator S/N :	3449	Calibrator Intercept :	-0.03727

Test No.	Delta H ₂ O (inch)	Q _{std} (m ³ /min)	I: Chart (CFM)	Linear Regression
1	2.8	1.0926	40	Slope : 41.1138 Intercept : -4.7441 Correlation Coefficient : 0.9994
2	3.6	1.2339	46	
3	4.2	1.3298	50	
4	4.8	1.4191	54	
5	6.0	1.5822	60	



Calibrated by Narathorn K. Approved by: Supot S.
(Mr. Narathorn Keawpongsa) (Mr. Supot Salamteh)
SGK Field Services Scientist (1) Field Services Section Head

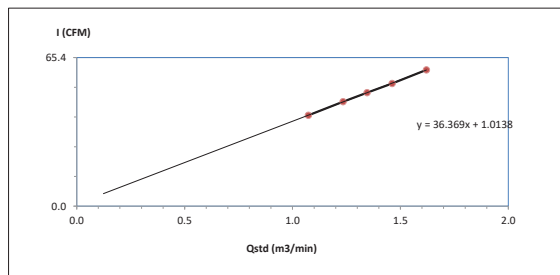
FORM NO.: F 06-073 REVISION NO.:2 ISSUE DATE: 20/11/23



High Volume Air Sampler Calibration Worksheet

Project Site :	PTTEP International Limited	Barometric Pressure (mm Hg) :	756.8
Calibrate Location :	บริเวณบ้านพักเจ้าหน้าที่ตำบลคลองกร	Temperature (°C) :	30.2
Calibrate Date :	16-Oct-25	High Volume ID :	SGK_FS0120
CalibrationSheet No.:	C-161025-SGK_FS0120	High Volume Model :	TE-5170D
Calibrator ID:	SGK_FS0034	High Volume S/N :	1063
Calibrator Model :	TE-5028A	Calibrator Slope :	1.56856
Calibrator S/N :	3449	Calibrator Intercept :	-0.03727

Test No.	Delta H ₂ O (inch)	Q _{std} (m ³ /min)	I: Chart (CFM)	Linear Regression
1	2.7	1.0736	40	Slope : 36.3692 Intercept : 1.0138 Correlation Coefficient : 0.9999
2	3.6	1.2339	46	
3	4.3	1.3451	50	
4	5.1	1.4616	54	
5	6.3	1.6203	60	

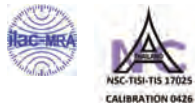


Calibrated by Narathorn K. Approved by: Supot S.
(Mr. Narathorn Keawpongsa) (Mr. Supot Salamteh)
SGK Field Services Scientist (1) Field Services Section Head

FORM NO.: F 06-073 REVISION NO.:2 ISSUE DATE: 20/11/23

SARTORIUS

Accredited by
NSC-TISI-TIS 17025
Calibration 0426



Calibration certificate

Calibration Certificate No. 25BCI0197

Object	Electronic non-automatic weighing instrument	This calibration certificate documents the traceability to national standards.
Manufacturer	Ohaus	Uncertainties of measurements are taken into account when only statements of compliance are made.
Type	EX225D/AD	This certificate was prepared by Sartorius Corporation in accordance to the current ISO/IEC 17025:2017 standard and Sartorius Work Instruction (Method) SOP WI 08.
Serial QM Ident. no.	C309774648 BKK_EN0403	This certificate relate and apply this equipment only.
Customer	ALS Laboratory Group (Thailand)Co., Ltd.	
	104 Phatthanakarn 40,Phattanakarn Rd.,Khwaeng Phatthanakarn ,Khet Suan Luang,Bangkok 10250	
Order no.	261969	REVIEW BY <u>Junda K.</u>
Number of pages	6	APPROVED BY <u>Supot P.</u>
Date of calibration	30 May 2025	NEXT CAL DATE <u>30/05/26</u>

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

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

Date	30 May 2025	Approval of the Calibration Certificate	Person in charge
		<u>Chonchai Inthana</u>	<u>Chonchai Inthana</u>
		Mr. Chonchai Inthana	Chonchai Inthana

Calibration certificate No.: 25BCI0197

Calibration Certificate

Calibration object

Multi range instrument

Model	EX225D/AD
Serial Number	C309774648
QM Ident. no Inventory no.	BKK_EN0403 ---
Range	1 2
Maximum capacity (Max. load)	120.00000 g 220.0000 g
Measured range	120.00000 g 220.0000 g
Scale interval	0.00001 g 0.0001 g

Place of calibration

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

Calibration procedure

EURAMET cg-18, V4.0 - Guidelines on the Calibration of Non-Automatic Weighing Instruments

Test equipment

Test equipment type	Test equipment ID	Valid until
Thermometer	Testo 174(Traceable to Si unit through ENTECH)	11 Nov 2025
Test weight set OIML R111 E2	Certificate No.M2308197S ,E2(Traceable to Si unit through TCS)	23 Aug 2025

Range 1

Adjustment Status

The measuring device was internally adjusted before the calibration.

Environmental and measuring conditions

Date of calibration	30 May 2025
Temperature at place of calibration Temp. diff.	21.7 °C 0.5 K
Weights - T _{place}	
Measuring conditions	The installation site is suitable. The device was levelled. Balance was loaded up to Max before test.
Comments	Humidity 60.0 %RH.

Measurement results | Measurement uncertainties

Repeatability		Eccentricity	
Test load (nominal): 1 g 100 g		Test load (nominal): 50 g	
1 g	100 g	Center	
1	0.99993 g	99.99971 g	49.99996 g
2	0.99991 g	99.99971 g	49.99993 g
3	0.99992 g	99.99974 g	49.99993 g
4	0.99993 g	99.99973 g	49.99994 g
5	0.99992 g	99.99974 g	49.99990 g
6	0.99991 g	99.99970 g	
7	0.99993 g	99.99974 g	
8	0.99994 g	99.99972 g	
9	0.99995 g	99.99971 g	
10	0.99995 g	99.99969 g	
s = 0.000014 g s = 0.000017 g		Maximum deviation from centric loading indication Δ _{feccl} max = 0.00006 g	

Testload	Indication	Error	Expansion factor	Uncertainty	Uncertainty relative
L	I	E	k	U(E)	U _{rel} (E)
0.00000 g	0.00000 g	0.00000 g	2.00	0.000030 g	—
0.01000 g	0.00995 g	-0.00005 g	2.00	0.000037 g	0.37 %
0.10000 g	0.09991 g	-0.00009 g	2.00	0.000038 g	0.038 %
0.50000 g	0.49985 g	-0.00015 g	2.00	0.000040 g	0.0080 %
1.00000 g	0.99991 g	-0.00009 g	2.00	0.000041 g	0.0041 %
5.00002 g	4.99997 g	-0.00005 g	2.00	0.000050 g	0.0010 %
10.00002 g	10.00003 g	0.00001 g	2.00	0.000069 g	0.00069 %
50.00002 g	49.99972 g	-0.00030 g	2.00	0.000091 g	0.00018 %
70.00004 g	69.99975 g	-0.00029 g	2.00	0.00017 g	0.00024 %
100.00001 g	99.99958 g	-0.00043 g	2.00	0.00017 g	0.00017 %
115.00006 g	114.99966 g	-0.00040 g	2.00	0.00028 g	0.00024 %
Maximum error of indication		E _{max} = 0.00043 g			

U_{rel}(E) is the quotient of U(E) and test load L. The uncertainty of measurement U(E) is valid only if error E is considered. You will find reference notes on the uncertainty of measurement in use under: Appendix to the calibration certificate | Interpretation of measurement results.
Reference note: The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the documented Expansion factor, determined in accordance with the European Calibration Guideline EURAMET cg-18, V4.0. There is a 95 % probability that the value of the measurand will be in the assigned value range.

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129 Rama 9 Road, Huaykwang
10310 Bangkok

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Range 2

Adjustment Status

The measuring device was internally adjusted before the calibration.

Environmental and measuring conditions

Date of calibration	30 May 2025
Temperature at place of calibration Temp. diff.	21.7 °C 0.5 K
Weights - T _{place}	
Measuring conditions	The installation site is suitable. The device was levelled. Balance was loaded up to Max before test.
Comments	Humidity 60.0 %RH.

Measurement results | Measurement uncertainties

Repeatability		Eccentricity	
Test load (nominal): 200 g		Test load (nominal): 100 g	
200 g		Center	
1	199.9998 g	99.99990 g	99.99984 g
2	199.9998 g	99.9998 g	99.99990 g
3	199.9998 g	99.9998 g	99.99983 g
4	200.0000 g	99.99979 g	99.99979 g
5	199.9998 g		
6	199.9999 g		
7	199.9999 g		
8	200.0000 g		
9	199.9998 g		
10	199.9999 g		
s = 0.00008 g		Maximum deviation from centric loading indication Δ _{feccl} max = 0.00006 g	

Testload	Indication	Error	Expansion factor	Uncertainty	Uncertainty relative
L	I	E	k	U(E)	U _{rel} (E)
0.00000 g	0.00000 g	0.00000 g	2.00	0.000030 g	—
20.00002 g	19.99986 g	-0.00016 g	2.00	0.000069 g	0.00034 %
50.00002 g	49.99978 g	-0.00024 g	2.00	0.000091 g	0.00018 %
70.00004 g	69.99981 g	-0.00023 g	2.00	0.00017 g	0.00024 %
90.00007 g	89.99976 g	-0.00031 g	2.00	0.00018 g	0.00020 %
110.00003 g	109.99986 g	-0.00017 g	2.00	0.00028 g	0.00025 %
130.0001 g	129.9999 g	-0.0002 g	2.00	0.00028 g	0.00022 %
150.0000 g	149.9999 g	-0.0001 g	2.00	0.00028 g	0.00019 %
170.0000 g	170.0000 g	0.0000 g	2.00	0.00028 g	0.00016 %
200.0000 g	199.9998 g	-0.0002 g	2.00	0.00028 g	0.00014 %
220.0000 g	219.9999 g	-0.0001 g	2.00	0.00029 g	0.00013 %
Maximum error of indication		E _{max} = 0.0003 g			

U_{rel}(E) is the quotient of U(E) and test load L. The uncertainty of measurement U(E) is valid only if error E is considered. You will find reference notes on the uncertainty of measurement in use under: Appendix to the calibration certificate | Interpretation of measurement results.
Reference note: The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the documented Expansion factor, determined in accordance with the European Calibration Guideline EURAMET cg-18, V4.0. There is a 95 % probability that the value of the measurand will be in the assigned value range.

End of calibration certificate

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10310 Bangkok

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Interpretation of measurement results | Appendix to the calibration certificate

Uncertainty of measurement in use

Range 1

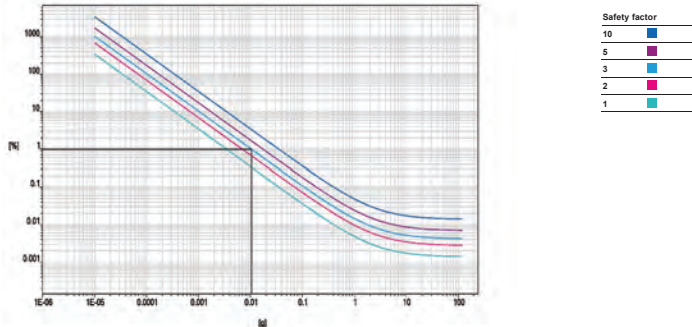
Device adjusted before measurement	Yes
Temperature deviation considered	5 K
Temperature coefficient considered	2 · 10 ⁻⁴ /K

Uncertainty of the weighing result U₉₅(W) U₉₅(W) = 0.000035 g + 1.38 · 10⁻⁵ · R

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

Indication in % from max load	Net indication	Uncertainty	Uncertainty relative
	R	U ₉₅ (W)	U ₉₅ (W) _{rel}
1 %	1.20000 g	0.000052 g	0.0043 %
25 %	30.00000 g	0.00045 g	0.0015 %
50 %	60.00000 g	0.00086 g	0.0014 %
75 %	90.00000 g	0.0013 g	0.0014 %
100 %	120.00000 g	0.0017 g	0.0014 %

Graphic realization of the relative uncertainty of measurement | process accuracy



Displayed example

Process accuracy	1.00 %
Safety factor	3
Minimum sample weight	0.01045 g

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129 Rama 9 Road, Huaykwang
10310 Bangkok

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Interpretation of measurement results | Appendix to the calibration certificate

Uncertainty of measurement in use

Range 2

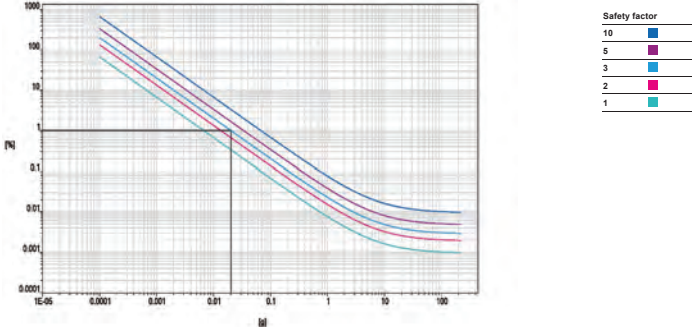
Device adjusted before measurement	Yes
Temperature deviation considered	5 K
Temperature coefficient considered	2 · 10 ⁻⁴ /K

Uncertainty of the weighing result U₉₅(W) U₉₅(W) = 0.000067 g + 9.52 · 10⁻⁵ · R

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

Indication in % from max load	Net indication	Uncertainty	Uncertainty relative
	R	U ₉₅ (W)	U ₉₅ (W) _{rel}
1 %	2.20000 g	0.000088 g	0.0040 %
25 %	55.00000 g	0.00059 g	0.0011 %
50 %	110.00000 g	0.0011 g	0.0010 %
75 %	165.0000 g	0.0016 g	0.00099 %
100 %	220.0000 g	0.0022 g	0.00098 %

Graphic realization of the relative uncertainty of measurement | process accuracy



Displayed example

Process accuracy	1.00 %
Safety factor	3
Minimum sample weight	0.02019 g

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129 Rama 9 Road, Huaykwang
10310 Bangkok

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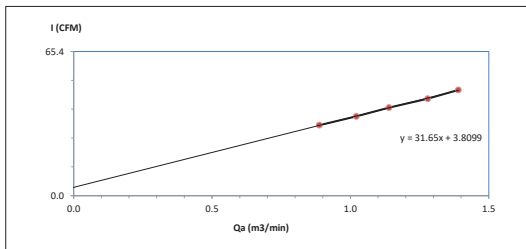
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High Volume Air Sampler Calibration Worksheet

Project Site : PTTEP International Limited Barometric Pressure (mm Hg) : 756.8
Calibrate Location : บริษัทพัฒนาปิโตรเลียม จำกัด Temperature (°C) : 30.2
Calibrate Date : 16-Oct-25 High Volume ID : SGK_FS0122
CalibrationSheet No.: C-161025-SGK_FS0122 High Volume Model : TE-5009X
Calibrator ID : SGK_FS0034 High Volume S/N : 1089
Calibrator Model : TE-S028A Calibrator Slope : 0.98245
Calibrator S/N : 3449 Calibrator Intercept : -0.02325

Test No.	Delta H ₂ O (inch)	Qa (m ³ /min)	I: Chart (CFM)	Linear Regression
1	1.8	0.888	32	Slope : 31.6502 Intercept : 3.8099 Correlation Coefficient : 0.9995
2	2.4	1.021	36	
3	3.0	1.139	40	
4	3.8	1.279	44	
5	4.5	1.390	48	



Calibrated by Narathorn K.
(Mr. Narathorn Keawpongsa)
SGK Field Services Scientist (1)

Approved by : Sept S.
(Mr. Supot Salameh)
Field Services Section Head

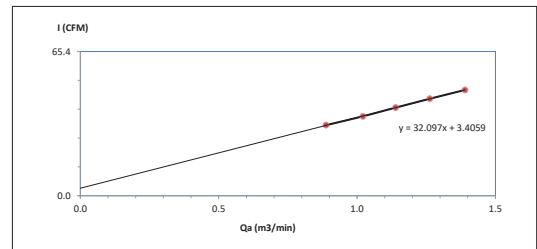
FORM NO.: F 06-074 REVISION NO.:2 ISSUE DATE: 20/11/23



High Volume Air Sampler Calibration Worksheet

Project Site : PTTEP International Limited Barometric Pressure (mm Hg) : 756.8
Calibrate Location : บริษัทพัฒนาปิโตรเลียม จำกัด Temperature (°C) : 30.2
Calibrate Date : 16-Oct-25 High Volume ID : SGK_FS0064
CalibrationSheet No.: C-161025-SGK_FS0064 High Volume Model : TE-5009X
Calibrator ID : SGK_FS0034 High Volume S/N : 5579
Calibrator Model : TE-S028A Calibrator Slope : 0.98245
Calibrator S/N : 3449 Calibrator Intercept : -0.02325

Test No.	Delta H ₂ O (inch)	Qa (m ³ /min)	I: Chart (CFM)	Linear Regression
1	1.8	0.888	32	Slope : 32.0970 Intercept : 3.4059 Correlation Coefficient : 0.9998
2	2.4	1.021	36	
3	3.0	1.139	40	
4	3.7	1.263	44	
5	4.5	1.390	48	



Calibrated by Narathorn K.
(Mr. Narathorn Keawpongsa)
SGK Field Services Scientist (1)

Approved by : Sept S.
(Mr. Supot Salameh)
Field Services Section Head

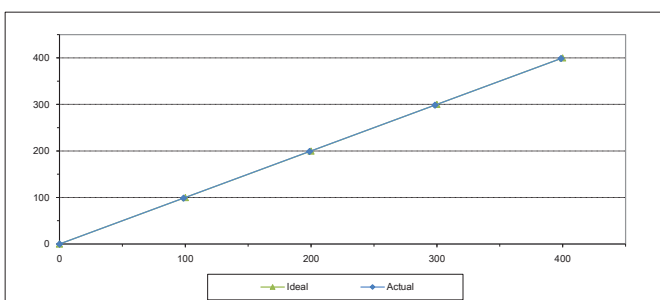
FORM NO.: F 06-074 REVISION NO.:2 ISSUE DATE: 20/11/23



MULTIPOINT CALIBRATION REPORT

Calibration Date : 1-Jul-25 Equipment Name : CO Analyzer
Manufacturer : HORIBA Model : APMA-370
Serial No. : YD1WSD2G Equipment ID : BKK_FS0786
Calibrator Manufacturer : Teledyne API Model : 700
Serial No. : 947
Std. Gas Concentration (PPM) : 55.22 Cylinder No. : GN0027222
Cylinder Pressure (psi) : 1800 Certified By : Airgas Inc.
Certified Date : 9-Feb-22 Expired Date : 9-Feb-30

Point	Ideal	Actual	Error	%Error
ZERO	0.00	0.10	0.10	0.10
1	100.00	98.60	-1.40	-1.40
2	200.00	198.80	-1.20	-0.60
3	300.00	298.50	-1.50	-0.50
4	400.00	398.70	-1.30	-0.33
AVERAGE (%)				-0.55



Calibrated By
Mr. Jirawut Sakam
Field Environmental Scientist (3)

Approved By
Mr. Sarayuth Jitranont
Assistant General Manager

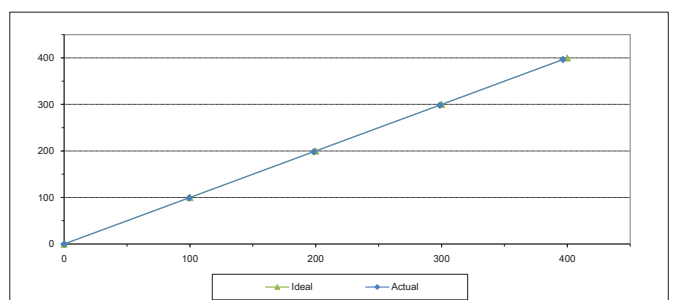
ALS Laboratory Group
FORM NO.: F 06-056 REVISION NO.: - ISSUE DATE: 02/04/12



MULTIPOINT CALIBRATION REPORT

Calibration Date : 1-Jul-25 Equipment Name : CO Analyzer
Manufacturer : Teledyne API Model : T300
Serial No. : 3630 Equipment ID : SGK_FS0068
Calibrator Manufacturer : Teledyne API Model : 700
Serial No. : 947
Std. Gas Concentration (PPM) : 55.22 Cylinder No. : GN0027222
Cylinder Pressure (psi) : 1800 Certified By : Airgas Inc.
Certified Date : 9-Feb-22 Expired Date : 9-Feb-30

Point	Ideal	Actual	Error	%Error
ZERO	0.00	0.10	0.10	0.10
1	100.00	99.40	-0.60	-0.60
2	200.00	198.60	-1.40	-0.70
3	300.00	298.70	-1.30	-0.43
4	400.00	396.50	-3.50	-0.88
AVERAGE (%)				-0.50



Calibrated By
Mr. Jirawut Sakam
Field Environmental Scientist (3)

Approved By
Mr. Sarayuth Jitranont
Assistant General Manager

ALS Laboratory Group
FORM NO.: F 06-056 REVISION NO.: - ISSUE DATE: 02/04/12

Certificate of Calibration

Customer

Name : ALS Laboratory Group Thailand Co., Ltd.
Address : 104 Soi Phanthanakan 40, Phanthanakan Road, Suan Luang,
Bangkok 10250

Certificate No : 24-AFM-179

Request No : Req-2024-1987

Unit Under Calibration Details

Measurement Item : Air Flow Meter
Manufacturer : MesaLabs
Model : Defender 510-M
Serial Number : 151114
ID : BKK_FS0614

Accuracy : 1% of Reading

Sensor Model : -

Sensor Serial Number : -

Instrument Status : Used

Location of Calibration : LAB 4 AIR VELOCITY METER

Calibration Environment and Details

Temperature : 23 °C ± 3 °C
Humidity : 55 %RH ± 20 %RH
Barometric Pressure : 1013 hPa ± 10 hPa
Received Date : 30 August 2024
Calibration Date : 9 September 2024

Calibration Procedure : In-house method CP-AFM-01 by Comparison technique with Standard Primary Flow Calibrator

Reference Standard	Model	Serial Number	Traceable	Due Calibration
Air Flow Meter	Gilibrator 3 Low flow	18501010006	Sensidyne	6 August 2025
Air Flow Meter	Gilibrator 3 Standard flow	19031011003	Sensidyne	2 August 2025
Temperature meter	GT 11	08000057	Qreborn	1 March 2025
Pressure meter	CPG2400	41000KDU/651882	TPA	9 November 2024

Traceability :

This Certificate is traceable to SI Unit through Sensidyne A2LA Accreditation No. 3943.01

Note :

The reported uncertainty is based on standard uncertainty multiplied by the Coverage Factor $k = 2$, providing a level of confidence approximately 95 %.

Calibration By : hgv
Mr. Noppadon Luangart
Service Calibration Engineer

Approved By : Mr. Pacit Mathavorn
Calibration Engineer Supervisor
Issue Date : 9 September 2024

The results related only to the item calibrated. The certificate shall not be reproduced except in full, without written approval of the Innovative Instrument Co., Ltd.

FM-708-AFM-01 Rev.04 Issue date 17/6/24

Certificate No : 24-AFM-179

Request No : Req-2024-1987

Result of Calibration : Without Adjustment

Temperature (°C)	Pressure (hPa)	STD (cc/min)	UUC (cc/min)	Error (cc/min)	Uncertainty (cc/min)	MPE (cc/min)	Result
24.70	100.95	100	100.41	0.4	2.8	1.0	N/A
24.90	100.90	502	500.47	-1.5	7.1	5.0	N/A
24.90	100.97	1003	1001.3	-2	14	10.0	N/A
25.00	100.92	2014	2009.9	-4	29	20.1	N/A
25.20	101.03	3043	3058.3	15	44	30.4	N/A
25.30	101.10	4043	4005.1	-38	57	40.4	N/A
25.50	101.15	5052	5003.9	-48	74	50.5	N/A

Note

STD : Standard UUC : Unit Under Calibration

- UUC Reference Condition : At atmospheric pressure and room temperature condition

- Flow Rate was corrected for non-standard operating condition by using equation :

$$Q_{meas} = Q_{ref} \times \frac{P_{ref}}{P_{meas}} \times \frac{T_{meas}}{T_{ref}}$$

where Q = Flow Rate P = Absolute Pressure T = Absolute Temperature
Meas = Measurement Condition ref = Standard Condition

* Indicates non accredited

MPE = Maximum Permissible Error (Specified in Manufacturer's Specifications)

N/A = Not Available, Customer does not require a statement of conformity.

The results related only to the item calibrated. The certificate shall not be reproduced except in full, without written approval of the Innovative Instrument Co., Ltd.

FM-708-AFM-01 Rev.04 Issue date 17/6/24

Certificate No : 24-AFM-179

Request No : Req-2024-1987

Decision Rule for Statements of Conformity

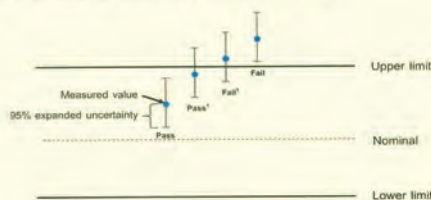
The standard decision rule employed for the statements of conformity to each calibration result will be applied using ILAC-G8:09/2019: Guidelines on the Reporting of Compliance with Specification in following Fig. and statements

Pass - The measurement result plus the expanded uncertainty with a 95% coverage probability were within the limit.

Pass¹ - The measurement result was within the limit. However, a portion of the expanded uncertainty of measurement at 95% exceeds the limit.

Fail¹ - The measurement result was out of the limit. However, a portion of the expanded uncertainty of measurement at 95% is within the limit.

Fail - The measurement result plus the expanded uncertainty with a 95% coverage probability were outside the limit.



End of Certificate

The results related only to the item calibrated. The certificate shall not be reproduced except in full, without written approval of the Innovative Instrument Co., Ltd.

FM-708-AFM-01 Rev.04 Issue date 17/6/24

Certificate of Calibration

Customer

Name : ALS Laboratory Group Thailand Co., Ltd.
Address : 104 Soi Phanthanakan 40, Phanthanakan Road, Suan Luang,
Bangkok 10250

Certificate No : 24-AFM-177

Request No : Req-2024-1862

Unit Under Calibration Details

Measurement Item : Air Flow Meter
Manufacturer : Bios
Model : Defender 510-L
Serial Number : 130026
ID : BKK_FS0619

Accuracy : 1% of Reading

Sensor Model : -

Sensor Serial Number : -

Instrument Status : Used

Location of Calibration : LAB 4 AIR VELOCITY METER

Calibration Environment and Details

Temperature : 23 °C ± 3 °C
Humidity : 55 %RH ± 20 %RH
Barometric Pressure : 1013 hPa ± 10 hPa
Received Date : 22 August 2024
Calibration Date : 9 September 2024

Calibration Procedure : In-house method CP-AFM-01 by Comparison technique with Standard Primary Flow Calibrator

Reference Standard	Model	Serial Number	Traceable	Due Calibration
Air Flow Meter	Gilibrator 3 Low flow	18501010006	Sensidyne	6 August 2025
Air Flow Meter	Gilibrator 3 Standard flow	19031011003	Sensidyne	2 August 2025
Temperature meter	GT 11	08000057	Qreborn	1 March 2025
Pressure meter	CPG2400	41000KDU/651882	TPA	9 November 2024

Traceability :

This Certificate is traceable to SI Unit through Sensidyne A2LA Accreditation No. 3943.01

Note :

The reported uncertainty is based on standard uncertainty multiplied by the Coverage Factor $k = 2$, providing a level of confidence approximately 95 %.

Calibration By : hgv
Mr. Noppadon Luangart
Service Calibration Engineer

Approved By : Mr. Pacit Mathavorn
Calibration Engineer Supervisor
Issue Date : 9 September 2024

The results related only to the item calibrated. The certificate shall not be reproduced except in full, without written approval of the Innovative Instrument Co., Ltd.

FM-708-AFM-01 Rev.04 Issue date 17/6/24



Certificate No : 24-AFM-177

Request No : Req-2024-1862

Result of Calibration : Without Adjustment

Temperature (°C)	Pressure (kPa)	STD (cc/min)	UUC (cc/min)	Error (cc/min)	Uncertainty (cc/min)	MPE (cc/min)	Result
24.70	100.92	20	20.192	0.2	1.3	0.2	N/A
24.70	100.90	100	99.923	-0.1	2.8	1.0	N/A
24.70	100.94	201	200.7	-0.3	5.6	2.0	N/A
24.70	100.97	298	300.1	2.1	8.4	3.0	N/A
24.70	100.99	403	399.1	-4	11	4.0	N/A
24.80	101.05	482	477.6	-4.4	6.9	4.8	N/A

Note STD : Standard UUC : Unit Under Calibration
- UUC Reference Condition : At atmospheric pressure and room temperature condition
- Flow Rate was corrected for non-standard operating condition by using equation :

$$Q_{meas} = Q_{ref} \times \frac{P_{ref}}{P_{meas}} \times \frac{T_{meas}}{T_{ref}}$$

where Q = Flow Rate P = Absolute Pressure T = Absolute Temperature
Meas = Measurement Condition ref = Standard Condition

* Indicates non accredited

MPE = Maximum Permissible Error (Specified in Manufacturer's Specifications)

N/A = Not Available, Customer does not require a statement of conformity.

The results related only to the item calibrated. The certificate shall not be reproduced except in full, without written approval of the Innovative Instrument Co., Ltd.

FM-708-AFM-01 Rev 04 Issue date 17/6/24



Certificate No : 24-AFM-177

Request No : Req-2024-1862

Decision Rule for Statements of Conformity

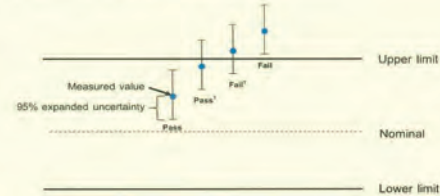
The standard decision rule employed for the statements of conformity to each calibration result will be applied using IAC-G8/09:2019: Guidelines on the Reporting of Compliance with Specification as following Fig. and statements

Pass - The measurement result plus the expanded uncertainty with a 95% coverage probability were within the limit.

Pass¹ - The measurement result was within the limit. However, a portion of the expanded uncertainty of measurement at 95% exceeds the limit.

Fail² - The measurement result was out of the limit. However, a portion of the expanded uncertainty of measurement at 95% is within the limit.

Fail - The measurement result plus the expanded uncertainty with a 95% coverage probability were outside the limit.



End of Certificate

The results related only to the item calibrated. The certificate shall not be reproduced except in full, without written approval of the Innovative Instrument Co., Ltd.

FM-708-AFM-01 Rev 04 Issue date 17/6/24



Certificate of Calibration

Certificate No. C-010925-SGK_FS0164

Air Sampling Pump Detail

Equipment name : <u>Personal Air Sampling Pump</u>	Equipment ID : <u>SGK_FS0164</u>
Brand : <u>Gilan</u>	Serial No. : <u>20190710141</u>
Model/Type : <u>GI/Air Plus</u>	Calibration Date : <u>01-Sep-25</u>
	Next calibration date : <u>01-Dec-25</u>

Reference Standard Low Flow Meter

Equipment name : <u>Air Flow Meter</u>	Equipment ID : <u>BKK_FS0619</u>
Brand : <u>MesaLabs</u>	Serial No. : <u>130026</u>
Model/Type : <u>Defender 510-L</u>	Calibration Date : <u>9-Sep-24</u>
	Due Date : <u>9-Sep-25</u>

Reference Standard High Flow Meter

Equipment name : <u>Air Flow Meter</u>	Equipment ID : <u>BKK_FS0614</u>
Brand : <u>MesaLabs</u>	Serial No. : <u>151114</u>
Model/Type : <u>Defender 510-M</u>	Calibration Date : <u>9-Sep-24</u>
	Due Date : <u>9-Sep-25</u>

Calibration Data

Air Sampling Pump setting (cc/min)	Reference Std. Flow Reading (cc/min)			Avg. (cc/min)	%Error acceptance	Acceptable range (cc/min)	Evaluation (Pass/ Fail)
	1	2	3				
Low Flow							
20	20.1	19.7	20.1	20.0	5%	19 - 21	Passed
50	50.1	51.2	52.1	51.1	5%	48 - 53	Passed
100	97.4	97.7	99.9	98.3	5%	95 - 105	Passed
200	197.4	198.4	199.7	198.5	5%	190 - 210	Passed
High Flow							
500	505.9	504.9	500.3	503.7	3%	485 - 515	Passed
1000	1001.5	996.8	1000.6	999.6	3%	970 - 1030	Passed
2000	2006.3	2006.9	2004.3	2005.8	3%	1940 - 2060	Passed
2500	2498.3	2497.2	2495.0	2496.8	3%	2425 - 2575	Passed

END OF REPORT

Calibrated By: [Signature]

(Mr. Apiwat Chanta)
SGK Field Services Scientist (2)

Issue date : 02-Sep-25

Approved By: [Signature]

(Mr. Supot Salamteh)
Field Services Section Head



Certificate of Calibration

Certificate No. C-010925-SGK_FS0165

Air Sampling Pump Detail

Equipment name : <u>Personal Air Sampling Pump</u>	Equipment ID : <u>SGK_FS0165</u>
Brand : <u>Gilan</u>	Serial No. : <u>20190710142</u>
Model/Type : <u>GI/Air Plus</u>	Calibration Date : <u>01-Sep-25</u>
	Next calibration date : <u>01-Dec-25</u>

Reference Standard Low Flow Meter

Equipment name : <u>Air Flow Meter</u>	Equipment ID : <u>BKK_FS0619</u>
Brand : <u>MesaLabs</u>	Serial No. : <u>130026</u>
Model/Type : <u>Defender 510-L</u>	Calibration Date : <u>9-Sep-24</u>
	Due Date : <u>9-Sep-25</u>

Reference Standard High Flow Meter

Equipment name : <u>Air Flow Meter</u>	Equipment ID : <u>BKK_FS0614</u>
Brand : <u>MesaLabs</u>	Serial No. : <u>151114</u>
Model/Type : <u>Defender 510-M</u>	Calibration Date : <u>9-Sep-24</u>
	Due Date : <u>9-Sep-25</u>

Calibration Data

Air Sampling Pump setting (cc/min)	Reference Std. Flow Reading (cc/min)			Avg. (cc/min)	%Error acceptance	Acceptable range (cc/min)	Evaluation (Pass/ Fail)
	1	2	3				
Low Flow							
20	19.6	20.2	20.3	20.0	5%	19 - 21	Passed
50	50.2	49.2	50.2	49.9	5%	48 - 53	Passed
100	99.2	97.8	99.1	98.7	5%	95 - 105	Passed
200	198.9	198.8	198.3	198.7	5%	190 - 210	Passed
High Flow							
500	504.5	502.2	503.4	503.4	3%	485 - 515	Passed
1000	994.6	991.2	994.2	993.4	3%	970 - 1030	Passed
2000	2008.5	2000.4	2005.2	2004.7	3%	1940 - 2060	Passed
2500	2508.4	2497.5	2506.4	2504.1	3%	2425 - 2575	Passed

END OF REPORT

Calibrated By: [Signature]

(Mr. Apiwat Chanta)
SGK Field Services Scientist (2)

Issue date : 02-Sep-25

Approved By: [Signature]

(Mr. Supot Salamteh)
Field Services Section Head

CERTIFICATE OF CALIBRATION

Page 1 of 2 Pages

MEASUREMENT ITEM

MANUFACTURER

MODEL/TYPE

SERIAL NUMBER

ID NUMBER

CONDITION AS-RECEIVED

CUSTOMER

Wind Direction Sensor

Novallux

Sensor: WS-02F

Data logger: 110-WS-25DL-D

Sensor: WS0-AS791

Data logger: AS791

SGK_F50088

Used item

ALS laboratory group (Thailand) Co., Ltd.

104 Phatthanakan 40, Phatthanakan Rd, Khwaeng Suan Luang, Khet Suan Luang, Bangkok 10250 Thailand.

Calibration procedure:

The wind direction sensor was calibrated against Standard Rotary Encoder model AX400915-DMD4-P3-S-UD in an close test-section of Eiffel-type wind tunnel with 900 cm² cross test-section area. The WI-CL-003 based on IEC 61400-12-1, Wind energy generation systems, - Part 12-1: Power performance measurements of electricity producing wind turbines, March 2017 was used as a calibration guideline.

Traceability:

This certificate provides a traceability of the measurement to recognized the national standards, and to realization of the international system of units (SI) through the NIMT (National Metrology Institute of Thailand) via Certificate Number: DA-0386-23.

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'

RECEIVED DATE

16 Aug 2024

MEASUREMENT DATE

23 Aug 2024

ISSUE DATE

23 Aug 2024

ENVIRONMENTAL CONDITIONS:

Ambient condition in the laboratory are as follow:

Temperature

23.0 ± 3.0 °C

Relative Humidity

55.0 ± 15.0 %RH

Atmospheric Pressure

1010± 10 hPa

PLACE OF CALIBRATION

Eiffel-type wind tunnel of Jiranatee Associates Co., Ltd.

CALIBRATION CONDITION

Wind tunnel cross-section area¹ 900 cm²

Wind direction frontal area² 129 cm²

Diameter of mounting pipe³ - mm

Blockage ratio of test object⁴ 0.143 [-]

Preconditioning

24 hours at ambient conditions.

Measurement Condition

The average values during measurement are (23.2)°C, (43.7) %RH and (1007.7) hPa.

TABULATION OF RESULTS:

The table on next page give the measured values.

Calibrated by:

Mr. Sorawit Thichalad

Miss Jitraporn Lertsomphol

Approved signatory:

Mr. Parinya Booncharoen
Calibration Department Manager

Remarks:

¹ Inside cross-section area of the wind tunnel

² Projected cross section area of the tested object include mounting pipe

³ Diameter of mounting pipe

⁴ Ratio = $\frac{A_o}{A_t}$

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

Page 2 of 2 Pages

MEASUREMENT RESULTS¹

The wind direction sensor was calibrated against standard rotary encoder by comparison method. During calibration, the measurement was carried out at 45° intervals in clockwise and counterclockwise directions after offset adjustment has been made. The flow speed of wind tunnel (usually 5 m/s) is kept constant while the sensor is rotated around its vertical axis. The results of calibration and associated measurement uncertainties are reported in the table below.

Air speed	D _{sen}	D _{sen}	Error	U (k=2)
m/s	Degree (°)	Degree (°)	Degree (°)	Degree (°)
5.04	45.000	42	-3	0.80
	90.000	88	-2	0.80
	135.000	135	0	0.80
	180.000	182	2	0.80
	225.000	228	3	0.80
	270.000	275	3	0.80
	315.000	318	3	0.80
	360.000	359	-1	0.80

Remark:

¹ Calibration results only cover for the tested circumstances and environmental conditions during which calibration took place.

² Direction of standard

³ Direction of Unit Under Calibration.

End of Certificate of Calibration



CERTIFICATE OF CALIBRATION

Certificate No. : CPR-012-67

Page 1 of 2 Pages

MEASUREMENT ITEM

MANUFACTURER

MODEL/TYPE

SERIAL NUMBER

ID NUMBER

CONDITION AS-RECEIVED

CUSTOMER

Digital barometer

Novallux

Sensor: 110-WS-25BP

Data logger: 110-WS-25DL-D

Sensor: BP-AS791

Data logger: AS791

SGK_F50088

Used item

ALS laboratory group (Thailand) Co., Ltd.

104 Phatthanakan 40, Phatthanakan Rd, Khwaeng Suan Luang, Khet Suan Luang, Bangkok 10250 Thailand.

Calibration procedure:

The Digital barometer was calibrated against Digital pressure calibrator. The WI-CL-003 was used as a calibration guideline.

Traceability:

The measurement results are traceable to the international system of units (SI) through the NIMT (National Metrology Institute of Thailand) via Certificate number: MP-0009-24

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'

RECEIVED DATE

16 Aug 2024

MEASUREMENT DATE

23 Aug 2024

ISSUE DATE

23 Aug 2024

CONDITION OF THIS RESULT OF CALIBRATION:

1. Reference Standard Instrument:

Instrument

Model

Serial No.

Certificate No.

Due Date

Absolute Pressure Transducer

CPG2500

4100126P

MP-0009-24

27 Dec 2024

2. Calibration effort for calibration sequence C

3. The UUC* was installed in vertical orientation above reference standard instrument and center of UUC* was used as the reference level.

3. Calibration conditions:

4. Condition

☒ Normal ☐ Abnormal

Pressure transmitting medium

Air

ρ_{air} (20°C, 1 bar)

ρ_{air} (20°C, 1 bar)

ρ_{air} (20°C, 1 bar)

ρ_{air} (20°C, 1 bar)

ρ_{air} (20°C, 1 bar)

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

Calibrated by:

Mr. Sorawit Thichalad

Miss Jitraporn Lertsomphol

Approved signatory:

Mr. Parinya Booncharoen
Calibration Department Manager

Certificate No. : CPR-012-67

Page 2 of 2 Pages

MEASUREMENT RESULTS

☐ Without adjustment ☒ With adjustment

CALIBRATION IN THE RANGE OF

950 mbar to 1050 mbar

The results of calibration and associated measurement uncertainties are reported in the table below.

STD	UUC*	Error	Uncertainty (k=2)
(mbar)	(mbar)	(mbar)	(mbar)
950.03	951.6	1.6	0.37
970.01	971.3	1.3	0.37
989.96	990.8	0.9	0.39
1010.03	1010.4	0.4	0.37
1030.02	1030.0	0.0	0.40
1050.02	1049.4	-0.6	0.40

Note: UUC* Unit Under Calibration

To convert the result in report unit to Pa should be multiply by 100

End of certificate



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



JIRANATEE ASSOCIATES CO., LTD.

Jiranatee Associates Co., Ltd.
63/39-35, 67/35-36
Petchkasem 7, 7/71, Rd. Wattana, Bangkok, Thailand 10600 (Thailand)
Tel: +6683999453
Mobile: +6683999453
E-mail: jnac-calibration@jiranatee.com
Web site: www.jiranatee.com

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

Air speed measurement laboratory
Calibration services department.



NSC-TIS-TS 17025
CALIBRATION 0367

Certificate Number

CWS-035-67

CERTIFICATE OF CALIBRATION

Page 1 of 2 Pages

MEASUREMENT ITEM

: Cup anemometer

MANUFACTURER

: Novalyne

MODEL/TYPE

: Sensor: WS-02F

Data logger: 200-WS-25LB

SERIAL NUMBER

: Sensor: WSD-AS379

Data logger: AS379

ID NUMBER

: BKK_950919

CONDITION AS-RECEIVED

: Used item

CUSTOMER

: AIS laboratory group (Thailand) Co., Ltd.

104 Phatthanakan 40, Phatthanakan Rd, Khwaeng Suan Luang,

Khet Suan Luang, Bangkok 10250 Thailand.

RECEIVED DATE

: 16 Aug 2024

MEASUREMENT DATE

: 26 Aug 2024

ISSUE DATE

: 26 Aug 2024

ENVIRONMENTAL CONDITIONS:

Ambient condition in the laboratory are as follow:

Temperature : 23.0 ± 3.0 °C

Relative Humidity : 55.0 ± 15.0 %RH

Atmospheric Pressure : 1010 ± 10 hPa

PLACE OF CALIBRATION

: Effel-type wind tunnel of Jiranatee Associates Co., Ltd.

CALIBRATION CONDITIONS

: Wind tunnel cross-section area¹ 900 cm²

Wind direction frontal area² 100 cm²

Diameter of mounting pipe³ - mm

Blockage ratio of test object⁴ 0.111 [-]

Preconditioning

: 24 hours at ambient conditions.

Measurement Condition

: The average values during measurement are (23.3) °C, (43.8) %RH and (1006.2) hPa.

TABULATION OF RESULTS:

The table on next page give the measured values.

Calibrated by:

☒ Mr. Sorawit Thadphad

☐ Miss Jittrapat Lertsomphol



Approved signatory:

Mr. Parinya Booncharoen

Calibration Department Manager

Remarks:

¹ Nozzle cross-section area of the wind tunnel

² Projected cross-section area of the tested object include mounting pipe

³ Diameter of mounting pipe

⁴ Ratio S_o/S_1

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

Page 2 of 2 Pages

MEASUREMENT RESULTS⁵

The Cup anemometer, Unit Under Calibration (UUC) was exercise at 10 m/s for 5 minutes prior to calibration being performed. The standard air velocity 0.5 m/s to 5 m/s was calculated by a standard air velocity transducer which was installed 50 mm away from wind tunnel nozzle and installed 40 mm away from top of the test section and the standard air velocity 5 m/s to 20 m/s was calculated by a pitot tube with precision differential pressure meter which was installed 50 mm away from wind tunnel nozzle and installed 40 mm away from top of the test section. UUC was mounted on a round vertical tube of the lower plate at center of test section. The calibration was carried out under both rising and falling air velocity in the range of 1 m/s to 16 m/s at calibration interval of 1 m/s. The results of calibration and associated measurement uncertainties are reported in the table below.

V_{ref} (m/s)	Temp. wind tunnel (°C)	Temp. room (°C)	V_{UUC} (m/s)	Error (m/s)	U (k=2) (m/s)
1.001	23.26	23.30	0.9	-0.1	0.31
2.069	23.40	23.30	1.9	-0.2	0.31
2.954	23.30	23.30	2.9	-0.1	0.31
4.068	23.30	23.30	3.9	-0.2	0.31
4.97	23.16	23.30	5.0	0.0	0.31
6.00	23.14	23.30	6.0	0.0	0.31
7.02	23.00	23.30	7.1	0.1	0.31
7.97	23.30	23.30	8.1	0.1	0.31
8.98	23.04	23.30	9.1	0.1	0.31
9.97	23.80	23.30	10.1	0.1	0.31
10.93	23.10	23.30	11.2	0.2	0.31
12.01	23.20	23.30	12.2	0.2	0.31
12.95	23.20	23.30	13.2	0.2	0.31
14.07	23.20	23.30	14.2	0.1	0.31
15.00	23.20	23.30	15.2	0.2	0.31
15.99	23.20	23.30	16.2	0.2	0.35

Remark:

⁵ Calibration results only count for the tested circumstances and environmental conditions during which calibration took place.

¹ Velocity of standard

² Velocity of Unit Under Calibration

PHOTO OF CALIBRATION SET-UP



Calibration set-up of the Cup anemometer calibration in the wind tunnel of Jiranatee Associates Co., Ltd. The Cup anemometer shown may differ from the calibrated one. Remark: The proportion of the set-up is not true to scale due to imaging geometry.

End of Certificate of Calibration

J NAC

JIRANATEE ASSOCIATES CO., LTD.

Certificate Number

CWS-035-67



JIRANATEE ASSOCIATES CO., LTD.

Jiranatee Associates Co., Ltd.
63/39-35, 67/35-36
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Tel: +6683999453
Mobile: +6683999453
E-mail: jnac-calibration@jiranatee.com
Web site: www.jiranatee.com

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

Wind direction measurement laboratory
Calibration services department.



NSC-TIS-TS 17025
CALIBRATION 0367

Certificate Number

CWD-035-67

CERTIFICATE OF CALIBRATION

Page 1 of 2 Pages

MEASUREMENT ITEM

: Wind Direction Sensor

MANUFACTURER

: Novalyne

MODEL/TYPE

: Sensor: WS-02F

Data logger: 200-WS-25LB

SERIAL NUMBER

: Sensor: WSD-AS379

Data logger: AS379

ID NUMBER

: BKK_950919

CONDITION AS-RECEIVED

: Used item

CUSTOMER

: AIS laboratory group (Thailand) Co., Ltd.

104 Phatthanakan 40, Phatthanakan Rd, Khwaeng Suan Luang,

Khet Suan Luang, Bangkok 10250 Thailand.

RECEIVED DATE

: 16 Aug 2024

MEASUREMENT DATE

: 26 Aug 2024

ISSUE DATE

: 26 Aug 2024

ENVIRONMENTAL CONDITIONS:

Ambient condition in the laboratory are as follow:

Temperature : 23.0 ± 3.0 °C

Relative Humidity : 55.0 ± 15.0 %RH

Atmospheric Pressure : 1010 ± 10 hPa

PLACE OF CALIBRATION

: Effel-type wind tunnel of Jiranatee Associates Co., Ltd.

CALIBRATION CONDITION

: Wind tunnel cross-section area¹ 900 cm²

Wind direction frontal area² 129 cm²

Diameter of mounting pipe³ - mm

Blockage ratio of test object⁴ 0.143 [-]

Preconditioning

: 24 hours at ambient conditions.

Measurement Condition

: The average values during measurement are (23.4) °C, (42.5) %RH and (1008.4) hPa.

TABULATION OF RESULTS:

The table on next page give the measured values.

Calibrated by:

☒ Mr. Sorawit Thadphad

☐ Miss Jittrapat Lertsomphol



Approved signatory:

Mr. Parinya Booncharoen

Calibration Department Manager

Remarks:

¹ Nozzle cross-section area of the wind tunnel

² Projected cross-section area of the tested object include mounting pipe

³ Diameter of mounting pipe

⁴ Ratio S_o/S_1

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

Page 2 of 2 Pages

MEASUREMENT RESULTS⁵

The wind direction sensor was calibrated against standard rotary encoder by comparison method. During calibration, the measurement was carried out at 45° intervals in clockwise and counter-clockwise directions after adjust adjustment has been made. The flow speed of wind tunnel (usually 5 m/s) is kept constant while the sensor is rotated around its vertical axis. The results of calibration and associated measurement uncertainties are reported in the table below.

Air speed m/s	D'_{ref} Degree (°)	D'_{UUC} Degree (°)	Error Degree (°)	U (k=2) Degree (°)
5.03	0.000	0	0	0.80
	45.000	42	-3	0.80
	90.000	87	-3	0.80
	135.000	133	-2	0.80
	180.000	181	1	0.80
	225.000	229	4	0.80
	270.000	275	5	0.80
	315.000	320	5	0.80

Remark:

⁵ Calibration results only count for the tested circumstances and environmental conditions during which calibration took place.

¹ Direction of standard

² Direction of Unit Under Calibration

End of Certificate of Calibration

J NAC

JIRANATEE ASSOCIATES CO., LTD.

Certificate Number

CWD-035-67

Cert. No. : ACC24073
Pages : 1 of 3

Calibration Certificate

Equipment : SOUND CALIBRATOR
Manufacturer : RION
Model : NC-75
Serial No. : 35024429
ID No. : SGK_FS0114

REVIEW BY : *Spt S*

APPROVED BY : *[Signature]*

NEXT CAL DATE : 11 /12 /25

Condition As Found : GOOD

Customer : ALS LABORATORY GROUP (THAILAND) CO., LTD.
104 PHATTHANAKAN 40, PHATTHANAKAN ROAD,
KHWAENG PHATTHANAKAN, KHET SUAN LUANG,
BANGKOK, 10250 THAILAND.

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

Received Date : 26 NOVEMBER 2024
Calibration Date : 11 DECEMBER 2024
Date of Issue : 11 DECEMBER 2024

Calibrated by : Nathakorn Pisutpaisan

Approved by : *T. Petchu*
(Thanakul Petchurai)

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. : ACC24073
Job No. : VC67AC0167
Pages : 2 of 3

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-0007-24	05-FEB-25
Digital Multimeter	33461A	MY53220104	EEL_BP 21/0267	13-FEB-25
Digital Multimeter	33461A	MY53220076	EEL_BP 20/0267	15-FEB-25
Digital Multimeter	33461A	MY60024273	EEL_BP 22/0267	15-FEB-25
Programmable Attenuator	MAT-1070	62100114	EF-0008-24	05-FEB-25
Condenser Microphone	4180	2977900	AA-1001-24	12-FEB-25
Measuring Amplifier	NA-42KA1	34560495	AA-3001-24	05-FEB-25
Audio Analyzer	AVR-3360A	V744B6069	EF-0009-24	09-FEB-25

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).

T. Petchu

Cert. No. : ACC24073
Job No. : VC67AC0167
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	93.97	-0.03	0.14	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 (%)
0.15	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

T. Petchu

Cert. No. : ACL25016
Pages : 1 of 8

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-42 / Microphone UC-52 / Preamplifier NH-24
Serial No. : 00873118 / 182836 / 73494
ID No. : SGK_FS0026

Condition As Found : GOOD

Customer : ALS LABORATORY GROUP (THAILAND) CO., LTD.
104 PHATTHANAKAN 40, PHATTHANAKAN ROAD,
KHWAENG PHATTHANAKAN, KHET SUAN LUANG,
BANGKOK, 10250 THAILAND.

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

Received Date : 19 DECEMBER 2024
Calibration Date : 09 - 10 JANUARY 2025
Date of Issue : 13 JANUARY 2025

REVIEW BY : *Spt S*

APPROVED BY : *[Signature]*

NEXT CAL DATE : 09 / 01 / 26

Calibrated by : Nathakorn Pisutpaisan

Approved by : *T. Petchu*
(Thanakul Petchurai)

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Cert. No. : ACL25016
Job No. : VC68AC0053
Pages : 2 of 8

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 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-0009-24	05-FEB-25
Waveform Generator	33511B	MY52302742	EF-0007-24	05-FEB-25
Digital Multimeter	33461A	MY53220104	EEL_BP 21/0267	13-FEB-25
Digital Multimeter	33461A	MY53220076	EEL_BP 20/0267	15-FEB-25
Digital Multimeter	34461A	MY60024273	EEL_BP 22/0267	15-FEB-25
Programmable Attenuator	MAT-1070	62100114	EF-0008-24	05-FEB-25
Condenser Microphone	4180	2977900	AA-1001-24	12-FEB-25
Measuring Amplifier	NA-42KA1	34560495	AA-3001-24	05-FEB-25

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).

Z. Petch

Cert. No. : ACL25016
Job No. : VC68AC0053
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

Z. Petch

Cert. No. : ACL25016
Job No. : VC68AC0053
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)
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	17.9
Flat	23.5

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	0.1	0.1	0.1	±1.5
1000	0.1	0.1	0.1	±1.0
8000	1.4	1.4	1.4	±5.0

Z. Petch

Cert. No. : ACL25016
Job No. : VC68AC0053
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	-0.2	-0.1	±2.0
125	-0.1	0.0	0.0	±1.5
250	0.0	-0.1	-0.1	±1.5
500	0.0	0.0	-0.1	±1.5
1000	0.0	0.0	0.0	±1.0
2000	0.0	0.0	0.0	±2.0
4000	0.0	0.0	0.0	±3.0
8000	0.0	0.0	0.0	±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

Z. Petch

Cert. No. : ACL25016
Job No. : VC68AC0053
Pages : 6 of 8

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	135.1	0.1	± 1.1
134.0	134.1	0.1	± 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	129.1	0.1	± 1.1
124.0	124.0	0.0	± 1.1
119.0	119.1	0.1	± 1.1
114.0	114.1	0.1	± 1.1
109.0	109.1	0.1	± 1.1
104.0	104.1	0.1	± 1.1
99.0	99.1	0.1	± 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	28.9	-0.1	± 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	24.9	-0.1	± 1.1

T. Retch

Cert. No. : ACL25016
Job No. : VC68AC0053
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	116.9	-0.1	1.0 ; -2.5
	200	800	134.0	134.0	0.0	±1.0
Slow	2	8	108.0	108.0	0.0	1.5 ; -5.0
	200	800	127.6	127.6	0.0	±1.0
SEL	0.25	1	99.0	98.8	-0.2	1.5 ; -5.0
	2	8	108.0	107.9	-0.1	1.0 ; -2.5
	200	800	128.0	128.0	0.0	±1.0

T. Retch

Cert. No. : ACL25016
Job No. : VC68AC0053
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	±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 %

End of Calibration Certificate

T. Retch

451-451/1 Sirinthon Road, Bangbunru, Bangkok, 10700 Thailand
Tel. +66 2433 8331 Email : calibration@sithiporn.comCert. No. : ACL25219
Pages : 1 of 8

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-52A / Microphone UC-59 / Preamplifier NH-25
Serial No.: 00331096 / 22929 / 22571
ID No.: SGK_FS0133

Condition As Found : GOOD

Customer : ALS LABORATORY GROUP (THAILAND) CO., LTD.
104 PHATTHANAKAN 40, PHATTHANAKAN ROAD,
KHAENG PHATTHANAKAN, KHET SUAN LUANG,
BANGKOK, 10250 THAILAND.

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

Received Date : 26 MAY 2025
Calibration Date : 05 JUNE 2025
Date of Issue : 06 JUNE 2025

Calibrated by :

Nathakorn Pisutpaisan

Approved by :

Wichok E.
(Wichok Ekpongpradit)

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Cert. No. : ACL25219
Job No. : VC68AC0112
Pages : 2 of 8

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 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
Programable 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).

Nichol E.

Cert. No. : ACL25219
Job No. : VC68AC0112
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

Nichol E.

Cert. No. : ACL25219
Job No. : VC68AC0112
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)
13.4

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	14.3
Flat	19.8

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	0.4	0.4	0.4	± 1.0
1000	0.2	0.2	0.2	± 0.7
8000	0.5	0.6	0.6	+ 1.5, - 2.5

Nichol E.

Cert. No. : ACL25219
Job No. : VC68AC0112
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	0.1	0.0	0.1	±1.0
125	0.1	0.1	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

Nichol E.

Cert. No. : ACL25219
Job No. : VC68AC0112
Pages : 6 of 8

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

Wichok E.

Cert. No. : ACL25219
Job No. : VC68AC0112
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
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

Wichok E.

Cert. No. : ACL25219
Job No. : VC68AC0112
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	133.3	-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		
89.5	89.6	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

Wichok E.

451-451/1 Sinthorn Road, Bangbunru, Bangkok, 10700 Thailand
Tel. +66 2433 8331 Email : calibration@sithiporn.comCert. No. : ACL25220
Pages : 1 of 8

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-52A / Microphone UC-59 / Preamplifier NH-25
Serial No.: 00331097 / 22940 / 22572
ID No.: SGK_FS0134

Condition As Found : GOOD

Customer : ALS LABORATORY GROUP (THAILAND) CO., LTD.
104 PHATTHANAKAN 40, PHATTHANAKAN ROAD,
KHWANG PHATTHANAKAN, KHET SUAN LUANG,
BANGKOK, 10250 THAILAND.

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

Received Date : 26 MAY 2025
Calibration Date : 05 JUNE 2025
Date of Issue : 06 JUNE 2025

REVIEW BY : *S.T.S.*
APPROVED BY : *S.T.S.*
NEXT CAL DATE : 04/06/2026

Calibrated by : Nathakorn Pisutpaisan

Approved by : *Wichok E.*
(Wichok Ekpongpradit)

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. : ACL25220
Job No. : VC68AC0112
Pages : 2 of 8

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 weightings 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-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).

นงศกร ข.

Cert. No. : ACL25220
Job No. : VC68AC0112
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

นงศกร ข.

Cert. No. : ACL25220
Job No. : VC68AC0112
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)
14.6

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	16.8
Flat	22.6

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	Acceptance Limits
125	0.4	0.4	0.4	± 1.0
1000	0.2	0.2	0.2	± 0.7
8000	0.5	0.6	0.6	+ 1.5, - 2.5

นงศกร ข.

Cert. No. : ACL25220
Job No. : VC68AC0112
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	-0.1	0.0	±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	-0.1	±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	0.0	0.0	+ 1.5, - 2.5
16000	0.0	-1.3	-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

นงศกร ข.

Cert. No. : ACL25220
Job No. : VC68AC0112
Pages : 6 of 8

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	135.1	0.1	±0.8
134.0	134.1	0.1	±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	119.1	0.1	±0.8
114.0	114.1	0.1	±0.8
109.0	109.0	0.0	±0.8
104.0	104.1	0.1	±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	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	34.0	0.0	±0.8
30.0	30.0	0.0	±0.8
29.0	29.0	0.0	±0.8
28.0	27.9	-0.1	±0.8
27.0	27.0	0.0	±0.8
26.0	26.0	0.0	±0.8
25.0	24.9	-0.1	±0.8

Nikhon E.

Cert. No. : ACL25220
Job No. : VC68AC0112
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	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
SEL	0.25	1	99.0	98.8	-0.2	1.0; -3.0
	2	8	108.0	107.9	-0.1	1.0; -1.5
	200	800	128.0	128.0	0.0	±0.5

Nikhon E.

Cert. No. : ACL25220
Job No. : VC68AC0112
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	133.3	-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		
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	±0.1

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

Nikhon E.



Southern Calibration Service Co., Ltd.

669/35 Kamjanavanit Rd., Banpru, Hatyai, Songkla 90250 Thailand

Tel : 08 1599 0412 Fax : 0 7480 5133 Email : s.calibration@gmail.com www.scal-lab.com



CALIBRATION CERTIFICATE

Issued Date : 13-Jan-2025

Certificate No. : 25TH0226

CSR No. : A10105028

Page : 1 of 3

Customer

ALG Laboratory Group (Thailand) Co., Ltd

114/1 Moo 8, Kamchanawanich Rd. Tambon Ban Phru, Amphoe Hat Yai, Songkhla, 90250

Calibration Place

Customer Laboratory

Instrument Name

Incubator

Manufacturer

Memmert

Model

ICP750

Serial No.

F816.0063

ID No.

SGK_CL0028

Resolution

0.1 °C

Received Date

10-Jan-2025

Calibrated Date

10-Jan-2025

Ambient Temperature

(30 ± 10) °C

Relative Humidity

(50 ± 30) %

REVIEW BY Ananta B.

APPROVED BY Nikhon E.

NEXT CAL. DATE 10/1/26

Calibration Method Used :

This instrument was calibrated using the Calibration In - house method : SCAL.WI.012 based on GLA - 20

The Southern Calibration Service Co., Ltd calibration control system complies with requirement of ISO/IEC 17025:2017

Traceability of measurement :

This Certificate is traceable to the International and/or national standards which realize the units of measurement according to the International System of Unit (SI) through :

TISTR / Thailand Institute of Scientific and Technological Research

Calibrated by : Ibrohim, Saleem

Approved by : Nikhon E.
Nikhon Rattanayum / Technical Manager



The uncertainties are for a confidence probability of approximately 95%

This certificate may not be reproduced other than in full, except with the prior written approval of Southern Calibration Service Co., Ltd.



Certificate No. : 25TH0226
CSR No. : A101/05026
Page. : 2 of 3

Details of Calibration

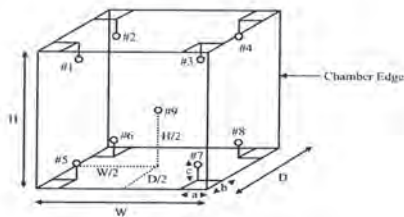
1. Reference Standard Equipment Used:

Equipment	Model	Serial No.	Cert. no.	Due Date
Data Acquisition/Switch Unit	34970A	MY58009813	PSL-T0707-1/67	22-May-2025

- The results reported in this certificate refer to the condition of the instrument on the date of calibration and carry no implication regarding the long-term stability of instrument.
- This certificate is not certified any commercial transaction
- Condition of item : normal condition, no indication for any damage or malfunction

Result of Calibration : (✓) Without Adjustment () After Adjustment

1. Sensor Installation Diagram



Sensor Installation Details

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

Dimension of the chamber

W = 104.0 cm
H = 120.0 cm
D = 60.0 cm



Certificate No. : 25TH0226
CSR No. : A101/05026
Page. : 3 of 3

Result of Calibration :

2. Temperature Measurement Accuracy Test

The measurement results of the Incubator and associates are reported in the manner as shown below

Cal point (°C)	Measured Standard Temperature At Spread Locations (°C)									Uncertainty (±°C)
	#1	#2	#3	#4	#5	#6	#7	#8	Ref. 9	
20	20.03	20.23	20.37	20.34	20.32	20.03	20.19	20.31	20.06	0.38

3. Performance Result

The performance of the Incubator are reported as shown below

Cal point (°C)	UUC Setting (°C)	UUC Reading (°C)	Temperature Stability (±°C)	Temperature Uniformity (°C)	Overall Variation (°C)
20	20.0	20.0	0.10	0.31	0.40

UUC = Unit Under Calibration

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

... End ...



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



Certificate of Calibration

Cert. No.: 25LM26
Page.: 1 of 2

Equipment : DO Meter with Sensor
Manufacturer : YSI
Model : 4010-1W
Serial No. : 24200618
ID No. :
Submitted by : ALS Laboratory Group (Thailand) Co.,Ltd. Songkhla Branch.
114/1 Moo 8 Kamchanawanich Rd.,
T.Ban Phru, A.Hat Yai,
Songkhla 90250 Thailand
Location : TPA Calibration Laboratory
Received Order : 21 February 2025
Calibrated Date : 24 February 2025
Ambient Temperature : (26 ± 10) °C
Relative Humidity : (50 ± 30) %
AC Line Voltage : (220 ± 22) V

Calibrated by : Warakorn Lerngagtrakul

Approved by :

- () Chakrit Waewwanjua
() Suwit Injai
(✓) Kunchit Promprat

Issue Date : 25 February 2025

The Uncertainties are for a confidence probability of approximately 95%

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



Equipment : DO Meter with Sensor
Condition As-Received : Used Item
Reference : 2502-0715WC-2

Cert. No.: 25LM26
Page.: 2 of 2

Procedure Used :-

Calibration were conducted using in-house calibration procedure CP-OT01 according to comparison with Industrial Platinum Resistance Thermometer (IPRT) into Temperature Bath.

The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standard instrument:-

Instrument	Serial No.	Cert. No.	Traceable	Due Date
1) Digital Thermometer	2188080	2411022	TPA	17 Sep 2025
2) This certificate is valid only to the item calibrated on date and place of calibration.				
3) This certificate is traceable to the International System of Unit.				

Remark : TPA : Technology Promotion Association (Thailand - Japan)

Result of Calibration :- (*) Without Adjustment

Function : Temperature measurement.

This instrument was connected with temperature sensor, S/N: 24F102419

Calibration Point (°C)	Immersion Depth (mm)	Standard Temperature (°C)	UUC* Reading (°C)	Error (°C)	Uncertainty (± °C)	Coverage Factor k
20.0	60	20.003	20.0	-0.003	0.16	2.00

UUC* : Unit Under Calibration

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

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Certificate of Testing

Cert.No.: 25TW32
Page.: 1 of 2

Equipment : DO Meter
Manufacturer : YSI
Model : 4010-1W
Serial No. : 24200618
ID No. : -
Received Date : 21 February 2025
Test Date : 24 February 2025
Reference : 2502-0715WC-1
Submitted by : ALS Laboratory Group (Thailand) Co., Ltd.
Songkhla Branch,
114/1 Moo 8 Kamchanawanich Rd., T.Ban Phru,
A.Hat Yai, Songkhla 90250 Thailand

Laboratory Condition : Temperature (25 ± 5) °C
Humidity (50 ± 20) %
Test Procedure : In-house method : CP-CH9
by Comparison Technique with Azide Modification Method

REVIEW BY Ananta B.
APPROVED BY Kanitta H.
NEXT CAL. DATE 24/2/26

Tested by : Walalak Sirthean

Approved by : Saithip
Approved Signatory

() Chakrit Waewwanjua
() Ponpan Palpim
(✓) Saithip Meangmai

Issue Date : 25 February 2025



Cert.No.: 25TW32
Page.: 2 of 2

Condition of this result of calibration

1. Reference Standard Instruments :
This certification is traceable to the International System of Unit through the reference standards laboratory of Industrial Calibration Center, Technology Promotion Association (Thailand-Japan).

Instruments	Serial No.	ID No.	Certificate No.	Due Date
1. Burette	-	130BU10	23CG1172	22 Mar 2025
2. Balance	14233821	110RC001	24MM131	04 July 2025

2. Standard Material :-

Material	Manufacturer	Lot.No.	Assay
Sodium Thiosulfate 5-Hydrate AR	KEMAUS	2203162447	99.6%

Result : Dissolved Oxygen Meter Adjustment With Air 100 %
Dissolved Oxygen Probe No.: 24F102419

Titration Method (Azide Modification Method) (mg/L)	DO Meter Reading (mg/L)	Standard Deviation (mg/L)
8.22	8.28	0.0089

This report was certified only for the instrument we tested. It is allowable to use for study
Intend to use for advertising and referral purpose is prohibited. This report may not be reproduced
other in full, without written approval of the laboratory

-o-o-

Southern Calibration Service Co., Ltd.

669/35 Karnjanavanit Rd., Banpru, Hatyai, Songkla 90250 Thailand
Tel : 08 1599 0437 Fax : 0 7480 5133 Email : s.calibration@gmail.com www.scal-lab.com



CALIBRATION CERTIFICATE

Issued Date : 22-Oct-2024

Certificate No. : 24CH0526

CSR No. : A163/08133

Page : 1 of 2

Customer : ALS Laboratory Group (Thailand) Co., Ltd.
114/1 Moo 8, Kamchanawanich Rd., Tambon, Ban Phru,
Amphoe Hat Yai, Songkhla, 90250

Calibration Place : Chemical Laboratory
Instrument Name : pH meter
Manufacturer : Mettler Toledo
Model : S220
Serial No. : B625631849
ID No. : SGK_CL0030
Electrode No. : 2281592
Received Date : 19-Oct-2024
Calibrated Date : 19-Oct-2024
Ambient Temperature : (25 ± 3) °C
Relative Humidity : (55 ± 15) %

REVIEW BY Ananta B.
APPROVED BY Kanitta H.
NEXT CAL. DATE 19/10/26

Calibration Method Used :

This instrument was calibrated using the Calibration In-house method : SCAL.WI.008 based on direct measurement by using certified reference Material (CRM)

The Southern Calibration Service Co., Ltd. calibration control system complies with requirement of ISO/IEC 17025:2017

Traceability of measurement :

This Certificate is traceable to the International and/or national standards which realize the units of measurement according to the International System of Unit (SI) through :

- CPAchem : CPAchem Ltd.
- WK : WK Electric Co., Ltd.
- SCAL : Southern Calibration Service Co., Ltd.

Calibrated by : Aisara Ma

Approved by :

Imron Rattanyum / Technical Manager



The uncertainties are for a confidence probability of approximately 95%

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Certificate No. : 24CH0526
CSR No. : A163/08133
Page : 2 of 2

Details of Calibration

1. Reference Standard Equipment Used:

Equipment	Model	Serial No.	Cert. No.	Due Date
Standard Solution	4.000	61310674	1042701	26-Oct-2025
Standard Solution	7.000	61314184	1042709	26-Oct-2025
Standard Solution	10.01	61313804	1042702	26-Oct-2025
Temperature/Electrical Calibrator	MC2-TE	14987	WK2106-299-223	31-May-2025
Digital Thermometer With Sensor	DP-77	L382895	24SDTH005	7-Aug-2025

2. The results reported in this certificate refer to the condition of the instrument on the date of calibration and carry no implication regarding the long-term stability of instrument.

3. This certificate is not certified any commercial transaction

4. Condition of item : normal condition, no indication for any damage or malfunction

Result of Calibration :

1. Electrical Measurement

Applied Voltage (mV)	pH meter Reading (mV)	pH (pH)	Correction (mV)	Uncertainty (± mV)
177.48	177.5	4.00	-0.02	0.17
0.00	0.0	7.00	0.00	0.13
-177.48	-177.5	10.00	0.02	0.17

2. Before Sample Test Measurement

Standard Buffer Solutions (pH)	pH meter Reading (pH)	mV (mV)	Correction (pH)	Uncertainty (± pH)
4.007	3.99	178.1	0.017	0.0092
6.976	7.02	1.7	-0.044	0.019
10.009	9.96	-169.8	0.049	0.038

3. After Sample Test Measurement

Standard Buffer Solutions (pH)	pH meter Reading (pH)	mV (mV)	Correction (pH)	Uncertainty (± pH)
4.007	3.99	177.7	0.017	0.0092
6.976	7.01	3.7	-0.034	0.019
10.009	10.00	-169.0	0.009	0.038

4. Temperature Measurement

Cal Point (°C)	Standard Temperature (°C)	UUC Reading (°C)	Correction (°C)	Uncertainty (± °C)
25	25.021	25.0	0.02	0.060

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

... End ...



CARIBRATION CERTIFICATE

Issued Date : 13-Jan-2025

Certificate No. : 25MA0125

CSR No. : A101/05028

Page : 1 of 3

Customer : ALS Laboratory Group (Thailand) Co., Ltd.
114/1 Moo 8, Kamchanawanit Rd., Tambon, Ban Phru,
Amphoe Hat Yai, Songkhla, 90250

Calibration Place : Customer Laboratory
Instrument Name : Analytical Balance
Manufacturer : Sartorius
Model : MSE224S-100-DU
Serial No. : 34705158
ID No. : SGK_CL0045
Resolution : 0.0001 g
Received Date : 10-Jan-2025
Calibrated Date : 10-Jan-2025
Ambient Temperature : (30 ± 10) °C
Relative Humidity : (50 ± 20) %

REVIEW BY : *Ananta B.*
APPROVED BY : *Kamthai H.*
NEXT CAL. DATE : 13/1/26

Calibration Method Used :

This instrument was calibrated using the Calibration In-house method: SCAL.WI.001 based on UKAS LAB 14: 2015
The Southern Calibration Service Co., Ltd. calibration control system complies with requirement of ISO/IEC 17025:2017

Traceability of measurement :

This Certificate is traceable to the International and/or national standards which realize the units of measurement according to the International System of Unit (SI) through
- SCAL: Southern Calibration Service Co., Ltd.

Calibrated by : Hachbordon Dattawee

Approved by :

Imron Rattanyulim / Technical Manager



The uncertainties are for a confidence probability of approximately 95%

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Certificate No. : 25MA0125

CSR No. : A101/05028

Page : 2 of 3

Details of Calibration

1. Reference Standard Equipment Used:

Equipment	Model	Serial No.	Cert. no.	Due Date
Standard Weight Set	2 mg - 1 kg	11119514/01	24SW5001	3-Jul-2025

2. The results reported in this certificate refer to the condition of the instrument on the date of calibration and carry no implication regarding the long-term stability of instrument.

3. This certificate is not certified any commercial transaction

4. Condition of item : normal condition, no indication for any damage or malfunction

Result of Calibration : (✓) Without Adjustment () After Adjustment

1. Repeatability

Nominal Value (g)	Standard Deviation (g)
10	0.0000
20	0.0000
200	0.0000

2. Effect of tare

Nominal Value (g)	Standard Value (g)	Balance Reading (g)	Correction (g)
20	20.0000	20.0000	0.0000
40	40.0001	40.0000	0.0001
60	60.0000	60.0000	0.0000
80	80.0001	80.0000	0.0001
100	100.0000	100.0000	0.0000



Certificate No. : 25MA0125

CSR No. : A101/05028

Page : 3 of 3

Result of Calibration :

3. Off-centre loading

A mass approximately 100g was placed on a pan and moved to various position.

The balance reading obtained are given in the table.

Position					Maximum Difference (g)
1	2	3	4	5	
100.0000	100.0000	100.0000	100.0000	100.0001	0.0001



4. Departure from nominal value

Nominal Value (g)	Standard Value (g)	UUC Reading (g)	Correction (g)	Uncertainty (±g)	Coverage Factor (k)
0.01	0.0100	0.0100	0.0000	0.00008	2.0
0.1	0.1000	0.1000	0.0000	0.00008	2.0
0.5	0.5000	0.5000	0.0000	0.00008	2.0
1	1.0000	1.0000	0.0000	0.00008	2.0
2	2.0000	2.0000	0.0000	0.00008	2.0
5	5.0000	5.0000	0.0000	0.00009	2.0
10	10.0000	10.0000	0.0000	0.00009	2.0
20	20.0000	20.0000	0.0000	0.00009	2.0
40	40.0001	40.0000	0.0001	0.00011	2.0
50	50.0000	50.0000	0.0000	0.00013	2.0
60	60.0000	60.0000	0.0000	0.00013	2.0
80	80.0000	80.0000	0.0000	0.00016	2.0
100	100.0000	100.0001	-0.0001	0.00017	2.0
120	120.0000	120.0001	-0.0001	0.00024	2.0
140	140.0001	140.0000	0.0001	0.00024	2.0
160	160.0000	160.0000	0.0000	0.00026	2.0
180	180.0000	180.0000	0.0000	0.00029	2.0
200	200.0000	200.0000	0.0000	0.00030	2.0

- UUC = Unit Under Calibration

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

...End...



CARIBRATION CERTIFICATE

Issued Date : 22-Oct-2024

Certificate No. : 24TH4295

CSR No. : A163/08133

Page : 1 of 3

Customer : ALS Laboratory Group (Thailand) Co., Ltd.
114/1 Moo 8, Kamchanawanit Rd., Tambon, Ban Phru,
Amphoe Hat Yai, Songkhla, 90250

Calibration Place : Chemical Laboratory
Instrument Name : Hot Air Oven
Manufacturer : Memmert
Model : UF110
Serial No. : B416.3387
ID No. : SGK_CL0024
Resolution : 0.1 °C
Received Date : 19-Oct-2024
Calibrated Date : 19-Oct-2024
Ambient Temperature : (30 ± 10) °C
Relative Humidity : (50 ± 30) %

REVIEW BY : *Ananta B.*
APPROVED BY : *Kamthai H.*
NEXT CAL. DATE : 19/10/2026

Calibration Method Used :

This instrument was calibrated using the Calibration in-house method: SCAL.WI.012 based on GLA - 20

The Southern Calibration Service Co., Ltd. calibration control system complies with requirement of ISO/IEC 17025:2017

Traceability of measurement :

This Certificate is traceable to the International and/or national standards which realize the units of measurement according to the International System of Unit (SI) through:

- TISTR: Thailand Institute of Scientific and Technological Research

Calibrated by : Ibrahim Saleemini

Approved by :

Imron Rattanyulim / Technical Manager



The uncertainties are for a confidence probability of approximately 95%

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Certificate No. : 24TH4295
CSR No. : A16308133
Page : 2 of 3

Details of Calibration

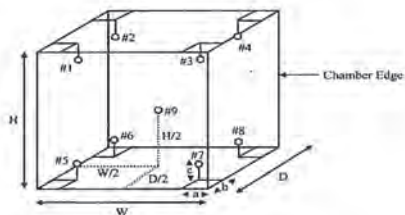
1. Reference Standard Equipment Used:

Equipment	Model	Serial No.	Cert. no.	Due Date
Data Acquisition/Switch Unit	34970A	MYS8006813	PSL-10707-1/67	22-May-2025

- The results reported in this certificate refer to the condition of the instrument on the date of calibration and carry no implication regarding the long-term stability of instrument.
- This certificate is not certified any commercial transaction.
- Condition of item : normal condition, no indication for any damage or malfunction.

Result of Calibration : (✓) Without Adjustment () After Adjustment

1. Sensor Installation Diagram



Sensor Installation Details

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

Dimension of the chamber

W = 55.0 cm
H = 48.0 cm
D = 40.0 cm



Certificate No. : 24TH4295
CSR No. : A16308133
Page : 3 of 3

Result of Calibration :

2. Temperature Measurement Accuracy Test

The measurement results of the Hot Air Oven and associates are reported in the manner as shown below

Cal point (°C)	Measured Standard Temperature At Spread Locations (°C)								Uncertainty (±°C)	
	#1	#2	#3	#4	#5	#6	#7	#8		
40	40.36	40.40	40.51	40.43	40.05	40.24	40.09	40.14	39.75	0.36
70	70.27	70.30	70.45	70.24	70.24	70.43	70.29	70.30	69.95	0.36
103	102.94	102.90	103.55	102.96	103.22	103.14	103.10	103.01	102.88	0.36
104	104.15	103.99	104.27	104.08	104.09	104.23	104.26	104.15	103.90	0.36
105	105.04	104.90	105.05	104.87	104.91	104.80	104.82	104.96	104.70	0.36
180	179.19	178.93	179.82	179.10	179.27	179.68	179.12	179.73	179.12	0.41

3. Performance Result

The performance of the Hot Air Oven are reported as shown below

Cal point (°C)	UUC Setting (°C)	UUC Reading (°C)	Temperature Stability (±°C)	Temperature Uniformity (°C)	Overall Variation (°C)
40	40.0	40.0	0.20	0.64	0.64
70	70.0	70.0	0.10	0.59	0.59
103	103.0	103.0	0.20	0.73	0.74
104	104.0	104.0	0.20	0.47	0.59
105	105.0	105.0	0.20	0.44	0.46
180	180.0	180.0	0.50	0.66	1.11

-UUC = Unit Under Calibration

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

... End ...

Southern Calibration Service Co., Ltd.

669/35 Karajanavanit Rd., Bangpu, Hatgui, Songkha 90250 Thailand
Tel: 08 1599 0417 Fax: 0 7480 5133 Email: socalibration@gmail.com www.socal-lab.com



CALIBRATION CERTIFICATE

Issued Date : 13-Jan-2025

Certificate No. : 25TH0227

CSR No. : A10105028

Page : 1 of 3

Customer : ALS Laboratory Group (Thailand) Co., Ltd.
114/1 Moo 8, Kamchanawanich Rd., Tambon, Ban Phru,
Amphoe Hat Yai, Songkhla, 90250

Calibration Place : Customer Laboratory
Instrument Name : Liquid Bath
Manufacturer : Memmert
Model : WNE29
Serial No. : L619 0539
ID No. : SGK_CL0035
Resolution : 0.1 °C
Received Date : 10-Jan-2025
Calibrated Date : 10-Jan-2025
Ambient Temperature : (30 ± 10) °C
Relative Humidity : (50 ± 30) %

REVIEW BY : Ananta B.
APPROVED BY : Kamthya H.
NEXT CAL. DATE : 10/9/26

Calibration Method Used :

This instrument was calibrated using the Calibration in-house method SCAL.WI.014 based on ASTM E 715 : 1990 (reapproved 2001)

The Southern Calibration Service Co., Ltd. calibration control system complies with requirement of ISO/IEC 17025:2017

Traceability of measurement :

This Certificate is traceable to the International and/or national standards which realize the units of measurement according to the International System of Unit (SI) through

-TISTR : Thailand Institute of Scientific and Technological Research

Calibrated by : Iborrhin Salemin

Approved by :

(Innon Rattanaayum / Technical Manager)



The uncertainties are for a confidence probability of approximately 95%

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Certificate No. : 25TH0227
CSR No. : A10105028
Page : 2 of 3

Details of Calibration

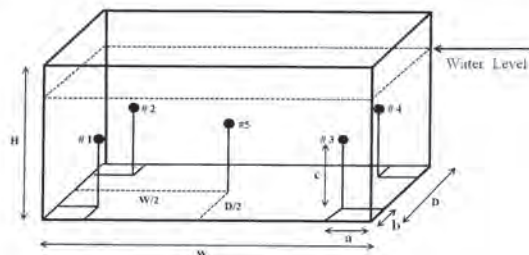
1. Reference Standard Equipment Used:

Equipment	Model	Serial No.	Cert. no.	Due Date
Data Acquisition/Switch Unit	34970A	MYS8006813	PSL-10707-1/67	22-May-2025

- The results reported in this certificate refer to the condition of the instrument on the date of calibration and carry no implication regarding the long-term stability of instrument.
- This certificate is not certified any commercial transaction.
- Condition of item : normal condition, no indication for any damage or malfunction.

Result of Calibration : (✓) Without Adjustment () After Adjustment

1. Sensor Installation Diagram



Sensor Installation Details

a = 5 cm
b = 5 cm
c = 5 cm

Dimension of the chamber

W = 59.0 cm
H = 14.0 cm
D = 35.0 cm



Certificate No. : 25TH0227

CSR No. : A101/05028

Page : 3 of 3

Result of Calibration :**2. Temperature Measurement Accuracy Test**

The measurement results of the Liquid Bath and associates are reported in the manner as shown below

Cal point (°C)	Measured Standard Temperature At Spread Locations (°C)					Uncertainty (±°C)
	#1	#2	#3	#4	Ref.5	
80	80.05	80.07	79.98	80.05	80.06	0.17

3. Performance Result

The performance of the Liquid Bath are reported as shown below

Cal point (°C)	UUC Setting (°C)	UUC Reading (°C)	Temperature Stability (±°C)	Temperature Uniformity (°C)	Overall Variation (°C)
80	80.0	80.0	0.20	0.17	0.26

- UUC = Unit Under Calibration

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

... End ...



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

**Certificate of Calibration**

Cert.No.: 25CH155

Page: 1 of 3

Equipment : pH Meter
Manufacturer : Mettler Toledo
Model : S2Field Kit
Serial No. : B731459205
ID No. : SGK_FS0019
Condition As-Received: Used Item
Received Date : 03 February 2025
Calibration Date : 04 February 2025
Reference : 2502-0019DSC-3
Submitted by : ALS Laboratory Group (Thailand) Co.,Ltd.
Songkhla Branch.
114/1 Moo 8 Kamchanawanich Rd.,
T.Ban Phru, A.Hat Yai, Songkhla 90250 Thailand

Ambient Temperature : (25 ± 2.5) °C
Relative Humidity : (50 ± 15) %
Calibration Procedure : In - house method :
- CP-CH5 by direct measurement with DC voltage standard and direct measurement with certified reference material (CRM)
- CP-CH8 by comparison with temperature standard

Calibrated by : Walalak Sirithean

Approved by :
Approved Signatory

() Chakrit Waewwanjua
() Ponpan Paipim
(✓) Saithip Meangmai

Issue Date : 5 February 2025

The Uncertainties are for a confidence probability of approximately 95%

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



Cert.No.: 25CH155

Page: 2 of 3

Condition of this calibration result**1. Reference Standard Instrument**

Instrument	Serial No.	ID No.	Cert. No.	Due Date
1)Document Process Calibrator	54030049	130RC116	24E2759	25 Aug 2025
2)Ref. Standard Thermometer	4982054	110RC044	24I757	14 July 2025

- This Certification is traceable to SI Through Technology Promotion Association (Thailand - Japan)

2. Certified Reference Materials

:The measurement results are traceable to SI through Hach Lenge GmbH Ltd.,
Deutsche Akkreditierungsstelle, Accredited No.D-RM-15184-01-00
:The measurement results are traceable to SI through CPA chem Ltd.,
ANSI-ASQ National Accreditation Board, Accredited No. AR-1835

Buffer Solution	Manufacturer	Lot No.	Exp. date
pH 4.008	CPA chem	1034203	27 Sep 2026
pH 6.999	Hach Lenge GmbH	C03220	29 Oct 2026
pH 10.010	CPA chem	1066669	18 Jan 2026

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

Calibration Results**Function : mV Measurement**

Performing standard curve by Document Process Calibrator at pH (4,7,10)

Unit Under Calibration	Nominal Value	Standard Voltage Input	Actual Reading		Uncertainty of Measurement (±mV)	Coverage factor k
	pH	mV	mV	pH		
pH Meter S/N.: B731459205	4.00	177.48	177	4.00	0.58	2.00
	7.00	0.00	0	7.00	0.58	2.00
	10.00	-177.48	-178	10.00	0.58	2.00



Cert.No.: 25CH155

Page: 3 of 3

Calibration Results**Function : pH Measurement**

Performing three buffers standard curve by using buffer nominal pH (4,7,10)

Unit Under Calibration	Standard pH Buffer Solution	Actual pH Reading	Actual mV Reading (mV)	Uncertainty of pH Measurement (±)	Coverage factor k
pH Electrode S/N.: 2234848	4.008	4.01	160	0.0071	2.00
	6.999	7.00	-15	0.0095	2.00
	10.010	10.01	-187	0.0092	2.00

Function : Temperature Measurement**(*) Without adjustment**

This equipment was connected with Temperature Probe;

- Model : InLabExpert Go-ISM

- Serial No. : 2234848

Dimension of probe

- Length : 120 mm.

- Diameter : 12 mm.

- Immersion Depth : 100 mm.

Calibration Point (°C)	Standard Temperature (°C)	UUC* Reading (°C)	Error (°C)	Uncertainty of measurement (± °C)	Coverage factor k
25.0	25.000	25.2	0.200	0.13	2.00
45.0	45.001	45.3	0.299	0.13	2.00

Remark : - UUC* = Unit Under Calibration

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

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Certificate of Testing

Cert.No.: 25TW72
Page.: 1 of 2

Equipment : DO Meter
Manufacturer : Mettler Toledo
Model : Seven2Go Pro
Serial No. : B728366470
ID No. : SGK_FS0018
Received Date : 10 April 2025
Test Date : 11 April 2025
Reference : 2504-0309DSC-1
Submitted by : ALS Laboratory Group (Thailand) Co.,Ltd.
Songkhla Branch,
114/1 Moo 8 Kamchanawanich Rd., T.Ban Phru,
A.Hat Yai, Songkhla 90250 Thailand
Laboratory Condition : Temperature (25 ± 5) °C
Humidity (50 ± 20) %
Test Procedure : In - house method : CP-CH9
by Comparison Technique with Azide Modification Method
Tested by : Walalak Sirthean
Approved by :
Approved Signatory
() Chakrit Waewwanjua
() Ponpan Paipim
(✓) Saithip Meangmai
Issue Date : 11 April 2025

REVIEW BY
APPROVED BY
NEXT CAL DATE.....10/04/26



Cert.No.: 25TW72
Page.: 2 of 2

Condition of this result of calibration

1. Reference Standard Instruments :
This certification is traceable to the International System of Unit through the reference standards laboratory of Industrial Calibration Center, Technology Promotion Association (Thailand-Japan).
- | Instruments | Serial No. | ID No. | Certificate No. | Due Date |
|-------------|------------|----------|-----------------|--------------|
| 1. Burette | - | 130BU10 | 25CG1126 | 18 Mar 2027 |
| 2. Balance | 14233821 | 110RC001 | 24MM131 | 04 July 2025 |
2. Standard Material :-
- | Material | Manufacturer | Lot.No. | Assay |
|---------------------------------|--------------|------------|-------|
| Sodium Thiosulfate 5-Hydrate AR | KEMAUS | 2203162447 | 99.6% |

Result : Dissolved Oxygen Meter Adjustment With Air 100 %
Dissolved Oxygen Probe No.: 526334

Titration Method (Azide Modification Method) (mg/L)	DO Meter Reading (mg/L)	Standard Deviation (mg/L)
8.20	8.22	0.0045

This report was certified only for the instrument we tested.It is allowable to use for study
Intend to use for advertising and referral purpose is prohibited.This report may not be reproduced
other in full, without written approval of the laboratory

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Certificate of Calibration

Cert. No.: 25LM61
Page.: 1 of 2

Equipment : Do Meter with Sensor
Manufacturer : Mettler Toledo
Model : Seven2Go Pro
Serial No. : B728366470
ID No. : SGK_FS0018
Submitted by : ALS Laboratory Group (Thailand) Co.,Ltd.
(Songkhla Branch)
114/1 Moo 8 Kanjanavanij Rd., Banphru,
Hatyai, Songkhla 90250 Thailand
Location : TPA On Site Calibration Laboratory
Received Order : 10 April 2025
Calibrated Date : 11 April 2025
Ambient Temperature : (26 ± 10) °C
Relative Humidity : (50 ± 30) %
AC Line Voltage : (220 ± 22) V
Calibrated by : Warakorn Lerngagtrakul
Approved by :
Approved Signatory
() Chakrit Waewwanjua
(✓) Suwit Imjai
() Kunchit Promprat
Issue Date : 16 April 2025

The Uncertainties are for a confidence probability of approximately 95%

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



Equipment : Do Meter with Sensor
Condition As-Received : Used Item
Reference : 2504-0309DSC-2
Cert. No.: 25LM61
Page.: 2 of 2

Procedure Used :-
Calibration were conducted using in-house calibration procedure CP-OT01 according to comparison with Industrial Platinum Resistance Thermometer (IPRT) into Temperature Bath.
The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standard instrument:-
- | Instrument | Serial No. | Cert. No. | Traceable | Due Date |
|------------------------|------------|-----------|-----------|-------------|
| 1) Digital Thermometer | 2188080 | 2411022 | TPA | 17 Sep 2025 |
2. This certificate is valid only to the item calibrated on date and place of calibration.
3. This certification is traceable to the International System of Unit.

Remark : TPA : Technology Promotion Association (Thailand - Japan)

Result of Calibration :- (*) Without Adjustment

Function : Temperature measurement.

This instrument was connected with temperature sensor, S/N.: 526334

Calibration Point (°C)	Immersion Depth (mm)	Standard Temperature (°C)	UUC* Reading (°C)	Error (°C)	Uncertainty (± °C)	Coverage Factor k
20.0	90	20.006	20.2	0.194	0.16	2.00

UUC* : Unit Under Calibration

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

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Certificate of Calibration

Cert.No.: 25CH504
Page.: 1 of 2

Equipment : Conductivity Meter
Manufacturer : Mettler Toledo
Model : SevenCompact S230
Serial No. : B608134488
ID No. : SGK_CL0032
Condition As-Received: Used Item
Received Date : 25 April 2025
Calibration Date : 02 May 2025
Reference : 2504-0711DSC-1
Submitted by : ALS Laboratory Group (Thailand) Co.,Ltd. Songkhla Branch.
114/1 Moo 8 Kamchanawanich Rd., T.Ban Phru,
A.Hat Yai, Songkhla 90250 Thailand
Ambient Temperature : (25 ± 2.5) °C
Relative Humidity : (50 ± 15) %
Calibration Procedure: In -house method :
- CP-CH6 by direct measurement
with reference material (RM)
Calibrated by : Warakorn Lemgagtrakul
Approved by :
Approved Signatory
(✓) Chakrit Waewwanjua
() Ponpan Paipim
() Salthip Meangmai
Issue Date : 05 May 2025

REVIEW BY:
APPROVED BY:
NEXT CAL DATE: 02/05/26

The Uncertainties are for a confidence probability of approximately 95%
This certificate may not be reproduced other than in full, except with the prior written
Approval of the head of Calibration and Testing Equipment Services.



Cert.No.: 25CH504
Page.: 2 of 2

Condition of this result of calibration

1. Reference Standard Instrument :-

Instrument	Serial No.	ID No.	Certificate No.	Due date
1) Thermometer	1963878	130RC095	241995	09 Sep 2025

- This Certification is traceable to SI Through Technology Promotion Association (Thailand - Japan)

2. Certified Reference Materials :-

- Conductivity calibration solution, Thermo Scientific (Traceable to NIST)

Conductivity Solution	Manufacturer	Lot No.	Exp. date
84 µS/cm	Thermo Scientific	424/02	18 Oct 2025
1413 µS/cm	Thermo Scientific	174/03	26 Apr 2027
12.88 mS/cm	Thermo Scientific	422/01	21 Oct 2025

- Control Conductivity calibration solution temperature by Water bath (25 ± 0.1) °C

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

Calibration results

Function : Conductivity Measurement

(*) Without Adjustment

Conductivity Electrode Serial No.: 5820120321

Standard Conductivity Solution	UUC* Reading	Uncertainty of Measurement (±)	Coverage factor k
84 µS/cm	84.3 µS/cm	4.3 µS/cm	2.00
1413 µS/cm	1426 µS/cm	15 µS/cm	2.00
12.88 mS/cm	12.88 mS/cm	0.14 mS/cm	2.00

Remark : - UUC* = Unit Under Calibration
- Cell constant = 0.574487 cm⁻¹

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

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Certificate of Calibration

Cert.No.: 25CH505
Page.: 1 of 2

Equipment : Conductivity Meter
Manufacturer : Mettler Toledo
Model : SevenCompact S230
Serial No. : B608134488
ID No. : SGK_CL0032
Condition As-Received: Used Item
Received Date : 25 April 2025
Calibration Date : 02 May 2025
Reference : 2504-0711DSC-2
Submitted by : ALS Laboratory Group (Thailand) Co.,Ltd. Songkhla Branch.
114/1 Moo 8 Kamchanawanich Rd., T.Ban Phru,
A.Hat Yai, Songkhla 90250 Thailand
Ambient Temperature : (25 ± 2.5) °C
Relative Humidity : (50 ± 15) %
Calibration Procedure: In -house method :
- CP-CH6 by direct measurement
with reference material (RM)
Calibrated by : Warakorn Lemgagtrakul
Approved by :
Approved Signatory
(✓) Chakrit Waewwanjua
() Ponpan Paipim
() Salthip Meangmai
Issue Date : 05 May 2025

The Uncertainties are for a confidence probability of approximately 95%
This certificate may not be reproduced other than in full, except with the prior written
Approval of the head of Calibration and Testing Equipment Services.



Cert.No.: 25CH505
Page.: 2 of 2

Condition of this result of calibration

1. Reference Standard Instrument :-

Instrument	Serial No.	ID No.	Certificate No.	Due date
1) Thermometer	9549224	130RC003	251440	16 Apr 2026

- This Certification is traceable to SI Through Technology Promotion Association (Thailand - Japan)

2. Certified Reference Materials :-

- Conductivity calibration solution, Thermo Scientific (Traceable to NIST)

Conductivity Solution	Manufacturer	Lot No.	Exp. date
84 µS/cm	Thermo Scientific	424/02	18 Oct 2025

- Control Conductivity calibration solution temperature by Water bath (25 ± 0.1) °C

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

Calibration results

Function : Conductivity Measurement

(*) After Adjustment at 84 µS/cm

Conductivity Electrode Serial No.: 5816340156

Standard Conductivity Solution	Before Adjustment UUC* Reading	After Adjustment UUC* Reading	Uncertainty of Measurement (±)	Coverage factor k
84 µS/cm	81.1 µS/cm	84.1 µS/cm	4.3 µS/cm	2.00

Remark : - UUC* = Unit Under Calibration
- Cell constant = 0.103477 cm⁻¹

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

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Internal Calibration

REVIEW BY	Somsak J.
APPROVED BY	Kanitha H.
NEXT CAL. DATE	30 May 26

Equipment : Turbidity Meter Manufacture : HACH
ID No. : SGK_FS0046 Model : 2100Q/QIS
Calibrate Date : May 30, 2025 Serial No. : 19030C074494

Calibration Point	1st (NTU)	2nd (NTU)	3rd (NTU)	AVG (NTU)	Specifications	Evaluate
Standard 20 NTU	20.1	20.0	20.0	20.0	19 to 21 NTU	Pass
Standard 100 NTU	100.0	101.0	101.0	100.7	95 to 105 NTU	Pass
Standard 800 NTU	799.0	799.0	800.0	799.3	760 to 840 NTU	Pass

Calibrated by Somsak J. Approved by Kanitha H.
(Scientist 2) (Section Head)



An ISO 9001 Certified Company

Loveland, CO 80539
(970) 669-3050

Certificate of Analysis

This is a Component of 2659405-TH / LOT A4243

PRODUCT: STABLCAL® FORMAZIN STANDARD 100 NTU

PRODUCT NUMBER: 2684901 LOT NUMBER: A4242
MANUFACTURE DATE: 08/28/2024 DATE OF ANALYSIS: 09/03/2024

TEST	SPECIFICATIONS	RESULTS
Turbidity	95 to 105 NTU	103.0 NTU

The expiration date is Nov 2025

Formazin and StablCal® solutions provided by Hach are not NIST traceable because the NIST does not carry turbidity standards. However, the use of Formazin and StablCal® as used in Hach method 8195 are accepted by the EPA as a primary standard to be used in the calibration of turbidity instruments.

Certified by: Scott Ala
Analytical Services Chemist



An ISO 9001 Certified Company

Loveland, CO 80539
(970) 669-3050

Certificate of Analysis

This is a Component of 2659405-TH / LOT A4243

PRODUCT: STABLCAL® FORMAZIN STANDARD 800 NTU

PRODUCT NUMBER: 2660501 LOT NUMBER: A4233
MANUFACTURE DATE: 08/26/2024 DATE OF ANALYSIS: 08/30/2024

TEST	SPECIFICATIONS	RESULTS
Turbidity	760 to 840 NTU	814.3 NTU

The expiration date is Nov 2025

Formazin and StablCal® solutions provided by Hach are not NIST traceable because the NIST does not carry turbidity standards. However, the use of Formazin and StablCal® as used in Hach method 8195 are accepted by the EPA as a primary standard to be used in the calibration of turbidity instruments.

Certified by: Scott Ala
Analytical Services Chemist



An ISO 9001 Certified Company

Loveland, CO 80539
(970) 669-3050

Certificate of Analysis

This is a Component of 2659405-TH / LOT A4243

PRODUCT: STABLCAL® FORMAZIN STANDARD 20 NTU

PRODUCT NUMBER: 2684801 LOT NUMBER: A4240
MANUFACTURE DATE: 08/28/2024 DATE OF ANALYSIS: 09/03/2024

TEST	SPECIFICATIONS	RESULTS
Turbidity	19 to 21 NTU	20.4 NTU

The expiration date is Nov 2025

Formazin and StablCal® solutions provided by Hach are not NIST traceable because the NIST does not carry turbidity standards. However, the use of Formazin and StablCal® as used in Hach method 8195 are accepted by the EPA as a primary standard to be used in the calibration of turbidity instruments.

Certified by: Scott Ala
Analytical Services Chemist



CARIBRATION CERTIFICATE

Issued Date : 4-Jul-2024

Certificate No. : 24TH2760

CSR No. : A15007473

Page : 1 of 3

Customer : ALS Laboratory Group (Thailand) Co., Ltd.
114/1 Moo 8, Kanchanawanich Rd. Tambon, Ban Phru,
Amphoe Hat Yai, Songkhla, 90250Calibration Place : Microbiological Laboratory
Instrument Name : Autoclave
Manufacturer : TOMY
Model : SX-700
Serial No. : 52134079
ID No. : SGK_ML0001
Resolution : 1 °C
Received Date : 1-Jul-2024
Calibrated Date : 1-Jul-2024
Ambient Temperature : (30 ± 10) °C
Relative Humidity : (50 ± 30) %REVIEW BY : Wichapol D.
APPROVED BY : Kanitta H.
NEXT CAL DATE : 1/01/25

Calibration Method Used :

This instrument was calibrated using the Calibration In-house method : SCAL.WI.013 based on BS 2648 : 1993 (part 5)
The Southern Calibration Service Co., Ltd. calibration control system complies with requirement of ISO/IEC 17025:2017

Traceability of measurement :

This Certificate is traceable to the International and/or national standards which realize the units of measurement

according to the International System of Unit (SI) through :

- SCAL : Southern Calibration Service Co., Ltd.

Calibrated by : Ibrohim Saleemin

Approved by :

Imron Rattanayum / Technical Manager



The uncertainties are for a confidence probability of approximately 95%

This certificate may not be reproduced other than in full, except with the prior written approval of Southern Calibration Service Co., Ltd.

Certificate No. : 24TH2760

CSR No. : A15007473

Page : 2 of 3



Details of Calibration

1. Reference Standard Equipment Used:

Equipment	Model	Serial No.	Cert. no.	Due Date
Data logger With Sensor	GL240	C90432223	24SDAT005	2-May-2025

2. The results reported in this certificate refer to the condition of the instrument on the date of calibration and carry no implication regarding the longterm stability of instrument.

3. This certificate is not certified any commercial transaction

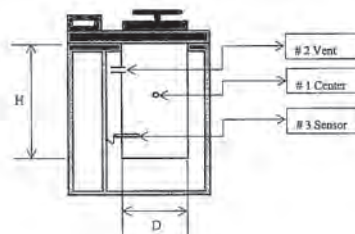
4. Condition of item : normal condition , no indication for any damage or malfunction

Result of Calibration :

(✓) Without Adjustment

() After Adjustment

1. Sensor Installation Diagram



Chamber Diameter (D) : 30 cm

Chamber Height (H) : 70 cm

Certificate No. : 24TH2760

CSR No. : A15007473

Page : 3 of 3

Result of Calibration :

2. Temperature Measurement Accuracy Test

The measurement results of the Autoclave and associates are reported in the manner as shown below

Cal point (°C)	Measured Standard Temperature At Spread Locations (°C)			Pressure Reading	Uncertainty (±°C)
	Center #1	Vent #2	Sensor #3		
115	116.3	116.4	116.3	0.07 MPa	0.76
118	119.2	119.2	119.2	0.09 MPa	0.76
121	121.8	121.5	121.6	0.11 MPa	0.76

3. Performance Result

The performance of the Autoclave are reported as shown below

Cal point (°C)	UUC Setting (°C)	UUC Reading (°C)	Temperature Stability (±°C)	Temperature Uniformity (°C)	Overall Variation (°C)
115	115	115	0.10	0.17	0.17
118	118	118	0.10	0.10	0.10
121	121	121	0.70	0.50	0.84

- UUC = Unit Under Calibration

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

... End ...



CALIBRATION CERTIFICATE

Issued Date : 6-Jul-2025

Certificate No. : 25TH3013

CSR No. : A20210083

Page : 1 of 3

Customer : ALS Laboratory Group (Thailand) Co., Ltd.
114/1 Moo 8, Kanchanawanich Rd. Tambon, Ban Phru,
Amphoe Hat Yai, Songkhla, 90250Calibration Place : Customer Laboratory
Instrument Name : Incubator
Manufacturer : Memmert
Model : ICP750
Serial No. : F816.0061
ID No. : SGK_ML0013
Resolution : 0.1 °C
Received Date : 3-Jul-2025
Calibrated Date : 3-Jul-2025
Ambient Temperature : (30 ± 10) °C
Relative Humidity : (50 ± 30) %REVIEW BY : Wichapol D.
APPROVED BY : Kanitta H.
NEXT CAL DATE : 3/01/25

Calibration Method Used :

This instrument was calibrated using the Calibration In-house method : SCAL.WI.012 based on GLA - 20

The Southern Calibration Service Co., Ltd. calibration control system complies with requirement of ISO/IEC 17025:2017

Traceability of measurement :

This Certificate is traceable to the International and/or national standards which realize the units of measurement according to
the International System of Unit (SI) through :

- TISTR : Thailand Institute of Scientific and Technological Research

Calibrated by : Ibrohim Saleemin

Approved by :

Imron Rattanayum / Technical Manager

SCAL_P0181810723



The uncertainties are for a confidence probability of approximately 95%

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Certificate No. : 25TH3013
CSR No. : A202/10083
Page. : 2 of 3

Details of Calibration

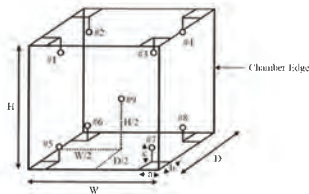
1. Reference Standard Equipment Used:

Equipment	Model	Serial No.	Cert. no.	Due Date
Data Acquisition/Switch Unit	34970A	MY58009813	PSL-T0707-2/67	22-Nov-2025

- The results reported in this certificate refer to the condition of the instrument on the date of calibration and carry no implication regarding the longterm stability of instrument.
- This certificate is not certified any commercial transaction
- Condition of item : normal condition , no indication for any damage or malfunction

Result of Calibration : [✓] Without Adjustment [] After Adjustment

1. Sensor Installation Diagram



Sensor Installation Details	Dimension of the chamber
a = 5.0 cm	W = 104.0 cm
b = 5.0 cm	H = 120.0 cm
c = 5.0 cm	D = 60.0 cm



Certificate No. : 25TH3013
CSR No. : A202/10083
Page. : 3 of 3

Result of Calibration :

2. Temperature Measurement Accuracy Test

The measurement results of the Incubator and associates are reported in the manner as shown below

Cal point (°C)	Measured Standard Temperature At Spread Locations (°C)								Uncertainty (±°C)	
	#1	#2	#3	#4	#5	#6	#7	#8		Ref. 9
35	34.97	35.05	35.09	35.04	35.02	34.91	34.99	35.01	34.98	0.38

3. Temperature Performance Result

The performance of the Incubator are reported as shown below

UUC Setting (°C)	UUC Reading (°C)	Temperature Stability (±°C)	Temperature Uniformity (°C)	Overall Variation (°C)
35.0	35.0	0.10	0.24	0.31

- UUC = Unit Under Calibration

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

.. End ..

Southern Calibration Service Co., Ltd.

669/35 Karnjanavanit Rd., Banpru, Haryai, Songkla 90250 Thailand
Tel : 08 1599 0417 Fax : 0 7480 5133 Email : socalibration@gmail.com www.socal-lab.com



CALIBRATION CERTIFICATE

Issued Date : 5-Jul-2024

Certificate No. : 24CH0342
CSR No. : A150/07473
Page. : 1 of 2

Customer : ALS Laboratory Group (Thailand) Co., Ltd.
114/1 Moo 8, Kamchanawanich Rd., Tambon, Ban Phru,
Amphoe Hei Yai, Songkhla, 90250

Calibration Place : Microbiological Laboratory
Instrument Name : pH meter
Manufacturer : Sartorius
Model : PB-10
Serial No. : C07160695
ID No. : SGK_ML0015
Electrode No. : P20087003
Received Date : 2-Jul-2024
Calibrated Date : 2-Jul-2024
Ambient Temperature : (25 ± 3) °C
Relative Humidity : (55 ± 15) %

REVIEW BY : *Kichaporn B.*
APPROVED BY : *Kanika H.*
NEXT CAL. DATE : 2/07/25

Calibration Method Used :

This instrument was calibrated using the Calibration In-house method : SCAL.WI.008 based on direct measurement by using certified reference Material (CRM)

The Southern Calibration Service Co., Ltd calibration control system complies with requirement of ISO/IEC 17025:2017

Traceability of measurement :

This Certificate is traceable to the international and for national standards which realize the units of measurement according to the International System of Unit (SI) through :

- CPASchem : CPASchem Ltd
- WK : WK Electric Co., Ltd

Calibrated by : Aisara Ma

Approved by : *Imron Rattanaylum*
Imron Rattanaylum / Technical Manager



The uncertainties are for a confidence probability of approximately 95%

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Certificate No. : 24CH0342
CSR No. : A150/07473
Page. : 2 of 2

Details of Calibration

1. Reference Standard Equipment Used:

Equipment	Model	Serial No.	Cert. no.	Due Date
Standard Solution	4.000	61278486	968236	10-May-2025
Standard Solution	7.000	61261486	968241	10-May-2025
Standard Solution	10.01	61267532	968240	10-May-2025
Temperature/Electrical Calibrator	MC2-TE	14967	WK2106-299-223	31-May-2025

- The results reported in this certificate refer to the condition of the instrument on the date of calibration and carry no implication regarding the longterm stability of instrument.
- This certificate is not certified any commercial transaction
- Condition of item : normal condition , no indication for any damage or malfunction

Result of Calibration :

1. Electrical Measurement

Applied Voltage (mV)	pH meter Reading (mV) (pH)	Correction (mV)	Uncertainty (± mV)
177.48	177.5 3.80	-0.02	0.17
0.00	0.0 6.80	0.00	0.13
-177.48	-177.5 10.00	0.02	0.17

2. Before Sample Test Measurement

Standard Buffer Solutions (pH)	pH meter Reading (pH) (mV)	Correction (pH)	Uncertainty (± pH)
4.008	4.07 164.0	-0.062	0.011
6.865	7.02 -7.1	-0.035	0.020
10.010	10.03 -182.1	-0.020	0.037

3. After Sample Test Measurement

Standard Buffer Solutions (pH)	pH meter Reading (pH) (mV)	Correction (pH)	Uncertainty (± pH)
4.008	4.02 164.2	-0.012	0.011
6.865	7.00 -0.9	-0.015	0.020
10.010	10.01 -170.7	0.000	0.037

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

... End ...



CARIBRATION CERTIFICATE

Issued Date : 4-Jul-2024

Certificate No. : 24TH2782

CSR No. : A150/07474

Page : 1 of 3

Customer : ALS Laboratory Group (Thailand) Co., Ltd.
114/1 Moo 8, Kanchanawarich Rd. Tambon, Ban Phru,
Amphoe Hat Yai, Songkhla, 90250

Calibration Place : Microbiological Laboratory
Instrument Name : Liquid Bath
Manufacturer : Memmert
Model : WPE45
Serial No. : L719.0558
ID No. : SGK_ML0021
Resolution : 0.1 °C
Received Date : 1-Jul-2024
Calibrated Date : 1-Jul-2024
Ambient Temperature : (30 ± 10) °C
Relative Humidity : (50 ± 30) %

REVIEW BY : Khampha H.
APPROVED BY : Kampha H.
NEXT CAL DATE : 7/01/26

Calibration Method Used :

This instrument was calibrated using the Calibration In-house method : SCAL-WI 014 based on ASTM E 715 : 1980 (reapproved 2001)

The Southern Calibration Service Co., Ltd. calibration control system complies with requirement of ISO/IEC 17025:2017

Traceability of measurement :

This Certificate is traceable to the international and for national standards which realize the units of measurement

according to the International System of Unit (SI) through :

- TISTR : Thailand Institute of Scientific and Technological Research

Calibrated by : Ibrorhim Saleemini

Approved by :

Ivonn Rattanyayum / Technical Manager



The uncertainties are for a confidence probability of approximately 95%

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Certificate No. : 24TH2782

CSR No. : A150/07474

Page : 2 of 3



Details of Calibration

1. Reference Standard Equipment Used:

Equipment	Model	Serial No.	Cert. no.	Due Date
Data Acquisition/Switch Unit	34970A	MY58009813	PSL-T0707-1/67	22-May-2025

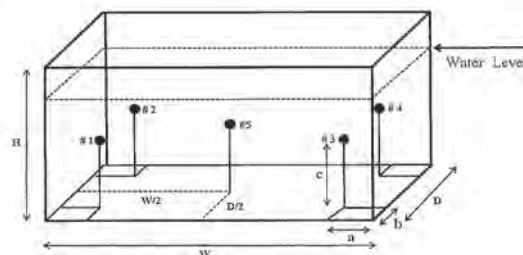
2. The results reported in this certificate refer to the condition of the instrument on the date of calibration and carry no implication regarding the long-term stability of instrument.

3. This certificate is not certified any commercial transaction

4. Condition of item : normal condition , no indication for any damage or malfunction

Result of Calibration : (✓) Without Adjustment () After Adjustment

1. Sensor Installation Diagram



Sensor Installation Details

a = 5 cm
b = 5 cm
c = 5 cm

Dimension of the chamber

W = 45 cm
H = 30 cm
D = 35 cm

Certificate No. : 24TH2782

CSR No. : A150/07474

Page : 3 of 3



Result of Calibration :

2. Temperature Measurement Accuracy Test

The measurement results of the Liquid Bath and associates are reported in the manner as shown below:

Cal point (°C)	Measured Standard Temperature At Spread Locations (°C)					Uncertainty (±°C)
	#1	#2	#3	#4	Rel.5	
44.5	44.48	44.46	44.51	44.49	44.47	0.14

3. Performance Result

The performance of the Liquid Bath are reported as shown below

Cal point (°C)	UUC Setting (°C)	UUC Reading (°C)	Temperature Stability (±°C)	Temperature Uniformity (°C)	Overall Variation (°C)
44.5	44.5	44.5	0.10	0.14	0.25

- UUC = Unit Under Calibration

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

... End ...



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)

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



Certificate of Calibration

Cert.No.: 25CG3385

Page.: 1 of 2

Equipment : Burette
Capacity : 50 mL
Serial No. :
ID. No. : BKK_EN0422
Manufacturer : Wifeg
Made in : Germany
Submitted by :

ALS Laboratory Group (Thailand) Co.,Ltd.
104 Phatthanakan 40, Phatthanakan Rd.,
Khuwaeng Phatthanakan, Khet Suan Luang,
Bangkok 10250 Thailand

Ambient Temperature : (20 ± 2.5) °C
Relative Humidity : (50 ± 10) %
Barometric Pressure : 753 mmHg
Calibration Procedure : ASTM E 542 - 01

Calibrated by : Srisuda Khamtha

Approved by : Srisuda Khamtha
Approved Signatory

() Ponpan Paipim
(✓) Chakrit Waewwanjua

Issue Date : 3 September 2025

The Uncertainties are for a confidence probability of approximately 95%

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



Equipment : Burette
Received Date : 1 September 2025
Condition As-Received : Used Item
Calibration Date : 3 September 2025
Reference : 2509-0049DSC-1

Cert.No.: 25CG3385
Page.: 2 of 2

Condition of this result of calibration

1. Reference Standard Instruments :

Instruments	Model	Serial No.	ID No.	Certificate No.	Traceability	Due date
1) Balance	MS204TS	C226356983	140RC010	24MM603	TPA	10 Oct 2025
2) Data Logger	HL-20D	20683159	140EC012	24H2129	TPA	15 Oct 2025
3) Digital Thermometer	HH376	230806555	140EC013	2511740	TPA	17 Jan 2026

This measurement result is traceable to SI Unit

- The certificate is valid only to the item calibrated on date and place of calibration.
- True value is converted to true volume at the standard temperature of 20 °C

Calibration result :

Nominal capacity (mL)	Reading (mL)	Uncertainty (± mL)	k Factor
10	9.9941	0.0082	2.00
25	24.9804	0.0087	2.00
50	49.9819	0.010	2.00

Remark mL = cm³

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

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Metrology Center

SCI ECO Services Company Limited

51 Moo 8, Tubkwang, Kaeng Khoi, Saraburi, Thailand 18260

Bangkok Tel : +669 9205 8851 , +669 81924 0059

Saraburi Tel : +669 8247 2360

Website : www.scieco.co.th E-Mail : calibrate@sci.co.th



Certificate No. T250873

Certificate of Calibration

Page 1 of 4

Equipment : Chamber (Cooling Room)

Manufacturer : KOLDTECH

Model : KM 320

Serial No. : TBN-1012061/05

Customer Code : BKK_EN0167

ID No. : T2463A3

Customer : ALS Laboratory Group (Thailand) Co.,Ltd.

104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan,

Khet Suan Luang, Bangkok 10250

Customer Location : Laboratory Room

Date of Receipt : 28 May 2025

Calibrated By : Atiphong Rongrat (Technician)

Approved By : / Boonchai Suriyawong (Site Calibration Manager)

Date of Issue : 19 JUN 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.

FM-TL06 102/27-03-68



Metrology Center

SCI ECO Services Company Limited

51 Moo 8, Tubkwang, Kaeng Khoi, Saraburi, Thailand 18260



Certificate No. T250873

Page 2 of 4

Calibration Report

Equipment : Chamber (Cooling Room)

Date of Calibration : 4 June 2025

Environment : Temperature : 23.4-24.9 °C

Line Voltage : 221.4-230.2 V

Relative Humidity : 55 - 65 %RH

Condition of this results of calibration :

- This equipment was calibrated by insert 16 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 (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
TC	TYPE T	TN91-TN100	T242036	3 December 2025
TC	TYPE T	TN101-TN110	T242036	3 December 2025
DATA LOGGER	34970A	T121	T242036	3 December 2025

3. This certificate is traceable to :

National Institute of Metrology (Thailand) through Metrological Center (NSC-TISI-TIS 17025 CALIBRATION 0244.3

4. Condition of calibrated item : good

Equipment Description :

Time Constant 2 Hour 20 Minute At 3 °C

Fresh Air Damper ☐ Open ☐ Min ☐ Medium ☐ Max

☐ Close

☒ Not Available

5. Adjustment :

(X) without adjustment () after adjustment

Approved By.

FM-TL07 102/27-03-68



Metrology Center

SCI ECO Services Company Limited

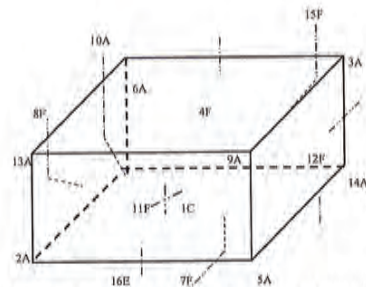
51 Moo 8, Tubkwang, Kaeng Khoi, Saraburi, Thailand 18260



Certificate No. T250873

Page 3 of 4

Calibration Report



C = Centre, F = Centre of Face, A = Corner, E = Centre of Edge

1C = TN91	12F = TN102
2A = TN92	13A = TN103
3A = TN93	14A = TN104
4F = TN94	15F = TN105
5A = TN95	16E = TN106
6A = TN96	
7F = TN97	
8F = TN98	
9A = TN99	
10A = TN100	
11F = TN101	

Approved By.

FM-TL07 102/27-03-68



Certificate of Testing

Cert.No.: 25TW32
Page.: 1 of 2

Equipment : DO Meter
Manufacturer : YSI
Model : 4010-1W
Serial No. : 24200618
ID No. : -
Received Date : 21 February 2025
Test Date : 24 February 2025
Reference : 2502-0715WC-1
Submitted by : ALS Laboratory Group (Thailand) Co.,Ltd.
Songkhla Branch,
114/1 Moo 8 Kamchanawanich Rd., T.Ban Phru,
A.Hat Yai, Songkhla 90250 Thailand

Laboratory Condition : Temperature (25 ± 5) °C
Humidity (50 ± 20) %
Test Procedure : In - house method : CP-CH9
by Comparison Technique with Azide Modification Method

REVIEW BY Ananta B.
APPROVED BY Kanika H.
NEXT CAL. DATE 24/2/26

Tested by : Walalak Sirthean
Approved by : Saithip
Approved Signatory

() Chakrit Waewwanjua
() Ponpan Palpim
(✓) Saithip Meangmai

Issue Date : 25 February 2025

The Uncertainties are for a confidence probability of approximately 95%

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



Cert.No.: 25TW32
Page.: 2 of 2

Condition of this result of calibration

1. Reference Standard Instruments :
This certification is traceable to the International System of Unit through the reference standards laboratory of Industrial Calibration Center, Technology Promotion Association (Thailand-Japan).

Instruments	Serial No.	ID No.	Certificate No.	Due Date
1. Burette	-	130BU10	23CG1172	22 Mar 2025
2. Balance	14233821	110RC001	24MM131	04 July 2025

2. Standard Material :-

Material	Manufacturer	Lot.No.	Assay
Sodium Thiosulfate 5-Hydrate AR	KEMAUS	2203162447	99.6%

Result : Dissolved Oxygen Meter Adjustment With Air 100 %
Dissolved Oxygen Probe No.: 24F102419

Titration Method (Azide Modification Method) (mg/L)	DO Meter Reading (mg/L)	Standard Deviation (mg/L)
8.22	8.28	0.0089

This report was certified only for the instrument we tested. It is allowable to use for study
Intend to use for advertising and referral purpose is prohibited. This report may not be reproduced
other in full, without written approval of the laboratory

-o-o-



Certificate of Calibration

Cert. No.: 25TM156
Page.: 1 of 3

Equipment : COD Reactor
Manufacturer : Hach
Model : DRB200
Serial No. : 21120C1313
ID No. : SGK_CL0085
Submitted by : ALS Laboratory Group (Thailand) Co.,Ltd.
(Songkhla Branch)
Kamchanawanich Rd., T.Ban Phru,
A.Hat Yai, Songkhla 90250 Thailand
Chemistry Lab

Location :
Received Order : 15 January 2025
Calibration Date : 15 - 16 January 2025
Ambient Temperature : (26 ± 10) °C
Relative Humidity : (50 ± 30) %
AC Line Voltage : (220 ± 22) V

REVIEW BY Ananta B.
APPROVED BY Kanika H.
NEXT CAL DATE 15/01/26

Calibrated by : Uthen Kankawi
Approved by : Uthen Kankawi
Approved Signatory

() Chakrit Waewwanjua
(✓) Suwit Imjai
() Kunchit Promprat

Issue Date : 06 February 2025



Equipment : COD Reactor
Condition As-Received : Used Item
Reference : 2501-0343QC-2
Procedure Used :-

Cert. No.: 25TM156
Page.: 2 of 3

As agreed with customer the calibration was performed using in-house calibration method according to directed measurement method with Data Acquisition which connected with Thermocouple Type T.
The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standard instrument:-

Instrument	Serial No.	Cert. No.	Traceable	Due Date
1) Data Acquisition	MY44073381	23LM95	TPA	19 Jun 2024

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

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

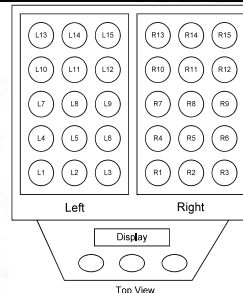
Remark : TPA : Technology Promotion Association (Thailand-Japan), NSC-ONSC Accredited No. Calibration 0008

Result of Calibration :- (*) Without Adjustment

Function of UUC* : Temperature Source

Heat transfer medium used : Alumina Calcined

Environment during calibration			Left		Right	
	Beginning	Finished	Position	ID No. of Sensor	Position	ID No. of Sensor
Temp.(°C)	22	22	L1	23-01TC-01	R1	23-01TC-01
REL.Humi.(%)	56	55	L2	23-01TC-02	R2	23-01TC-02
AC Supply (Volt)	225	225	L3	23-01TC-03	R3	23-01TC-03
			L4	23-01TC-04	R4	23-01TC-04
			L5	23-01TC-05	R5	23-01TC-05
			L6	23-01TC-06	R6	23-01TC-06
			L7	23-01TC-07	R7	23-01TC-07
			L8	23-01TC-08	R8	23-01TC-08
			L9	23-01TC-09	R9	23-01TC-09
			L10	23-01TC-10	R10	23-01TC-10
			L11	23-01TC-01	R11	23-01TC-01
			L12	23-01TC-02	R12	23-01TC-02
			L13	23-01TC-03	R13	23-01TC-03
			L14	23-01TC-04	R14	23-01TC-04
			L15	23-01TC-05	R15	23-01TC-05





Equipment : COD Reactor
Condition As-Received : Used Item
Reference : 2501-0343OC-2
Result of Calibration : (*) Without Adjustment
Function of UUC* : Temperature Source
Calibration Point : 150 °C

Cert. No.: 25TM156
Page: 3 of 3

UUC*		Measured Temperature (°C)						Temperature stability (± °C)	Uncertainty (± °C)	Coverage Factor k
Setting (°C)	Reading (°C)	Position								
Left		Left			Right			0.11	1.1	2
150	150	L13	L14	L15	R13	R14	R15			
		149.407	149.739	149.671	148.510	148.840	148.458			
		L10	L11	L12	R10	R11	R12			
		149.910	150.069	150.171	148.894	148.931	148.753			
		L7	L8	L9	R7	R8	R9			
Right		L7	L8	L9	R7	R8	R9	0.11	1.1	2
150	150	150.880	150.841	151.199	150.289	150.358	150.147			
		L4	L5	L6	R4	R5	R6			
		150.618	150.843	151.109	150.350	150.273	149.820			
		L1	L2	L3	R1	R2	R3			
		150.229	150.688	150.838	150.094	150.115	149.792			

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

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

UUC* : Unit Under Calibration

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

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

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Certificate No. C07240192

Calibration Certificate

Equipment: SPECTROPHOTOMETER
Model: DR 3900
Serial No.(or ID): 2403637
Manufacturer: HACH
Condition: New

Job No.: KSM2403543
Received Date: 25 December 2024
Issued Date: 25 December 2024
Page: 1 of 3

Customer
ALS Laboratory Group (Thailand) Co., Ltd
114/1 Moo 8, Kantichawanich Rd. T. Bai Phru, A Hatyai, Songkhla 90250

Calibration Place
Hach (Thailand) Limited.
Branch 00001, Building D Room No. D3 11, 3rd Floor, No. 735/4, Srinakarin Road,
Pattanakarn, Suanluang, Bangkok 10250 Thailand.

Calibration Date
25 December 2024

Environment Condition
Temperature: 22.2 °C ± 0.5 °C
Humidity: 59.2 %RH ± 2.3 %RH

The Method used
In-house method, W07, based on ASTM E 275-08 and
ASTM E 387-04

Traceability
This certificate is traceable to the CRM maintained by National Institute
of Standards and Technology (NIST) through Starna Scientific Limited.
The standard for Wavelength Certificate No. 106891 and 108692
The standard for Photometric Certificate No. 109010, 114655

This certificate is issued the units of measurement according to the International System of Units (SI). It provides traceability of measurement to international or national standard or other recognized national standard laboratories.
The measurement uncertainty stated is the expanded uncertainty which is obtained from the standard uncertainty multiplied by the coverage factor (*k*=2) to provide a level of confidence of approximately 95%. It is determined in accordance with the Guide to Expression of Uncertainty in Measurement (GUM).
These results may be affected by deviations from specified conditions. The results relate only to the items listed, calibrated or sampled. The report shall not be reproduced except in full without approval of SCIMET Co., Ltd.

(Mr. Siwapan Srijan)
Person in charge



(Mr. Thalongkoat Pongnam)
Authorized signatory

FC07-03: 30 MAY 2023



Certificate No.: C07240192 Page 2 of 3

Condition of reference standards instruments / CRM:

Instruments	Set No.	Certificate No.	Due date
Holmium Oxide Glass Reference	121512	108691	25-Jan-25
Didymium Oxide Glass Reference	119722	108692	25-Jan-25
Neutral Density Filter Reference	12276	109010, 114655	2-Feb-25

Calibration Results: Without Adjustment

Wavelength Accuracy (nm), The spectral bandwidth of Std at 5 nm and UUC at 5 nm

Standard Wavelength (nm)	Unit Under Calibration (nm)	Correction (nm)	Uncertainty of Measurement (± nm)
333.67	333	0.67	0.59
361.02	361	0.02	0.59
417.80	417	0.80	0.59
441.29	441	0.29	0.59
479.88	480	-0.12	0.59
513.75	513	0.75	0.59
528.59	528	0.59	0.59
537.75	537	0.75	0.59
585.56	585	0.56	0.59
641.95	642	-0.05	0.59
684.70	685	-0.30	0.59
747.61	748	-0.39	0.59
807.04	807	0.04	0.59
879.68	880	-0.32	0.59



Certificate No.: C07240192 Page 3 of 3

Calibration Results: Without Adjustment

Photometric Accuracy (Absorbance)

Wavelength	Standard absorbance (Abs)	Unit Under Calibration (Abs)	Correction (Abs)	Uncertainty of Measurement (± Abs)
420 nm	0.0009	0.000	0.0009	0.0045
	0.2373	0.234	0.0033	0.0045
	0.5617	0.561	0.0007	0.0045
	0.7392	0.738	0.0012	0.0045
440 nm	1.0550	1.056	-0.0010	0.0045
	0.0000	0.000	0.0000	0.0045
	0.2355	0.231	0.0025	0.0045
	0.5513	0.550	0.0013	0.0045
465 nm	0.7230	0.722	0.0010	0.0045
	1.0324	1.032	0.0004	0.0045
	0.0000	0.000	0.0000	0.0045
	0.2126	0.210	0.0026	0.0045
546.1 nm	0.5038	0.508	-0.0024	0.0045
	0.6735	0.676	-0.0025	0.0045
	0.9815	0.985	-0.0035	0.0045
	0.0000	0.000	0.0000	0.0045
590 nm	0.2291	0.217	0.0031	0.0045
	0.5176	0.520	-0.0024	0.0045
	0.6930	0.694	-0.0010	0.0045
	0.9908	0.994	-0.0032	0.0045
635 nm	0.0000	0.000	0.0000	0.0045
	0.2443	0.241	0.0033	0.0045
	0.5530	0.554	-0.0010	0.0045
	0.7195	0.719	0.0006	0.0045
635 nm	1.0301	1.031	-0.0009	0.0045
	0.0000	0.000	0.0000	0.0045
	0.2646	0.261	0.0036	0.0045
	0.5370	0.538	-0.0010	0.0045
635 nm	0.6862	0.687	-0.0008	0.0045
	0.9822	0.984	-0.0018	0.0045

The End of Certificate

ภาคผนวก จ

สำเนาหนังสือใบอนุญาตขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

ลำดับที่	สารเคมี	วิธีวิเคราะห์
19	Copper	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
20	Cyanide	Distillation, Colorimetric Method ⁽⁴⁾
21	2,4'-DDD	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
22	4,4'-DDD	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
23	2,4'-DDE	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
24	4,4'-DDE	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
25	2,4'-DDT	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
26	4,4'-DDT	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
27	Dieldrin	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
28	Endosulfan Sulfate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
29	Endosulfan I	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
30	Endosulfan II	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
31	Endrin	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
32	Endrin Aldehyde	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
33	Formaldehyde	Distillation, Colorimetric Method ⁽³⁾
34	Free Chlorine	1) DPD Ferrous Titrimetric Method ⁽⁴⁾ 2) DPD Colorimetric Method ⁽⁴⁾
35	Heptachlor	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
36	Heptachlor Epoxide	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
37	Hexavalent Chromium	Colorimetric Method ⁽⁴⁾
38	3-Hydroxycarbofuran	High-Performance Liquid Chromatographic Method ⁽⁴⁾
39	Lead	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾

40 Manganese...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
40	Manganese	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
41	Mercury	1) Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
42	Methiocarb	High-Performance Liquid Chromatographic Method ⁽⁴⁾
43	Methoxychlor	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
44	Methomyl	High-Performance Liquid Chromatographic Method ⁽⁴⁾
45	Nickel	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
46	Oil & Grease	1) Liquid-Liquid, Partition-Gravimetric Method ⁽⁴⁾ 2) Soxhlet Extraction Method ⁽⁴⁾
47	Oxamyl	High-Performance Liquid Chromatographic Method ⁽⁴⁾
48	Propoxur	High-Performance Liquid Chromatographic Method ⁽⁴⁾
49	pH	Electrometric Method ⁽⁴⁾
50	Phenols	1) Distillation, Chloroform Extraction Method ⁽⁴⁾ 2) Distillation, Direct Photometric Method ⁽⁴⁾
51	Selenium	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
52	Sulfide	Iodometric Method ⁽⁴⁾
53	Temperature	Laboratory and Field Method ⁽⁴⁾
54	Total Dissolved Solids	Dried at 180 °C ⁽⁴⁾
55	Total Kjeldahl Nitrogen	Semi-Micro Kjeldahl Method ⁽⁴⁾
56	Total Phosphorous	Digestion, Colorimetric Method ⁽⁴⁾
57	Total Suspended Solids	Dried from 103-105 °C ⁽⁴⁾
58	Toxaphene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
59	Trivalent Chromium	1) Digestion, Inductively Coupled Plasma Method; Colorimetric Method; Calculation ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method; Colorimetric Method; Calculation ⁽⁴⁾
60	Zinc	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁽⁴⁾

น้ำดื่ม...

น้ำดื่ม จำนวน 126 รายการ

ลำดับที่	สารเคมี	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	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
6	Arsenic	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
7	Atrazine	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
8	Barium	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
9	Benz(a)anthracene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
10	Benzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
11	Benzo(b)fluoranthene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
12	Benzo(k)fluoranthene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
13	Benzoic Acid	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
14	Benzo(a)pyrene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
15	Benzo(g,h,i)perylene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
16	Beryllium	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
17	Bis(2-chloroethyl)ether	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾

18 Bis(2-ethoxyethyl)phthalate...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
18	Bis(2-ethoxyethyl)phthalate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
19	Bromodichloromethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
20	Bromoform	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
21	Butanol	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
22	Butyl benzyl phthalate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
23	Cadmium	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
24	Carbazole	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
25	Carbon disulfide	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
26	Carbon tetrachloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
27	Chlordane	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
28	p-Chloroaniline	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
29	Chlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
30	Chlorodibromomethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
31	Chloroform	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
32	2-Chlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
33	Chromium	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
34	Chromium (III)	1) Digestion, Inductively Coupled Plasma Method; Colorimetric Method; Calculation ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method; Colorimetric Method; Calculation ⁽⁴⁾
35	Chromium (VI)	Colorimetric Method ⁽⁴⁾

36 Chrysene...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
36	Chrysene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
37	Cyanide	Distillation, Colorimetric Method ⁽⁴⁾
38	2,4-D	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
39	DDD	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
40	DDE	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
41	DDT	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
42	Dibenz(a,h)anthracene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
43	Di-n-Butyl Phthalate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
44	1,2-Dichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
45	1,3-Dichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
46	1,4-Dichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
47	3,3-Dichlorobenzidine	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
48	1,1-Dichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
49	1,2-Dichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
50	1,1-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
51	cis-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
52	trans-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
53	2,4-Dichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
54	1,2-Dichloropropane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
55	1,3-Dichloropropane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾

56 1,3-Dichloropropene...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
56	1,3-Dichloropropene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
57	Dieldrin	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
58	Diethyl Phthalate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
59	2,4-Dimethylphenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
60	2,4-Dinitrophenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
61	2,4-Dinitrotoluene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
62	2,6-Dinitrotoluene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
63	Di-n-octyl phthalate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
64	Endosulfan	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
65	Endrin	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
66	Ethylbenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
67	Fluoranthene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
68	Fluorene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
69	Heptachlor	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
70	Heptachlor epoxide	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
71	Hexachlorobenzene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
72	Hexachloro-1,3-butadiene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
73	n-Hexane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
74	α-HCH	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
75	β-HCH	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾

76 γ-HCH...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
76	γ-HCH	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
77	Hexachlorocyclopentadiene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
78	Hexachloroethane	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
79	Indeno(1,2,3-cd)pyrene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
80	Isophorone	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
81	Lead	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
82	Manganese	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
83	Mercury	1) Digestion, Cold Vapor Atomic Absorption Spectrometric Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
84	Methanol	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
85	Methoxychlor	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
86	Methyl bromide	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
87	Methylene chloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
88	2-Methylphenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
89	2-Methylnaphthalene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
90	Methyl tert-butyl Ether	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
91	Naphthalene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
92	Nickel	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
93	Nitrobenzene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾

94 N-Nitrosodiphenylamine...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
94	N-Nitrosodiphenylamine	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
95	N-Nitrosodi-n-Propylamine	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
96	Polychlorinated Biphenyls - PCB 1016 - PCB 1221 - PCB 1232 - PCB 1242 - PCB 1248 - PCB 1254 - PCB 1260	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
97	Pentachlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
98	pH	Electrometric Method ⁽⁴⁾
99	Phenanthrene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
100	Phenol	1) Distillation, Chloroform Extraction Method ⁽⁴⁾ 2) Distillation, Direct Photometric Method ⁽⁴⁾ 3) Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
101	Pyrene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
102	Selenium	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
103	Silver	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
104	Styrene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
105	1,1,2,2-Tetrachloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
106	Tetrachloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
107	Toluene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
108	Toxaphene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
109	TPH (C ₉ -C ₉)	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽¹⁾⁽²⁾

110 TPH (C₁₀-C₁₆)...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
110	TPH (C ₈ -C ₁₆)	Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^(8,22)
111	TPH (C ₁₆ -C ₃₅)	Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^(8,22)
112	1,2,4-Trichlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
113	1,1,1-Trichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
114	1,1,2-Trichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
115	Trichloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
116	2,4,5-Trichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
117	2,4,6-Trichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
118	1,3,5-Trimethylbenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
119	Vanadium	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁽⁴⁾
120	Vinyl acetate	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
121	Vinyl chloride	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
122	m-Xylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
123	o-Xylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
124	p-Xylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
125	Xylene (Total)	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
126	Zinc	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁽⁴⁾

อากาศเสีย...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Antimony	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁽⁵⁾ 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁽⁵⁾
2	Arsenic	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁽⁵⁾ 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁽⁵⁾
3	Beryllium	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁽⁵⁾ 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁽⁵⁾
4	Cadmium	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁽⁵⁾ 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁽⁵⁾
5	Carbon Monoxide	1) Instrumental Analyzer Method ⁽⁵⁾ 2) Sampling Bag Non-Dispersive Infrared Method ⁽⁵⁾
6	Chlorine	1) Absorption Sampling, Ion Chromatographic Method ⁽⁵⁾ 2) Isokinetic Sampling, Ion Chromatographic Method ⁽⁵⁾
7	Chromium	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁽⁵⁾ 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁽⁵⁾
8	Cobalt	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁽⁵⁾ 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁽⁵⁾
9	Copper	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁽⁵⁾ 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁽⁵⁾
10	Cresol	Absorption Sampling, Gas Chromatographic Method ⁽⁵⁾
11	Dioxins	Isokinetic Sampling ⁽⁵⁾
12	Hydrogen Chloride	1) Absorption Sampling, Ion Chromatographic Method ⁽⁵⁾ 2) Isokinetic Sampling, Ion Chromatographic Method ⁽⁵⁾
13	Hydrogen Fluoride	1) Absorption Sampling, Ion Chromatographic Method ⁽⁵⁾ 2) Isokinetic Sampling, Ion Chromatographic Method ⁽⁵⁾
14	Hydrogen Sulfide	Absorption Sampling, Iodometric Method ⁽⁵⁾

15 Lead...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
15	Lead	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁽⁵⁾ 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁽⁵⁾
16	Manganese	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁽⁵⁾ 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁽⁵⁾
17	Mercury	1) Isokinetic Sampling, Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ⁽⁵⁾ 2) Isokinetic Sampling, Digestion, Cold-Vapor Atomic Fluorescence Spectrometric Method ⁽⁵⁾
18	Nickel	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁽⁵⁾ 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁽⁵⁾
19	Opacity	Ringelmann's Method ⁽²⁾
20	Oxides of Nitrogen	1) Absorption Sampling, Phenoldisulfonic Acid Method ⁽⁵⁾ 2) Absorption Sampling, Alkaline Permanganate/Colorimetric Method ⁽⁵⁾ 3) Instrumental Analyzer Method ⁽⁵⁾
21	Selenium	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁽⁵⁾ 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁽⁵⁾
22	Sulfur Dioxide	1) Absorption Sampling, Barium-Thorin Titrimetric Method ⁽⁵⁾ 2) Instrumental Analyzer Method ⁽⁵⁾
23	Sulfuric Acid	Isokinetic Sampling, Barium-Thorin Titrimetric Method ⁽⁵⁾
24	Tellurium	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁽⁵⁾ 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁽⁵⁾
25	Tin	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁽⁵⁾ 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁽⁵⁾
26	Total Suspended Particulate	1) Isokinetic Sampling, Gravimetric Method ⁽⁵⁾ 2) Paired Train, Isokinetic Sampling, Gravimetric Method ⁽⁵⁾

27 Vanadium...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
27	Vanadium	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁽⁵⁾ 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁽⁵⁾
28	Xylene	Absorption Sampling, Gas Chromatographic Method ⁽⁵⁾

สิ่งปนเปื้อนหรือวัสดุที่ไม่ใช่แก๊ส จำนวน 35 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Aldrin	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1,2,26) 2) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26) 3) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1,2,26)
2	Antimony	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,6,16) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,6,17) 3) Digestion, Inductively Coupled Plasma Method ^(7,16) 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7,17)
3	Arsenic	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,6,16) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,6,17) 3) Digestion, Inductively Coupled Plasma Method ^(7,16) 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7,17)
4	Barium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,6,16) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,6,17) 3) Digestion, Inductively Coupled Plasma Method ^(7,16) 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7,17)

5 Beryllium...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
5	Beryllium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1.6,16) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1.6,17) 3) Digestion, Inductively Coupled Plasma Method ^(7.14) 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(7.17)
6	Cadmium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1.6,16) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1.6,17) 3) Digestion, Inductively Coupled Plasma Method ^(7.14) 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(7.17)
7	Chlordane	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1.9,26) 2) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 3) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
8	Chromium	1) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1.6,17) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7.14) 3) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(7.17)
9	Chromium (III)	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method; Waste Extraction, Colorimetric Method; Calculation Method ^(1.6,16,19) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method; Waste Extraction, Colorimetric Method; Calculation Method ^(1.6,17,19) 3) Digestion, Inductively Coupled Plasma Method; Alkaline Digestion, Colorimetric Method; Calculation Method ^(7.18,19) 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method; Alkaline Digestion, Colorimetric Method; Calculation Method ^(7.18,17,19)

10 Chromium (VI)...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
10	Chromium (VI)	1) Waste Extraction, Colorimetric Method ^(1.6,19) 2) Alkaline Digestion, Colorimetric Method ^(8,19)
11	Cobalt	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1.6,16) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1.6,17) 3) Digestion, Inductively Coupled Plasma Method ^(7.14) 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(7.17)
12	Copper	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1.6,16) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1.6,17) 3) Digestion, Inductively Coupled Plasma Method ^(7.14) 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(7.17)
13	2,4-D	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1.9,26) 2) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 3) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
14	DDD	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1.9,26) 2) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 3) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
15	DDE	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1.9,26) 2) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 3) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
16	DOT	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1.9,26)

2) Soxhlet...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
17	Dieldrin	2) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 3) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
18	Endrin	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1.9,26) 2) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 3) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
19	Heptachlor	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1.9,26) 2) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 3) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
20	Lead	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1.6,16) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1.6,17) 3) Digestion, Inductively Coupled Plasma Method ^(7.14) 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(7.17)
21	Lindane	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1.9,26) 2) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 3) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)

22 Mercury...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
22	Mercury	1) Waste Extraction, Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ^(1.6,20) 2) Waste Extraction, Digestion, Cold-Vapor Atomic Fluorescence Spectrometric Method ^(1.6,30) 3) Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ⁽²⁰⁾ 4) Digestion, Cold-Vapor Atomic Fluorescence Spectrometric Method ⁽²⁰⁾ 5) Thermal Decomposition Amalgamation and Atomic Absorption Spectrometric Method ⁽²¹⁾
23	Methoxychlor	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1.9,26) 2) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 3) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
24	Mirex	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1.9,26) 2) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 3) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
25	Molybdenum	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1.6,16) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1.6,17) 3) Digestion, Inductively Coupled Plasma Method ^(7.14) 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(7.17)
26	Nickel	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1.6,16) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1.6,17) 3) Digestion, Inductively Coupled Plasma Method ^(7.14) 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(7.17)
27	Polychlorinated biphenyls (PCBs) - Aroclor 1016 - Aroclor 1221 - Aroclor 1232 - Aroclor 1242 - Aroclor 1248 - Aroclor 1254 - Aroclor 1260	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1.9,26) 2) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 3) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)

- 2-Chlorobiphenyl...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
28	- 2-Chlorobiphenyl - 2,3-Dichlorobiphenyl - 2,2',5'-Trichlorobiphenyl - 2,4',5'-Trichlorobiphenyl - 2,2',3,5'-Tetrachlorobiphenyl - 2,2',5,5'-Tetrachlorobiphenyl - 2,3',4,4'-Tetrachlorobiphenyl - 2,2',3,4,5'-Pentachlorobiphenyl - 2,2',4,5,5'-Pentachlorobiphenyl - 2,3,3',4',6-Pentachlorobiphenyl - 2,2',3,4,4',5'-Hexachlorobiphenyl - 2,2',3,4,5,5'-Hexachlorobiphenyl - 2,2',3,5,5',6-Hexachlorobiphenyl - 2,2',4,4',5,5'-Hexachlorobiphenyl - 2,2',3,3',4,4',5'-Heptachlorobiphenyl - 2,2',3,4,4',5,5'-Heptachlorobiphenyl - 2,2',3,4,4',5',6-Heptachlorobiphenyl - 2,2',3,4',5,5',6-Heptachlorobiphenyl - 2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl Pentachlorophenol	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1.9,28) 2) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,28) 3) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(11,26) Electrometric Method ^(23,24) 1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1.4,14) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1.6,17) 3) Digestion, Inductively Coupled Plasma Method ^(7,14) 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7,17)
29	pH	
30	Selenium	

31 Silver...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
31	Silver	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1.6,16) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1.6,17) 3) Digestion, Inductively Coupled Plasma Method ^(7,14) 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7,17)
32	Thallium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1.4,14) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1.6,17) 3) Digestion, Inductively Coupled Plasma Method ^(7,14) 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7,17)
33	Toxaphene	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1.9,28) 2) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,28) 3) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(11,26)
34	Vanadium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1.4,14) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1.6,17) 3) Digestion, Inductively Coupled Plasma Method ^(7,14) 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7,17)
35	Zinc	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1.4,14) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1.6,17) 3) Digestion, Inductively Coupled Plasma Method ^(7,14) 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7,17)

ดิน...

ดิน จำนวน 125 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Acenaphthene	1) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,28) 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(11,26)
2	Acetone	1) Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(15,23) 2) Equilibrium Headspace, Gas Chromatographic/Mass Spectrometric Method ⁽¹³⁾
3	Aldrin	1) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,28) 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(11,26)
4	Anthracene	1) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,28) 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(11,26)
5	Antimony	1) Digestion, Inductively Coupled Plasma Method ^(7,14) 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7,17)
6	Arsenic	1) Digestion, Inductively Coupled Plasma Method ^(7,14) 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7,17)
7	Atrazine	1) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,28) 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(11,26)
8	Barium	1) Digestion, Inductively Coupled Plasma Method ^(7,14) 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7,17)
9	Benz(a)anthracene	1) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,28) 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(11,26)
10	Benzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(15,23)

11 Benzo(b)fluoranthene

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
11	Benzo(b)fluoranthene	1) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,28) 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(11,26)
12	Benzo(k)fluoranthene	1) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,28) 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(11,26)
13	Benzoic acid	1) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,28) 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(11,26)
14	Benzo(a)pyrene	1) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,28) 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(11,26)
15	Benzo(g,h,i)perylene	1) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,28) 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(11,26)
16	Beryllium	1) Digestion, Inductively Coupled Plasma Method ^(7,14) 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7,17)
17	Bis(2-chloroethyl)ether	1) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,28) 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(11,26)
18	Bis(2-ethylhexyl)phthalate	1) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,28) 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(11,26)
19	Bromodichloromethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(15,23)
20	Bromoform	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(15,23)
21	Butanol	Equilibrium Headspace, Gas Chromatographic/Mass Spectrometric Method ^(13,23)
22	Butyl Benzyl Phthalate	1) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,28) 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(11,26)

23 Cadmium...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
23	Cadmium	1) Digestion, Inductively Coupled Plasma Method ^(7,14) 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(1,17)
24	Carbazole	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
25	Carbon Disulfide	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
26	Carbon tetrachloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
27	Chlordane	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
28	p-Chloroaniline	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
29	Chlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
30	Chlorodibromomethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
31	Chloroform	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
32	2-Chlorophenol	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
33	Chromium	1) Digestion, Inductively Coupled Plasma Method ^(7,14) 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(1,17)
34	Chromium (III)	1) Digestion, Inductively Coupled Plasma Method; Alkaline Digestion, Colorimetric Method, Calculation Method ^(7,8,14,19) 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method; Alkaline Digestion, Colorimetric Method; Calculation Method ^(7,8,17,19)
35	Chromium (VI)	Alkaline Digestion, Colorimetric Method ^(8,19)

36 Chrysene...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
36	Chrysene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
37	Cyanide	Extraction, Distillation, Colorimetric Method ^(27,28,29)
38	2,4-D	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
39	DDD	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
40	DDE	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
41	DDT	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
42	Dibenz(a,h)anthracene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
43	Di-n-Butyl Phthalate	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
44	1,2-Dichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
45	1,3-Dichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
46	1,4-Dichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
47	3,3-Dichlorobenzidine	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
48	1,1-Dichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)

49 1,2-Dichloroethane...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
49	1,2-Dichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
50	1,1-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
51	cis-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
52	trans-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
53	2,4-Dichlorophenol	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
54	1,2-Dichloropropane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
55	1,3-Dichloropropane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
56	1,3-Dichloropropene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
57	Dieldrin	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
58	Diethyl Phthalate	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
59	2,4-Dimethylphenol	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
60	2,4-Dinitrophenol	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
61	2,4-Dinitrotoluene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
62	2,6-Dinitrotoluene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)

63 Di-n-Octyl Phthalate...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
63	Di-n-Octyl Phthalate	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
64	Endosulfan	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
65	Endrin	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
66	Ethylbenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
67	Fluoranthene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
68	Fluorene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
69	Heptachlor	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
70	Heptachlor epoxide	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
71	Hexachlorobenzene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
72	Hexachloro-1,3-butadiene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
73	n-Hexane	1) Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25) 2) Equilibrium Headspace, Gas Chromatographic/ Mass Spectrometric Method ⁽¹⁵⁾

73 n-Hexane...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
74	α -HCH	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
75	β -HCH	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
76	γ -HCH	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
77	Hexachlorocyclopentadiene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
78	Hexachloroethane	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
79	Indeno(1,2,3-cd)pyrene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
80	Isophorone	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
81	Lead	1) Digestion, Inductively Coupled Plasma Method ^(7,16) 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(7,17)
82	Manganese	1) Digestion, Inductively Coupled Plasma Method ^(7,16) 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(7,17)
83	Mercury	1) Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ⁽²⁰⁾ 2) Thermal Decomposition, Amalgamation, and Atomic Absorption Spectrophotometry ⁽²¹⁾ 3) Digestion, Cold-Vapor Atomic Fluorescence Spectrometric Method ⁽¹⁹⁾

84 Methanol...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
84	Methanol	1) Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,25) 2) Equilibrium Headspace, Gas Chromatographic/ Mass Spectrometric Method ^(13,25)
85	Methoxychlor	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
86	Methyl Bromide	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,25)
87	Methylene Chloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,25)
88	2-methylphenol	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
89	2-Methylnaphthalene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
90	Methyl tert-Butyl Ether	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,25)
91	Naphthalene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
92	Nickel	1) Digestion, Inductively Coupled Plasma Method ^(7,16) 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(7,17)
93	Nitrobenzene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
94	N-Nitrosodiphenylamine	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
95	N-Nitrosodi-n-propylamine	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)

96 Polychlorinated biphenyls (PCBs)

ลำดับที่	สารเคมี	วิธีวิเคราะห์
96	Polychlorinated biphenyls (PCBs) - Aroclor 1016 - Aroclor 1221 - Aroclor 1232 - Aroclor 1242 - Aroclor 1248 - Aroclor 1254 - Aroclor 1260 - 2-Chlorobiphenyl - 2,2',3,5'-Tetrachlorobiphenyl - 2,2',5,5'-Tetrachlorobiphenyl - 2,3',4,4'-Tetrachlorobiphenyl - 2,2',3,4,5'-Pentachlorobiphenyl - 2,2',4,5,5'-Pentachlorobiphenyl - 2,3',3',4,6-Pentachlorobiphenyl - 2,2',3,4,4',5'-Hexachlorobiphenyl - 2,2',3,4,5,5'-Hexachlorobiphenyl - 2,2',3,5,5',6'-Hexachlorobiphenyl - 2,2',4,4',5,5'-Hexachlorobiphenyl - 2,2',3,3',4,4',5'-Heptachlorobiphenyl - 2,2',3,4,4',5,5'-Heptachlorobiphenyl - 2,2',3,4,4',5,6'-Heptachlorobiphenyl - 2,2',3,4,4',5,6'-Heptachlorobiphenyl - 2,2',3,3',4,4',5,6'-Heptachlorobiphenyl - 2,2',3,3',4,4',5,5',6'-Nonachlorobiphenyl Pentachlorophenol	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
97	Phenanthrene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)

99 Phenol...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
99	Phenol	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
100	Pyrene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
101	Selenium	1) Digestion, Inductively Coupled Plasma Method ^(7,16) 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(7,17)
102	Silver	1) Digestion, Inductively Coupled Plasma Method ^(7,16) 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(7,17)
103	Styrene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,25)
104	1,1,2,2-Tetrachloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,25)
105	Tetrachloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,25)
106	Toluene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,25)
107	Toxaphene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
108	TPH (C ₉ -C ₆)	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,25)
109	TPH (C ₉ -C ₁₀)	1) Automated Extraction, Gas Chromatographic Method ^(12,21) 2) Solvent Extraction, Gas Chromatographic Method ^(12,21) 3) Ultrasonic Extraction, Gas Chromatographic Method ^(12,21)
110	TPH (C ₉ -C ₁₆)	1) Automated Extraction, Gas Chromatographic Method ^(12,21) 2) Solvent Extraction, Gas Chromatographic Method ^(12,21) 3) Ultrasonic Extraction, Gas Chromatographic Method ^(12,21)
111	1,2,4-Trichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,25)
112	1,1,1-Trichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,25)
113	1,1,2-Trichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,25)
114	Trichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,25)

115 2,4,5-Trichlorophenol...

20. United States.

ฉบับนี้ หนังสือฉบับนี้จะมีผลใช้บังคับตั้งแต่วันที่ออกให้จนครบกำหนดการปฏิบัติภารกิจตามที่กำหนด
ในวันที่ ๒ กันยายน ๒๕๖๔

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นายพรหม กลิ่นทอง)
พลเอกโท ปฏิบัติราชการแทน
อธิบดีกรมโรงงานอุตสาหกรรม

กองวิจัยและเตือนภัยมลพิษโรงงาน
กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษและทะเบียนห้องปฏิบัติการ
โทร. ๐ ๒๕๓๐ ๖๓๑๒ ต่อ ๒๑๐๓-๕
โทรสาร ๐ ๒๕๓๐ ๖๓๑๒ ต่อ ๒๑๐๓-๕
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อุตสาหกรรมการค้าไทย ประเทศไทยก้าวหน้า ร่วมกันพัฒนา อุตสาหกรรมสีเขียว



ที่ อก ๐๓๑๐(๑)/ ๑๒๓๖ ๘ ๑



กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๕๐๐

๑๘ ธันวาคม ๒๕๖๓

เรื่อง ยกเลิกบุคลากรของห้องปฏิบัติการวิเคราะห์

เรียน กรรมการผู้จัดการ บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และขอคืนสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน
ลงวันที่ ๒ ธันวาคม ๒๕๖๓

ตามคำขอที่อ้างถึง บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด ห้องปฏิบัติการ
วิเคราะห์เอกชน เลขทะเบียน ๖-๒๐๔ สถานที่ตั้งเลขที่ ๑๐๔ ซอยพัฒนาการ ๔๐ ถนนพัฒนาการ แขวงพัฒนาการ
เขตสวนหลวง กรุงเทพมหานคร ขอยกเลิกบุคลากร ความละเอียดแจ้งแล้ว นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้ยกเลิกเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์
จำนวน ๘ ราย ได้แก่

- | | |
|--------------------------------|----------------------------|
| ๑) นายประพนธ์ วรรณชัย | ทะเบียนเลขที่ ๖-๒๐๔-๖-๐๐๖๐ |
| ๒) นายจิรพันธุ์ ขาวหล่อ | ทะเบียนเลขที่ ๖-๒๐๔-๖-๐๐๗๒ |
| ๓) นายพิรพัฒน์ กำคำ | ทะเบียนเลขที่ ๖-๒๐๔-๖-๐๐๘๘ |
| ๔) นางสาวอรสา ศักดิ์ทอง | ทะเบียนเลขที่ ๖-๒๐๔-๖-๐๑๓๔ |
| ๕) นายกิตติพงศ์ แซ่ลี | ทะเบียนเลขที่ ๖-๒๐๔-๖-๐๑๓๔ |
| ๖) นายจิรเมธ ประเสริฐศิริพิงค์ | ทะเบียนเลขที่ ๖-๒๐๔-๖-๐๑๖๐ |
| ๗) นายไพโรจน์ มณฑาทอง | ทะเบียนเลขที่ ๖-๒๐๔-๖-๐๑๖๖ |
| ๘) นางสาวจารุวรรณ กระจำพันธ์ | ทะเบียนเลขที่ ๖-๒๐๔-๖-๐๑๖๘ |

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นายธีรศักดิ์ อิศรางกูร ณ อยุธยา)
รองอธิบดี ปฏิบัติราชการแทน
อธิบดีกรมโรงงานอุตสาหกรรม

กองวิจัยและเตือนภัยมลพิษโรงงาน

กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษและทะเบียนห้องปฏิบัติการ

โทร. ๐ ๒๕๓๐ ๖๓๑๒ ต่อ ๒๑๐๓-๕

โทรสาร ๐ ๒๕๓๐ ๖๓๑๒ ต่อ ๒๑๐๓-๕

ไปรษณีย์อิเล็กทรอนิกส์ sarabang@diw.mail.go.th



อุตสาหกรรมการค้าไทย ประเทศไทยก้าวหน้า ร่วมกันพัฒนา อุตสาหกรรมสีเขียว



ที่ อก ๐๓๑๐(๑)/ ๑๒ ๓ ๕ ๐



กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๕๐๐

๑๐ เมษายน ๒๕๖๔

เรื่อง ยกเลิกบุคลากรของห้องปฏิบัติการวิเคราะห์

เรียน กรรมการผู้จัดการ บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และขอคืนสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน
ลงวันที่ ๒ เมษายน ๒๕๖๔

ตามคำขอที่อ้างถึง บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด ห้องปฏิบัติการ
วิเคราะห์เอกชน เลขทะเบียน ๖-๒๐๔ สถานที่ตั้งเลขที่ ๑๐๔ ซอยพัฒนาการ ๔๐ ถนนพัฒนาการ แขวงพัฒนาการ
เขตสวนหลวง กรุงเทพมหานคร ขอยกเลิกบุคลากร ความละเอียดแจ้งแล้ว นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้ยกเลิกเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์
จำนวน ๒ ราย ได้แก่

- | | |
|------------------------|----------------------------|
| ๑) นายอิทธิศักดิ์ วัฒน | ทะเบียนเลขที่ ๖-๒๐๔-๖-๐๑๑๒ |
| ๒) นายสมชาย ผลาพิชัย | ทะเบียนเลขที่ ๖-๒๐๔-๖-๐๑๑๒ |

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นายธีรศักดิ์ อิศรางกูร ณ อยุธยา)
รองอธิบดี ปฏิบัติราชการแทน
อธิบดีกรมโรงงานอุตสาหกรรม

กองวิจัยและเตือนภัยมลพิษโรงงาน

กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษและทะเบียนห้องปฏิบัติการ

โทร. ๐ ๒๕๓๐ ๖๓๑๒ ต่อ ๒๑๐๓-๕

โทรสาร ๐ ๒๕๓๐ ๖๓๑๒ ต่อ ๒๑๐๓-๕

ไปรษณีย์อิเล็กทรอนิกส์ sarabang@diw.mail.go.th



อุตสาหกรรมการค้าไทย ประเทศไทยก้าวหน้า ร่วมกันพัฒนา อุตสาหกรรมสีเขียว



ที่ อก ๐๓๑๐(๑)/ ๑๒ ๓ ๕ ๐



กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๕๐๐

๐๕ มิถุนายน ๒๕๖๔

เรื่อง เปลี่ยนแปลงบุคลากรของห้องปฏิบัติการวิเคราะห์

เรียน กรรมการผู้จัดการ บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และขอคืนสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน
ลงวันที่ ๓ พฤษภาคม ๒๕๖๔

ตามคำขอที่อ้างถึง บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด ห้องปฏิบัติการ
วิเคราะห์เอกชน เลขทะเบียน ๖-๒๐๔ สถานที่ตั้งเลขที่ ๑๐๔ ซอยพัฒนาการ ๔๐ ถนนพัฒนาการ แขวงพัฒนาการ
เขตสวนหลวง กรุงเทพมหานคร ขอเปลี่ยนแปลงบุคลากร ความละเอียดแจ้งแล้ว นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้เพิ่มเจ้าหน้าที่ห้องปฏิบัติการวิเคราะห์เอกชน
จำนวน ๑๑ ราย ได้แก่

- | | |
|-----------------------------------|----------------------------|
| ๑) นายคุณากร มั่นชื่น | ทะเบียนเลขที่ ๖-๒๐๔-๖-๐๑๑๔ |
| ๒) นายชัยมงคล แสนมาตร | ทะเบียนเลขที่ ๖-๒๐๔-๖-๐๑๑๕ |
| ๓) นายเอกรินทร์ บุตรคำทิ | ทะเบียนเลขที่ ๖-๒๐๔-๖-๐๑๑๖ |
| ๔) นายพิชานันท์ อินธิกร | ทะเบียนเลขที่ ๖-๒๐๔-๖-๐๑๑๗ |
| ๕) นายศตวรรษ แก้วโนนา | ทะเบียนเลขที่ ๖-๒๐๔-๖-๐๑๑๘ |
| ๖) นายวิกรม มิตธี | ทะเบียนเลขที่ ๖-๒๐๔-๖-๐๑๑๙ |
| ๗) นายกนกนันท์ คำจันทร์ | ทะเบียนเลขที่ ๖-๒๐๔-๖-๐๑๒๐ |
| ๘) นายศุภชัย มีทรัพย์ | ทะเบียนเลขที่ ๖-๒๐๔-๖-๐๑๒๑ |
| ๙) นายธีรพงษ์ ศรีคำแหง | ทะเบียนเลขที่ ๖-๒๐๔-๖-๐๑๒๒ |
| ๑๐) นายอภิสิทธิ์ ศรีคนแก้ว | ทะเบียนเลขที่ ๖-๒๐๔-๖-๐๑๒๓ |
| ๑๑) ว่าที่ร้อยตรี ภาณุพงศ์ แสนศรี | ทะเบียนเลขที่ ๖-๒๐๔-๖-๐๑๒๔ |

อนึ่ง หนังสือฉบับนี้จะมีผลใช้บังคับตั้งแต่วันที่ออกให้จนครบกำหนดการปฏิบัติภารกิจตามที่กำหนด
ในวันที่ ๒ กันยายน ๒๕๖๔

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นายธีรศักดิ์ อิศรางกูร ณ อยุธยา)
รองอธิบดี ปฏิบัติราชการแทน
อธิบดีกรมโรงงานอุตสาหกรรม

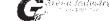
กองวิจัยและเตือนภัยมลพิษโรงงาน

กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษและทะเบียนห้องปฏิบัติการ

โทร. ๐ ๒๕๓๐ ๖๓๑๒ ต่อ ๒๑๐๓-๕

โทรสาร ๐ ๒๕๓๐ ๖๓๑๒ ต่อ ๒๑๐๓-๕

ไปรษณีย์อิเล็กทรอนิกส์ sarabang@diw.mail.go.th



อุตสาหกรรมการค้าไทย ประเทศไทยก้าวหน้า ร่วมกันพัฒนา อุตสาหกรรมสีเขียว



ที่ อก ๐๓๔๐(๑)/ ๒๕ ๐ ๕



กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๕๐๐

๒๑ สิงหาคม ๒๕๖๔

เรื่อง: เปลี่ยนแปลงสารมลพิษที่วิเคราะห์

เรียน: กรรมการผู้จัดการ บริษัท เอแอลเอส แลบริทอรี่ กรุ๊ป (ประเทศไทย) จำกัด

อ้างถึง: คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงผลการ และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน
ลงวันที่ ๒๗ มิถุนายน ๒๕๖๔

สิ่งที่ส่งมาด้วย เอกสารแนบท้ายหนังสือเปลี่ยนแปลงสารมลพิษที่วิเคราะห์

บริษัท เอแอลเอส แลบริทอรี่ กรุ๊ป (ประเทศไทย) จำกัด จำนวน ๖ หน้า

ตามคำขอที่อ้างถึง บริษัท เอแอลเอส แลบริทอรี่ กรุ๊ป (ประเทศไทย) จำกัด ต้องปฏิบัติตาม
วิเคราะห์เอกชน เลขทะเบียน ๖-๒๐๔ สถานที่ตั้งเลขที่ ๑๐๔ ซอยพัฒนาการ ๔๐ ถนนพัฒนาการ แขวงพัฒนาการ
เขตสวนหลวง กรุงเทพมหานคร ขอเปลี่ยนแปลงสารมลพิษที่วิเคราะห์ ที่ต้องวิเคราะห์จากสารมลพิษ ดังนี้

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ได้รับบริษัท เอแอลเอส แลบริทอรี่ กรุ๊ป (ประเทศไทย) จำกัด
เพิ่มขอบข่ายชนิดสารมลพิษที่วิเคราะห์ในใบได้ติด สิ่งปลูกและวัสดุที่ไม่ใช้แล้ว และคืน สารสิ่งที่ส่งมาด้วย

อนึ่ง หนังสือฉบับนี้จะส่งนายพรหมนัยสิทธิ์ต่ออายุรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
ในวันที่ ๒ กันยายน ๒๕๖๔

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นายภาณุพิพัทธ์ คุปประเสริฐ)
ผู้อำนวยการกองนโยบายและแผนสิ่งแวดล้อม
ปฏิบัติราชการแทนอธิบดีกรมโรงงานอุตสาหกรรม

กองวิจัยและเฝ้าระวังมลพิษโรงงาน

กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษและทะเบียนห้องปฏิบัติการ

โทร. ๐ ๒๕๖๐ ๖๓๓๐๒ ต่อ ๒๑๐๓-๕

โทรสาร ๐ ๒๕๖๐ ๖๓๓๐๒ ต่อ ๒๑๖๔

ไปรษณีย์อิเล็กทรอนิกส์ sarabang@gv.w.go.th



อุตสาหกรรมก้าวไกล ประเทศไทยก้าวหน้า ร่วมกันพัฒนา อุตสาหกรรมสีเขียว



เอกสารแนบท้ายหนังสือเปลี่ยนแปลงสารมลพิษที่วิเคราะห์

บริษัท เอแอลเอส แลบริทอรี่ กรุ๊ป (ประเทศไทย) จำกัด

เลขทะเบียน ๖-๒๐๔

ที่ อก ๐๓๔๐(๑)/ ๒๕ ๐ ๕

ลงวันที่ ๒๑ สิงหาคม ๒๕๖๔

ขอขยายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๔๐ รายการ

นำติดขึ้น จำนวน ๔ รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Aluminum	Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(1,3,6)
2	Copper	Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(2,3)
3	Iron	Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(2,3)
4	Molybdenum	Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(2,3)

สิ่งปลูกและวัสดุที่ไม่ใช้แล้ว จำนวน 17 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Antimony	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,3,6) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,3,7) 3) Digestion, Inductively Coupled Plasma Method ^(4,6) 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(4,7)
2	Arsenic	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,3,6) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,3,7) 3) Digestion, Inductively Coupled Plasma Method ^(4,6) 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(4,7)
3	Barium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,3,6) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,3,7) 3) Digestion, Inductively Coupled Plasma Method ^(4,6) 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(4,7)

Beryllium

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ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
4	Beryllium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,3,6) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,3,7) 3) Digestion, Inductively Coupled Plasma Method ^(4,6) 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(4,7)
5	Cadmium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,3,6) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,3,7) 3) Digestion, Inductively Coupled Plasma Method ^(4,6) 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(4,7)
6	Chromium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,3,6) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,3,7) 3) Digestion, Inductively Coupled Plasma Method ^(4,6) 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(4,7)
7	Chromium (III)	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method; Waste Extraction, Colorimetric Method; Calculation Method ^(1,3,6,8) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method; Waste Extraction, Colorimetric Method; Calculation Method ^(1,3,7,8) 3) Digestion, Inductively Coupled Plasma Method; Alkaline Digestion, Colorimetric Method; Calculation Method ^(4,5,6,8) 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method; Alkaline Digestion, Colorimetric Method; Calculation Method ^(4,5,7,8)
8	Cobalt	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,3,6) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,3,7)

3) Digestion...

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ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
9	Copper	3) Digestion, Inductively Coupled Plasma Method ^(4,6) 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(4,7) 1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,3,6) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,3,7) 3) Digestion, Inductively Coupled Plasma Method ^(4,6) 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(4,7)
10	Lead	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,3,6) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,3,7) 3) Digestion, Inductively Coupled Plasma Method ^(4,6) 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(4,7)
11	Molybdenum	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,3,6) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,3,7) 3) Digestion, Inductively Coupled Plasma Method ^(4,6) 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(4,7)
12	Nickel	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,3,6) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,3,7) 3) Digestion, Inductively Coupled Plasma Method ^(4,6) 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(4,7)
13	Selenium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,3,6) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,3,7) 3) Digestion, Inductively Coupled Plasma Method ^(4,6) 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(4,7)

14 Silver...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
14	Silver	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,3,4) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(3,5,7) 3) Digestion, Inductively Coupled Plasma Method ^(8,9) 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(4,7)
15	Thallium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,3,4) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,3,7) 3) Digestion, Inductively Coupled Plasma Method ^(8,9) 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(4,7)
16	Vanadium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,3,4) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,3,7) 3) Digestion, Inductively Coupled Plasma Method ^(8,9) 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(4,7)
17	Zinc	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,3,4) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,3,7) 3) Digestion, Inductively Coupled Plasma Method ^(8,9) 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(4,7)

ดิน จำนวน 19 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Aluminum	1) Digestion, Inductively Coupled Plasma Method ^(8,9) 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(4,7)
2	Antimony	1) Digestion, Inductively Coupled Plasma Method ^(8,9) 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(4,7)

3 Arsenic...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
3	Arsenic	1) Digestion, Inductively Coupled Plasma Method ^(8,9) 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(4,7)
4	Barium	1) Digestion, Inductively Coupled Plasma Method ^(8,9) 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(4,7)
5	Beryllium	1) Digestion, Inductively Coupled Plasma Method ^(8,9) 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(4,7)
6	Cadmium	1) Digestion, Inductively Coupled Plasma Method ^(8,9) 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(4,7)
7	Chromium	1) Digestion, Inductively Coupled Plasma Method ^(8,9) 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(4,7)
8	Chromium (III)	1) Digestion, Inductively Coupled Plasma Method; Alkaline Digestion, Colorimetric Method; Calculation Method ^(4,5,6,8) 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method; Alkaline Digestion, Colorimetric Method; Calculation Method ^(4,5,7,8)
9	Copper	1) Digestion, Inductively Coupled Plasma Method ^(8,9) 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(4,7)
10	Iron	1) Digestion, Inductively Coupled Plasma Method ^(8,9) 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(4,7)
11	Lead	1) Digestion, Inductively Coupled Plasma Method ^(8,9) 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(4,7)
12	Manganese	1) Digestion, Inductively Coupled Plasma Method ^(8,9) 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(4,7)
13	Molybdenum	1) Digestion, Inductively Coupled Plasma Method ^(8,9) 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(4,7)
14	Nickel	1) Digestion, Inductively Coupled Plasma Method ^(8,9) 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(4,7)

15 pH...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
15	pH	Electrometric Method ⁽⁹⁾
16	Selenium	1) Digestion, Inductively Coupled Plasma Method ^(8,9) 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(4,7)
17	Silver	1) Digestion, Inductively Coupled Plasma Method ^(8,9) 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(4,7)
18	Vanadium	1) Digestion, Inductively Coupled Plasma Method ^(8,9) 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(4,7)
19	Zinc	1) Digestion, Inductively Coupled Plasma Method ^(8,9) 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(4,7)

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๓๗



ที่ อก ๐๗๓๐(๒)๕๐ ๑ ๑๑

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๕๐๐๐

๒๖ กันยายน ๒๕๖๕

เรื่อง เปลี่ยนแปลงบุคลากร ชื่อตัวและชื่อสกุลของบุคลากร
เรียน กรรมการผู้จัดการ บริษัท เอแอลเอส แลบริเอทอรี่ กรุ๊ป (ประเทศไทย) จำกัด
อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และขอคืนความลับของห้องปฏิบัติการวิเคราะห์เอกชน
ลงวันที่ ๒๓ สิงหาคม ๒๕๖๕

ตามคำขอที่อ้างถึง บริษัท เอแอลเอส แลบริเอทอรี่ กรุ๊ป (ประเทศไทย) จำกัดขอปฏิบัติ
วิเคราะห์เอกชน เลขทะเบียน ๖-๒๐๔ สถานที่ตั้งเลขที่ ๑๐๔ ซอยพัฒนาการ ๔๐ ถนนพัฒนาการ
แขวงพัฒนาการ เขตสวนหลวง กรุงเทพมหานคร ขอเปลี่ยนแปลงบุคลากร ชื่อตัวและชื่อสกุลของบุคลากร
ต่อกรมโรงงานอุตสาหกรรม นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว มีความเห็นดังนี้

๑. ให้อยกเลิกเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๒ ราย

๑) นางสาวพาดิ์ คุณนาม ทะเบียนเลขที่ ๖-๒๐๔-๖-๐๑๓๓๔

๒) นางสาวอนิชา เทียนคำ ทะเบียนเลขที่ ๖-๒๐๔-๖-๐๑๓๓๔

๒. ให้เปลี่ยนชื่อตัวและชื่อสกุลของเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จากเดิม
นายอาทิตย์ ศรีเสน เป็น นายรัฐธีร์ หวังจิรวรพจน์ ทะเบียนเลขที่ ๖-๒๐๔-๖-๐๑๓๓๔

อนึ่ง หนังสือฉบับนี้จะเป็นลายเซ็นพร้อมหนังสือต่ออายุรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
ในวันที่ ๒ กันยายน ๒๕๖๕

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

๒

(นางสาววิมลวรรณ คุณประเสริฐ)

ผู้อำนวยการกองขึ้นทะเบียนและขึ้นทะเบียนโรงงาน

ปฏิบัติการตามนโยบายกรมโรงงานอุตสาหกรรม

กองวิจัยและพัฒนาระบบพลังงาน

กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษและทะเบียนห้องปฏิบัติการ

โทร. ๐ ๒๕๓๒ ๖๓๓๒ ต่อ ๒๑๐๓-๕

โทรสาร ๐ ๒๕๓๐ ๖๓๓๒ ต่อ ๒๑๑๔

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"อุตสาหกรรมก้าวไกล ประเทศไทยก้าวหน้า ร่วมกันพัฒนา อุตสาหกรรมสีเขียว"



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นางสาว อธิษฐา
(นางสาวบุษยา รัตนสุภา)
นักวิทยาศาสตร์ชำนาญการ



ที่ อก ๐๓๑๐(๕)/ ๑๐๕

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๕๐๐

๒๓ เมษายน ๒๕๖๗

เรื่อง เปลี่ยนแปลงบุคลากรของห้องปฏิบัติการวิเคราะห์

เรียน กรรมการผู้จัดการ บริษัท เอนแอล แลบริทอรี่ กรุ๊ป (ประเทศไทย) จำกัด

อ้างถึง คำขอเปลี่ยนแปลงบุคลากรของห้องปฏิบัติการวิเคราะห์เอกชน ลงวันที่ ๒๙ มีนาคม ๒๕๖๗

ตามคำขอฯ ที่อ้างถึง บริษัท เอนแอล แลบริทอรี่ กรุ๊ป (ประเทศไทย) จำกัด ห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ๖-๒๖๗ สถานที่ตั้งเลขที่ ๑๑๔/๑ หมู่ที่ ๘ ถนนกาญจนาภิเษก ตำบลบ้านบุ อำเภอกาญจนดิษฐ์ จังหวัดสุราษฎร์ธานี ขอเปลี่ยนแปลงบุคลากรของห้องปฏิบัติการวิเคราะห์ ความละเอียดแจ้งแล้ว นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว เห็นชอบให้เพิ่มเจ้าหน้าที่ห้องปฏิบัติการวิเคราะห์เอกชน จำนวน ๓ ราย ได้แก่

- | | |
|-------------------------|----------------------------|
| ๑) นายสุรภรณ์ เกษตรกลาง | ทะเบียนเลขที่ ๖-๒๖๗-๖-๐๐๒๐ |
| ๒) นายพลเทพ สืบแก้ว | ทะเบียนเลขที่ ๖-๒๖๗-๖-๐๐๒๑ |
| ๓) นายอนุชา คุ้มทอง | ทะเบียนเลขที่ ๖-๒๖๗-๖-๐๐๒๒ |

อนึ่ง หนังสือเห็นชอบฉบับนี้จะมีผลย้อนอายุพร้อมหนังสือขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชนในวันที่ ๑๖ สิงหาคม ๒๕๖๗ ทั้งนี้ หากประสงค์จะต่ออายุ สามารถยื่นคำขอผ่านระบบอิเล็กทรอนิกส์ได้ทั้งนี้เว็บไซต์กรมโรงงานอุตสาหกรรม

จึงเรียนมาเพื่อทราบ

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โทร. ๐ ๗๔๓๒ ๕๐๒๙, ๐ ๗๔๔๙ ๐๖๓๔ ต่อ ๕๒๐๑
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"อุตสาหกรรมก้าวไกล ประเทศไทยก้าวหน้า ร่วมกันพัฒนา อุตสาหกรรมสีเขียว"



ที่ อก ๐๓๑๐(๕)/ ๑๐๕



กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๕๐๐

๐๗ มกราคม ๒๕๖๘

เรื่อง เปลี่ยนแปลงบุคลากรและสารมลพิษที่วิเคราะห์

เรียน กรรมการผู้จัดการ บริษัท เอนแอล แลบริทอรี่ กรุ๊ป (ประเทศไทย) จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน ลงวันที่ ๒ ธันวาคม ๒๕๖๗

สิ่งที่ส่งมาด้วย เอกสารแนบท้ายหนังสือเปลี่ยนแปลงบุคลากรและสารมลพิษที่วิเคราะห์ บริษัท เอนแอล แลบริทอรี่ กรุ๊ป (ประเทศไทย) จำกัด จำนวน ๒ แผ่น

ตามคำขอฯ ที่อ้างถึง บริษัท เอนแอล แลบริทอรี่ กรุ๊ป (ประเทศไทย) จำกัด ห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ๖-๒๖๗ สถานที่ตั้งเลขที่ ๑๑๔/๑ หมู่ที่ ๘ ถนนกาญจนาภิเษก ตำบลบ้านบุ อำเภอกาญจนดิษฐ์ จังหวัดสุราษฎร์ธานี ขอเปลี่ยนแปลงบุคลากรและสารมลพิษที่วิเคราะห์ ต่อกรมโรงงานอุตสาหกรรม นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว มีความเห็นดังนี้

๑. ให้อยกเลิกเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๑ ราย ได้แก่

นางสาวอินทิรา คงประยูร ทะเบียนเลขที่ ๖-๒๖๗-๖-๐๐๐๓

๒. ให้เพิ่มขอบข่ายชนิดสารมลพิษที่วิเคราะห์ในน้ำ/น้ำเสีย และน้ำใต้ดิน ตามสิ่งที่ส่งมาด้วย

อนึ่ง หนังสือฉบับนี้จะมีผลย้อนอายุพร้อมหนังสือขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ในวันที่ ๑๖ สิงหาคม ๒๕๖๘

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นายธีรศักดิ์ อิศรางกูร ณ อยุธยา)
รองอธิบดี ปฏิบัติราชการแทน
อธิบดีกรมโรงงานอุตสาหกรรม

กองวิจัยและเตือนภัยมลพิษโรงงาน

ศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคใต้

โทร. ๐ ๗๔๓๒ ๕๐๒๙, ๐ ๗๔๔๙ ๐๖๓๔ ต่อ ๕๒๐๑

อีเมล: sirw@diw.mail.go.th



"อุตสาหกรรมก้าวไกล ประเทศไทยก้าวหน้า ร่วมกันพัฒนา อุตสาหกรรมสีเขียว"



เอกสารแนบท้ายหนังสือเปลี่ยนแปลงบุคลากรและสารมลพิษที่วิเคราะห์

บริษัท เอนแอล แลบริทอรี่ กรุ๊ป (ประเทศไทย) จำกัด

เลขทะเบียน ๖-๒๖๗

ที่ อก ๐๓๑๐(๕)/ ๑๐๕

ลงวันที่ ๐๗ มกราคม ๒๕๖๘

ขอขยายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๓๙ รายการ

น้ำ/น้ำเสีย จำนวน ๑ รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Total Kjeldahl Nitrogen	Semi-Micro-Kjeldahl Methods

น้ำใต้ดิน จำนวน 18 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Antimony	Digestion, Inductively Coupled Plasma/Mass Spectrometric Method
2	Arsenic	Digestion, Inductively Coupled Plasma/Mass Spectrometric Method
3	Barium	Digestion, Inductively Coupled Plasma/Mass Spectrometric Method
4	Beryllium	Digestion, Inductively Coupled Plasma/Mass Spectrometric Method
5	Cadmium	Digestion, Inductively Coupled Plasma/Mass Spectrometric Method
6	Chromium	Digestion, Inductively Coupled Plasma/Mass Spectrometric Method
7	Chromium (III)	Digestion, Inductively Coupled Plasma/Mass Spectrometric Method; Colorimetric Method; Calculation
8	Chromium (VI)	Filtration, Colorimetric Method
9	Lead	Digestion, Inductively Coupled Plasma/Mass Spectrometric Method
10	Manganese	Digestion, Inductively Coupled Plasma/Mass Spectrometric Method
11	Mercury	Digestion, Inductively Coupled Plasma/Mass Spectrometric Method
12	Nickel	Digestion, Inductively Coupled Plasma/Mass Spectrometric Method

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
13	pH	Electrometric Method
14	Phenol	Distillation, Direct Photometric Method
15	Selenium	Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method
16	Silver	Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method
17	Vanadium	Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method
18	Zinc	Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method

เอกสารอ้างอิง

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